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COMMISSION

Kentucky Power
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Frankfort, KY 40602-5190
KentuckyPower.com

Jeff R. Derouen, Executive Director
Kentucky Public Service Commission
P. O. Box 615
211 Sower Boulevard
Frankfort, KY 40602

August 15, 2011

Dear Mr. Derouen:

Re: Case No. 2011-_______________

In the Matter of the Joint Application Pursuant to 1994 House Bill No. 501 for the Approval of Kentucky Power Company Collaborative Demand-Side Management Programs, and for Authority to Implement a Tariff to Recover Costs, Net Lost Revenues and Receive Incentives associated with the Implementation of the Kentucky Power Company Collaborative Demand-Side Management Programs.

Pursuant to the Commission's Order dated May 22, 1996, enclosed are an original and ten copies of the Joint Applicants' status report. This report describes the operation and progress of the Demand-Side Management Plan.

The Joint Applicants seek authority for Kentucky Power Company or KPCo, in conjunction with its utility services and pursuant to the 1994 House Bill No. 501, to implement the enclosed revised electric tariff to recover costs associated with the implementation of demand-side management programs, which include net lost revenues and incentives related to those programs.

The DSM Collaborative is requesting Commission approval to significantly decrease annual participation levels for the following programs. The actual participant levels for the first half of 2011 were lower than expected. As a result, a decrease in annual participants based on a revised projection for the last half of the year was prudent.

- Small Commercial AC HP Program from 120 to 65 participants per year.
- Residential & Commercial Load Management Program from 1,040 to 550 participants per year.

In this filing, the DSM Collaborative is requesting Commission approval for a three-year extension of Kentucky Power's Targeted Energy Efficiency, Community Outreach CFL, Energy Education for Students, Mobile Home Heat Pump, Mobile Home New Construction, and High Efficiency Heat Pump programs through 2014. Evaluation reports for the first two years of the previous three-year extension (2009–2010) have been provided to justify the continuation of the programs.

The DSM Collaborative is also requesting Commission approval in this filing, for a two-year extension of the Kentucky Power Modified Energy Fitness Program. A program evaluation report is recommended for development beginning January 1st through June 30th, 2013, based on the program operation for years 2011 and 2012. The evaluation reports for the first two years of the previous three-year extension (2009–2010) have been provided to justify the continuation of the program.

The DSM collaborative recommends 2012 Evaluation, Measurement, and Verification, or EM&V, services for 5 DSM programs to be provided by an external vendor. The EM&V services will begin October 2011 with the evaluation report to be developed through June 30, 2012. The evaluation reports will be filed with the August 15, 2012 filing for the following 5 programs; Residential Efficient Products, Commercial High Efficiency Heat Pump/Air Conditioner, Residential and Commercial HVAC Diagnostic and Tune-up, Commercial Incentive, and Residential and Commercial Load Management programs.

The revised DSM Adjustment clause factor for the residential sector has been agreed upon and is proposed by the DSM Collaborative (see Exhibit C, Column 4, Line 13). The proposed factor for the residential sector is the midpoint between the ceiling and the floor calculations as demonstrated on Exhibit C. The floor was calculated by taking the Collaborative projected remaining fourth quarter position (see Exhibit C, Column 4 Line 2) and dividing by the adjusted estimated sector KWH sales for the remaining fourth quarter (see Exhibit C, Column 4, Line 11). The ceiling was calculated by taking the Collaborative projected remaining fourth quarter position (see Exhibit C, Column 4, Line 4) and dividing by the adjusted estimated sector KWH sales for the remaining fourth quarter (see Exhibit C, Column 4, Line 11).

The revised DSM Adjustment clause factor for the commercial sector has been agreed upon and is proposed by the DSM Collaborative (see Exhibit C, Column 4, Line 26). The proposed factor for the commercial sector is the midpoint between the ceiling and the floor calculations as demonstrated on Exhibit C. The floor was calculated by taking the Collaborative projected remaining fourth quarter position (see Exhibit C, Column 4, Line 16) and dividing by the adjusted estimated sector KWH sales for the remaining fourth quarter (see Exhibit C, Column 4, Line 24). The ceiling was calculated by taking the Collaborative projected remaining fourth quarter position (see Exhibit C, Column 4, Line 18) and dividing by the adjusted estimated sector KWH sales for the remaining fourth quarter (see Exhibit C, Column 4, Line 24).

The Joint Applicants request the Commission to approve the following:

(1) A three-year extension of the Targeted Energy Efficiency, Community Outreach CFL, Energy Education for Students, Mobile Home Heat Pump, Mobile Home New Construction, and High Efficiency Heat Pump programs.

(2) A two-year extension of the Modified Energy Fitness program.

(3) The reduced participant levels for the Residential & Commercial Load Management Program and Small Commercial AC HP Program.

(4) The DSM Electric Tariff to become effective September 28, 2011. This will allow the Company to utilize the new residential and commercial factors with the first billing cycle in October 2011.

As is customary, the Company requests the Commission return a stamped copy of the revised tariff sheet upon arrival. If you have any questions, please contact me at (502) 696-7010.

Sincerely,

Lila P. Munsey

Lila P. Munsey
Manager, Regulatory Services

enclosure

KENTUCKY POWER COMPANY
Demand Side Management
Status Report
As of June 30, 2011

INDEX

DEFINITIONS

1) YTD Costs - Year-to-Date costs recorded through June 30, 2011.
2) YTD Impacts - Estimated in place load impacts for Year-to-Date participants.
3) PTD Costs - Costs recorded from the inception of the program through June 30, 2011
4) PTD Impacts - Estimated in place load impacts for Program-to-Date participants.

COMMENTS

Our calculations are based on actual participants and costs as of June 30, 2011. The Residential DSM costs in this status report do not agree with the total costs in the Financial Report due to a one month lag in reporting.

The estimated actual in-place energy (kWh) savings is the summation of the monthly average net energy savings associated with participating customers of each DSM program (including T&D losses). The average monthly net energy savings is the product of 1/12 of the annual kWh per participant (shown in Exhibit E) and 1/2 of the new participants for the current month, plus the cumulative participants from the previous months. The average monthly net energy savings is then increased by 10% to include T&D losses. The estimated actual in-place energy (kWh) savings are calculated in accordance with the Sunset Provision contained in the joint application, filed September 27, 1995.

The estimated anticipated peak demand (kW) reduction is a product of the number of net participating customers (excluding free riders) and projected winter/summer demand reductions filed for each program (refer to Section III to V of the joint application). The anticipated peak demand (kW) reductions includes 11% T&D loss savings.

The calculation of YTD and PTD estimated in place energy (kWh) savings and anticipated peak demand (kW) reductions contained in this status report reflect, wherever applicable, the program evaluation results of each individual program as described in the August 16, 1999, June 30, 2002, June 30, 2005, June 30, 2008, June 30, 2010, and August 15, 2011 DSM collaborative report.

The individual DSM lost revenue, efficiency incentive and maximizing incentives as of June 30, 1997 are calculated based on the initial values from Exhibit E in the joint application, filed September 27, 1995. A retroactive adjustment of the initial values of the efficiency incentives and net lost revenue KWH impacts was used for each program for the first eighteen months (1/1/96 to 6/30/97). The lost revenue, efficiency incentive and maximizing incentive for the period 1/1/2011 to 12/31/2011 are calculated using the revised values contained in Schedule C of this status report.

The program lost revenue is the product of the number of participating customers, the average net energy savings (kWh) per customer and the net lost revenue ($/kWh). The number of participating customers is equal to 1/2 of the new participants for the current month, plus the cumulative participants from the previous months. The program-to-date lost revenues are calculated in accordance with the Sunset Provision contained in the joint application, filed September 27, 1995.

The efficiency incentive is the product of the number of participants for the month and the efficiency rate ($/participant). The maximizing incentive is calculated as 5% of actual program cost for the month.

KENTUCKY POWER COMPANY
SUMMARY INFORMATION (ALL PROGRAMS)
As of June 30, 2011

DESCRIPTION	YTD	PTD
Total Revenue Collected	$2,159,716	$19,104,829
Total Program Costs	788,106	12,600,290
Total Lost Revenues	258,694	4,375,063
Total Efficiency / Maximizing Incentive	137,209	1,485,904
HEAP - Kentucky Power's Information Technology Implementation Costs (Case No 2006 - 00373, Dated December 14, 2006)	0	58,968
HEAP - KACA's Information Technology Implementation Costs	0	15,700
Total DSM Costs As of June 30, 2011	$1,184,009	$18,535,925

KENTUCKY POWER COMPANY
SUMMARY INFORMATION (ALL PROGRAMS)
As of June 30, 2011

DESCRIPTION	YTD		PTD	
Actual In-Place Energy Savings:	3,098,615	kWh	637,549,877	kWh
w/ T&D Line Losses:	3,408,477	kWh	701,304,865	kWh
Total kW Reductions:				
Winter	805	kW	23,616	kW
w/ T&D Line Losses:	893	kW	26,214	kW
Summer	1,150	kW	6,246	kW
w/ T&D Line Losses:	1,276	kW	6,933	kW

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Targeted Energy Fitness**
PARTICIPANT DEFINITION:	Number of Households
CUSTOMER SECTOR:	Residential - Low Income
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	All Electric	Non All Electric
Jan	13	2
Feb	24	0
Mar	21	1
Apr	15	1
May	14	2
Jun	23	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**110**	**6**
PTD	**3,180**	**1,056**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	**221,796**	**100,016,701**
Anticipated Peak Demand (kW) Reduction:		
Summer	**36**	**686**
Winter	**63**	**2,986**

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	6,922.00	0.00	260,249.00
Equipment/Vendor:	70,042.00	0.00	3,242,317.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	9,553.00
Total Program Costs	**76,964.00**	**0.00**	**3,512,119.00**
Lost Revenues:	**54,465.00**	**1,944.00**	**737,287.00**
Efficiency Incentive:	**16,253.00**	**184.00**	**99,902.00**
Maximizing Incentive:	**42.00**	**0.00**	**123,239.00**
Total Costs	**147,724.00**	**2,128.00**	**4,472,547.00**

COMMENTS:

The Targeted Energy Efficiency Program provides a variety of services, including a home energy audit, weatherization and seal-up to targeted low income customers.

The Equipment / Vendor cost categories includes the cost of labor and materials of measures installed, participant energy education costs and vendor administration costs. The YTD costs are $76,123 for all-electric and $841 for non-all-electric homes.

The YTD Estimated in Place Energy (kWh) Savings for all-electric participants and non-all-electric participants is 215,376 and 6,420 respectively.

The YTD Anticipated Peak Demand (kW) Reduction summer/winter for all-electric and non-all-electric participants is 34/62 and 1/1 respectively.

The YTD Lost Revenue for all-electric participants and non-all-electric participants is $49,111 and $5,354 respectively.

The YTD Efficiency Incentive for all-electric participants is $16,253.
The YTD Maximizing Incentive for non-all-electric participants is $42.

The projected participant and budgetary level for 2011 is 350 all-electric homes, 55 non-all-electric homes and $400,000.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**High Efficiency Heat Pump - Mobile Home**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

Jan	19
Feb	10
Mar	9
Apr	18
May	27
Jun	11
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	94
PTD	2,374

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	144,760	97,870,349
Anticipated Peak Demand (kW) Reduction:		
Summer	48	381
Winter	79	3,997

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	5,748.00	0.00	52,122.00
Equipment/Vendor:	4,650.00	0.00	70,155.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	36,800.00	0.00	1,014,000.00
Other Costs:	0.00	0.00	1,167.00
Total Program Costs	**47,198.00**	**0.00**	**1,137,444.00**
Lost Revenues:	**35,657.00**	**5,820.00**	**515,159.00**
Efficiency Incentive:	**27,615.00**	**18,331.00**	**213,023.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**110,470.00**	**24,151.00**	**1,865,626.00**

COMMENTS:

The High Efficiency Heat Pump - Mobile Home program provides incentives to customers, encouraging them to install the highest efficiency equipment practical.

The projected participant and budgetary level for 2011 is 230 and $113,500 respectively.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Mobile Home New Construction**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	Heat Pump	Air Conditioner
Jan	17	0
Feb	2	0
Mar	18	0
Apr	12	0
May	12	0
Jun	7	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**68**	**0**
PTD	**2,213**	**2**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	123,209	145,687,038
Anticipated Peak Demand (kW) Reduction:		
Summer	34	637
Winter	18	5,105

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	6,150.00	0.00	36,444.00
Equipment/Vendor:	3,600.00	0.00	133,563.00
Promotional:	0.00	0.00	3,939.00
Customer Incentives:	36,500.00	0.00	1,117,950.00
Other Costs:	0.00	0.00	4,616.00
Total Program Costs	**46,250.00**	**0.00**	**1,296,512.00**
Lost Revenues:	**26,205.00**	**0.00**	**574,587.00**
Efficiency Incentive:	**6,393.00**	**0.00**	**164,170.00**
Maximizing Incentive:	**0.00**	**0.00**	**2,580.00**
Total Costs	**78,848.00**	**0.00**	**2,037,849.00**

COMMENTS:

The Collaborative has devised and implemented a plan in conjunction with trade allies to offer a financial incentive to new mobile home buyers and trade allies to encourage the installation of high efficiency heat pumps and upgraded insulation packages in new mobile homes.

The revised projected participant and budgetary level for 2011 is 205 heat pumps and $123,000 respectively.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Modified Energy Fitness**
PARTICIPANT DEFINITION:	Number of Audits
CUSTOMER SECTOR:	*Residential*
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

Jan	88
Feb	88
Mar	120
Apr	101
May	120
Jun	128
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	**645**
PTD	**7,635**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	476,786	97,445,347
Anticipated Peak Demand (kW) Reduction:		
Summer	-21	1,037
Winter	172	4,240

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	4,393.00	0.00	31,499.00
Equipment/Vendor:	197,564.00	0.00	2,739,342.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	21,547.00	0.00	21,547.00
Total Program Costs	**223,504.00**	**0.00**	**2,792,388.00**
Lost Revenues:	**49,469.00**	**0.00**	**709,136.00**
Efficiency Incentive:	**9,456.00**	**0.00**	**299,990.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**282,429.00**	**0.00**	**3,801,514.00**

COMMENTS:

The Modified Energy Fitness program provides energy audits, blower door testing, duct sealing and direct installation of low cost conservation measures to residential customers with electric space heating and electric water heating.

The equipment / vendor cost category includes the cost of labor and materials of measures installed, the cost of promotion by the vendor and vendor administration costs including customer education.

The projected participants for 2011 is 1,211 at a budgeted expense of $455,000.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**High Efficiency Heat Pumps**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	Resistance	Non Resistance
Jan	28	53
Feb	24	20
Mar	26	20
Apr	18	17
May	28	47
Jun	30	55
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**154**	**212**
PTD	**497**	**938**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	356,815	4,582,224
Anticipated Peak Demand (kW) Reduction:		
Summer	29	209
Winter	228	1,690

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	11,849.00	0.00	11,849.00
Equipment/Vendor:	16,850.00	0.00	95,400.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	132,000.00	0.00	532,100.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**160,699.00**	**0.00**	**639,349.00**
Lost Revenues:	**45,993.00**	**0.00**	**108,411.00**
Efficiency Incentive:	**37,063.00**	**0.00**	**201,052.00**
Maximizing Incentive:	**0.00**	**0.00**	**17,177.00**
Total Costs	**243,755.00**	**0.00**	**965,989.00**

COMMENTS:

This program was implemented to reduce residential electric consumption by replacing older, less efficient electric heating systems with high efficiency heat pumps. Customers are provided an incentive encouraging them to promote the highest efficiency equipment practical.

The YTD Estimated in Place Energy (kWh) Savings for resistance heat replacement and non-resistance heat replacement participants is 190,307 and 166,508, respectively.

The YTD Anticipated Peak Demand (kW) Reduction summer/winter for resistance heat replacement and non-resistance heat replacement participants is 0/89 and 0/139 respectively

The YTD Lost Revenue for resistance heat replacement and non-resistance heat replacement participants is $13,725 and $32,268 respectively.

The Efficiency Incentive for resistance heat replacement participants is $12,030 and for the non-resistance heat replacement participants is $25,033.

The projected participants and budgeted expense for 2011 is 272 resistance heat replacement customers, 500 non-resistance heat replacement customers and $363,300 respectively.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Community Outreach Compact Fluorescent Lamp**
PARTICIPANT DEFINITION:	Number of Customers
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

Jan	0
Feb	29
Mar	252
Apr	234
May	1,187
Jun	816
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	**2,518**
PTD	**11,073**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	**79,670**	**888,711**
Anticipated Peak Demand (kW) Reduction:		
Summer	**145**	**155**
Winter	**137**	**355**

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	9,605.00	0.00	18,411.00
Equipment/Vendor.	40,154.00	0.00	107,356.00
Promotional:	420.00	0.00	13,966.00
Administration:	0.00	0.00	1,699.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**50,179.00**	**0.00**	**141,432.00**
Lost Revenues:	**15,695.00**	**0.00**	**62,652.00**
Efficiency Incentive:	**9,871.00**	**0.00**	**52,561.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**75,745.00**	**0.00**	**256,645.00**

COMMENTS:

The Community Outreach Compact Fluorescent Lighting (CFL) program is designed to educate and influence residential customers to purchase and use compact fluorescent lighting in their homes. A package of 4 high efficiency CFLs are distributed to customers at scheduled community outreach events.

The projected participant and budgetary level for 2011 is 4,800 customers and $60,500, respectively.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Energy Education For Students**
PARTICIPANT DEFINITION:	Number of Students
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	
Jan	237
Feb	81
Mar	163
Apr	0
May	457
Jun	0
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	**938**
PTD	**3,615**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	59,194	348,016
Anticipated Peak Demand (kW) Reduction:		
Summer	56	59
Winter	34	103

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	6,081.00	0.00	10,260.00
Equipment/Vendor:	5,554.00	0.00	34,757.00
Promotional:	0.00	0.00	0.00
Education Workshops	0.00	0.00	10,000.00
Administration	0.00	0.00	4,562.00
Total Program Costs	**11,635.00**	**0.00**	**59,579.00**
Lost Revenues:	**5,579.00**	**0.00**	**17,084.00**
Efficiency Incentive:	**1,613.00**	**0.00**	**14,944.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**18,827.00**	**0.00**	**91,607.00**

COMMENTS:

The Energy Education for Students program is designed to partner with the National Energy Education Development Project (NEED) to implement an energy education program for 7th grade students at participating middle schools. The students will be provided a package of four 23 watt CFLs to install in their homes. The program will influence residential customers to purchase and use compact fluorescent lighting in their homes.

The projected participant and budgetary level for 2011 is 2,000 students and $31,000.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Residential HVAC Diagnostic and Tune-up**
PARTICIPANT DEFINITION.	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	Heat Pump	Air Conditioner
Jan	13	0
Feb	12	0
Mar	72	13
Apr	98	13
May	50	14
Jun	45	24
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**290**	**64**
PTD	**318**	**64**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	175,909	175,909
Anticipated Peak Demand (kW) Reduction:		
Summer	70	70
Winter	66	66

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor:	12,050.00	0.00	13,500.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	12,100.00	0.00	13,500.00
Administration:	0.00	0.00	0.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**24,150.00**	**0.00**	**27,000.00**
Lost Revenues:	3,326.00	1,944.00	3,390.00
Efficiency Incentive:	3,384.00	184.00	3,703.00
Maximizing Incentive:	0.00	0.00	0.00
Total Costs	30,860.00	2,128.00	34,093.00

COMMENTS:

The Residential HVAC Diagnostic and Tune-up Program provides incentives to customers for a variety of HVAC services including over and under refrigerant charge and other diagnostic performance checks on residential unitary central air conditioning and heat pump units.

The projected participant and revised budgetary level for 2011 is 180 central air conditioners and 400 heat pumps at a budgeted program expense of $63,780.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Residential Load Management**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	A/C Switches	Water Heater SW
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**0**	**0**
PTD	**0**	**0**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	0	0
Anticipated Peak Demand (kW) Reduction:		
Summer	0	0
Winter	0	0

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor:	0.00	0.00	0.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**0.00**	**0.00**	**0.00**
Lost Revenues:	**0.00**	**0.00**	**0.00**
Efficiency Incentive:	**0.00**	**0.00**	**0.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**0.00**	**0.00**	**0.00**

COMMENTS:

The Residential Load Management Program will determine whether peak demand can be effectively reduced through the installation of load control devices on central air conditioners, heat pumps, and/or electric water heaters.

The projected participant and budgetary level for 2011 is 250 air conditioners or heat pumps and 250 water heating switches at $260,650 respectively. The vendor contract was effective on June 1, 2011 with program participants targeted for remainder of year.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Residential Efficient Products**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	CFL	Specialty Bulbs	LED Lights
Jan	0	0	0
Feb	0	0	0
Mar	3,299	0	0
Apr	23,439	0	0
May	29,148	0	0
Jun	21,878	0	0
Jul	0	0	0
Aug	0	0	0
Sep	0	0	0
Oct	0	0	0
Nov	0	0	0
Dec	0	0	0
YTD	**77,764**	**0**	**0**
PTD	**77,764**	**0**	**0**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	1,734,741	1,734,741
Anticipated Peak Demand (kW) Reduction:		
Summer	863	863
Winter	86	86

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor:	41,694.00	0.00	41,694.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	100,383.00	0.00	100,383.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**142,077.00**	**0.00**	**142,077.00**
Lost Revenues:	**20,573.00**	**0.00**	**20,573.00**
Efficiency Incentive:	**24,107.00**	**0.00**	**24,107.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**186,757.00**	**0.00**	**186,757.00**

COMMENTS:

The Residential Efficient Products Program will provide incentives and marketing support through retailers to build market share and usage of ENERGY STAR lighting products. Designed to produce long-term energy savings in the residential sector by increasing the market share of ENERGY STAR CFLs and (or) other ENERGY STAR lighting products.

The projected levels for 2011 is 135,945 ENERGY STAR CFLs and 800 other lighting products
The budgeted expense for 2011 $367,876.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Energy Fitness - Inactive**
PARTICIPANT DEFINITION:	Number of Households
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

Jan	0
Feb	0
Mar	0
Apr	0
May	0
Jun	0
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	**0**
PTD	**2,812**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	0	55,360,221
Anticipated Peak Demand (kW) Reduction:		
Summer	0	441
Winter	0	1,932

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	18,189.00
Equipment/Vendor:	0.00	0.00	665,964.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	960.00
Total Program Costs	**0.00**	**0.00**	**685,113.00**
Lost Revenues:	**0.00**	**(19,322.00)**	**363,029.00**
Efficiency Incentive:	**0.00**	**(46,349.00)**	**63,482.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**0.00**	**(65,671.00)**	**1,111,624.00**

COMMENTS:

This program was discontinued May 14, 1999.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Compact Fluorescent Bulb - Inactive**
PARTICIPANT DEFINITION:	Number of Bulbs Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	
Jan	0
Feb	0
Mar	0
Apr	0
May	0
Jun	0
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	**0**
PTD	**269**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	0	280,416
Anticipated Peak Demand (kW) Reduction:		
Summer	0	3
Winter	0	3

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	60.00
Equipment/Vendor:	0.00	0.00	15,021.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**0.00**	**0.00**	**15,081.00**
Lost Revenues:	**0.00**	**25.00**	**1,605.00**
Efficiency Incentive:	**0.00**	**8.00**	**433.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**0.00**	**33.00**	**17,119.00**

COMMENTS:

This program was discontinued December 31, 1996

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**High Efficiency Heat Pumps Retro - Inactive**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	Resistance	Non Resistance
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**0**	**0**
PTD	**1,367**	**929**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	0	71,026,985
Anticipated Peak Demand (kW) Reduction:		
Summer	0	851
Winter	0	2,995

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	12,885.00
Equipment/Vendor:	0.00	0.00	129,767.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	70,500.00
Other Costs:	0.00	0.00	1,160.00
Total Program Costs	***0.00***	***0.00***	***214,312.00***
Lost Revenues:	0.00	(269.00)	368,960.00
Efficiency Incentive:	0.00	(2,196.00)	48,017.00
Maximizing Incentive:	0.00	0.00	5.00
Total Costs	0.00	(2,465.00)	631,294.00

COMMENTS:

This program was discontinued December 31, 2001.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Commercial HVAC Diagnostic and Tune-up**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	Heat Pump	Air Conditioner
Jan	0	0
Feb	0	0
Mar	6	0
Apr	3	0
May	6	0
Jun	3	1
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**18**	**1**
PTD	**19**	**1**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	22,481	22,481
Anticipated Peak Demand (kW) Reduction:		
Summer	10	10
Winter	7	7

Costs Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor:	500.00	0.00	550.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	800.00	0.00	875.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**1,300.00**	**0.00**	**1,425.00**
Lost Revenues:	424.00	0.00	424.00
Efficiency Incentive:	539.00	0.00	569.00
Maximizing Incentive:	0.00	0.00	0.00
Total Costs	2,263.00	0.00	2,418.00

COMMENTS:

The Commercial HVAC Diagnostic and Tune-up Program provides a variety of HVAC services, including diagnostic performance checks on commercial unitary central air conditioning and heat pump units.

The Equipment / Vendor cost includes the cost of incentives for participating HVAC dealers promotion of the program. The customer incentives are $75 per program participant. YTD cost for the program are $0 for central air conditioning and $1,300 for heat pump.

The projected participant and budgetary level for 2011 is 60 central air conditioners and 40 heat pumps and $24,120 respectively.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Commercial Load Management**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	Heat Pump	Air Conditioner
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**0**	**0**
PTD	**0**	**0**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	**0**	**0**
Anticipated Peak Demand (kW) Reduction:		
Summer	**0**	**0**
Winter	**0**	**0**

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor:	0.00	0.00	0.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**0.00**	**0.00**	**0.00**
Lost Revenues:	**0.00**	**0.00**	**0.00**
Efficiency Incentive:	**0.00**	**0.00**	**0.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**0.00**	**0.00**	**0.00**

COMMENTS:

The Commercial Load Management Program will determine whether peak demand can be effectively reduced through the installation of load control devices on central air conditioners, heat pumps, and/or electric water heaters.

The projected participant and budgetary level for 2011 is 25 A/C and 25 water heating switches and $28,976 respectively. The vendor contract was effective on June 1, 2011 with program participants targeted for remainder of year.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Commercial High Efficiency HP/AC**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	Heat Pump	Air Conditioner
Jan	0	0
Feb	0	0
Mar	0	0
Apr	5	0
May	6	1
Jun	4	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**15**	**1**
PTD	**15**	**1**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	13,116	13,116
Anticipated Peak Demand (kW) Reduction:		
Summer	6	6
Winter	3	3

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor.	600.00	0.00	600.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	3,550.00	0.00	3,550.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**4,150.00**	**0.00**	**4,150.00**
Lost Revenues:	**1,308.00**	**0.00**	**1,308.00**
Efficiency Incentive:	**873.00**	**0.00**	**873.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**6,331.00**	**0.00**	**6,331.00**

COMMENTS:

The Commercial High Efficiency Heat Pump/Air Conditioner program offers financial incentive to small commercial customers (< 100 kW demand) who upgrade to a new qualifying central air conditioner or heat pump with a Consortium for Energy Efficiency (CEE) rating. Applicable for 5 ton units or less.

The Equipment / Vendor cost includes incentive payments for participating HVAC dealers. Customer incentives are included with the program and a promotional expense of $12,000 is included with the 2011 budget with newspaper advertisement beginning in July.

The projected participant and budgetary level is revised for 2011 to include 25 central air conditioners and an increase to 40 heatpumps with a program budget of $47,100. The revised budget includes an increase for 2011 evaluation expense from $2,000 to $5,305.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Commercial Incentive**
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	
Jan	0
Feb	0
Mar	0
Apr	0
May	0
Jun	0
Jul	0
Aug	0
Sep	0
Oct	0
Nov	0
Dec	0
YTD	**0**
PTD	**0**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	**0**	**0**
Anticipated Peak Demand (kW) Reduction:		
Summer	**0**	**0**
Winter	**0**	**0**

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	0.00
Equipment/Vendor:	0.00	0.00	0.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**0.00**	**0.00**	**0.00**
Lost Revenues:	**0.00**	**0.00**	**0.00**
Efficiency Incentive:	**0.00**	**0.00**	**0.00**
Maximizing Incentive:	**0.00**	**0.00**	**0.00**
Total Costs	**0.00**	**0.00**	**0.00**

COMMENTS:

The Commercial Incentive program offers energy savings for all commercial business customers through promotion of high efficiency electric lighting, HVAC, pumps, and motors. Primary objectives include; increasing the market share and installation rate of high efficiency technologies, and improving the operating efficiencies of existing long life equipment for commercial customers.

The projected participant and budgetary level for 2011 is 88 customers and $910,560.
The vendor contract was effective February 1, 2011 and the program is continuing to acquire new customers with program energy savings to be recorded following verification of customer installed projects.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Smart Audit - Commercial - Inactive**
PARTICIPANT DEFINITION:	Number of Audits
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	Class I	Class II
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	**0**
YTD	**0**	**0**
PTD	**1,952**	**194**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	n/a	n/a
Anticipated Peak Demand (kW) Reduction:		
Summer	n/a	n/a
Winter	n/a	n/a

Costs			
		Retroactive	
Description	Year-To-Date	Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	30,661.00
Equipment/Vendor:	0.00	0.00	1,268,176.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	0.00	0.00	(8,156.00)
Total Program Costs	**0.00**	**0.00**	**1,290,681.00**
Lost Revenues:	**0.00**	**0.00**	**0.00**
Efficiency Incentive:	**0.00**	**0.00**	**0.00**
Maximizing Incentive:	**0.00**	**0.00**	**64,533.00**
Total Costs	**0.00**	**0.00**	**1,355,214.00**

COMMENTS:

This program was discontinued December 31, 2002.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Smart Incentive - Commercial - Inactive**
PARTICIPANT DEFINITION:	Number of Incentives
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	Existing Building	New Building
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**0**	**0**
PTD	**182**	**69**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	0	125,682,085
Anticipated Peak Demand (kW) Reduction:		
Summer	0	1,519
Winter	0	2,640

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	144,039.00
Equipment/Vendor:	0.00	0.00	21,504.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	399,592.00
Other Costs:	0.00	0.00	691.00
Total Program Costs	**0.00**	**0.00**	**565,826.00**
Lost Revenues:	0.00	442.00	891,458.00
Efficiency Incentive:	0.00	1,078.00	88,039.00
Maximizing Incentive:	0.00	0.00	281.00
Total Costs	0.00	1,520.00	1,545,604.00

COMMENTS:

This program was discontinued December 31, 2002.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION	
PROGRAM:	**Smart Audit - Industrial - Inactive**
PARTICIPANT DEFINITION:	Number of Audits
CUSTOMER SECTOR:	Industrial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants	Class I	Class II
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**0**	**0**
PTD	**60**	**4**

Impacts	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	n/a	n/a
Anticipated Peak Demand (kW) Reduction:		
Summer	n/a	n/a
Winter	n/a	n/a

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	5,741.00
Equipment/Vendor:	0 00	0.00	37,786 00
Promotional:	0 00	0.00	0.00
Customer Incentives:	0 00	0.00	0.00
Other Costs:	0 00	0 00	161.00
Total Program Costs	**0.00**	**0.00**	**43,688.00**
Lost Revenues:	**0.00**	**0.00**	**0.00**
Efficiency Incentive:	**0.00**	**0.00**	**0.00**
Maximizing Incentive:	**0.00**	**0.00**	**2,186.00**
Total Costs	**0.00**	**0.00**	**45,874.00**

COMMENTS:

This program was discontinued December 31, 1998.

KENTUCKY POWER COMPANY

PROGRAM INFORMATION

PROGRAM:	**Smart Incentive - Industrial - Inactive**
PARTICIPANT DEFINITION:	Number of Incentives
CUSTOMER SECTOR:	Industrial
REPORTING PERIOD:	January 1, 2011 - December 30, 2011

New Participants

	General	Compressed Air
Jan	0	0
Feb	0	0
Mar	0	0
Apr	0	0
May	0	0
Jun	0	0
Jul	0	0
Aug	0	0
Sep	0	0
Oct	0	0
Nov	0	0
Dec	0	0
YTD	**0**	**0**
PTD	**1**	**0**

Impacts

	Year-To-Date	Program-To-Date
Estimated in Place Energy (kWh) Savings	0	170,525
Anticipated Peak Demand (kW) Reduction:		
Summer	0	6
Winter	0	6

Costs

Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	0.00	0.00	28,385.00
Equipment/Vendor:	0.00	0.00	3,288.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	441.00
Other Costs:	0.00	0.00	0.00
Total Program Costs	**0.00**	**0.00**	**32,114.00**
Lost Revenues:	**0.00**	**0.00**	**0.00**
Efficiency Incentive:	**0.00**	**0.00**	**383.00**
Maximizing Incentive:	**0.00**	**0.00**	**655.00**
Total Costs	**0.00**	**0.00**	**33,152.00**

COMMENTS:

This program was discontinued December 31, 1998.

TARIFF D.S.M.C.
(DEMAND-SIDE MANAGEMENT ADJUSTMENT CLAUSE) (Cont'd.)

RATE. (Cont'd.)

5. The DSM adjustment shall be filed with the Commission ten (10) days before it is scheduled to go into effect, along with all the necessary supporting data to justify the amount of the adjustments, which shall include data, and information as may be required by the Commission.

6. Copies of all documents required to be filed with the Commission under this regulation shall be open and made available for public inspection at the office of the Public Service Commission pursuant to the provisions of KRS 61.870 to 61.884.

7. The resulting range for each customer sector per KWH during the three-year Experimental Demand-Side Management Plan is as follows:

CUSTOMER SECTOR

		RESIDENTIAL ($ Per KWH)	COMMERCIAL ($ Per KWH)	INDUSTRIAL*	
Floor Factor	=	0.000108	0.000444	- 0 -	(I) (I
Ceiling Factor	=	0.001658	0.002637	- 0 -	(R) (I

8. The DSM Adjustment Clause factor ($ Per KWH) for each customer sector which fall within the range defined in Item 7 above is as follows:

CUSTOMER SECTOR

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL*	
DSM (c)	561,601	556,333	- 0 -	(R) (F
S (c)	$ 636,014,500	361,020,800	- 0 –	(R) (F
Adjustment Factor	$ 0.000883	$ 0.001541	- 0 -	(I) (I

*The Industrial Sector has been discontinued pursuant to the Commission's Order dated September 28, 1999.

DATE OF ISSUE August 15, 2011 EFFECTIVE DATE Service rendered on or after September 28, 2011

Lila P. Munsey

ISSUED BY LILA P MUNSEY MANAGER REGULATORY SERVICES FRANKFORT, KENTUCKY
NAME TITLE ADDRESS

Issued by authority of an Order of the Public Service Commission in Case No. 2011-XXXXX dated XXXXXX

AEP®

Evaluation Report

Kentucky Power Company

Targeted Energy Efficiency

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team
American Electric Power Service Corporation
1 Riverside Plaza, 13th Floor
Columbus, OH 43215

Table of Contents

Executive Summary

The Kentucky Power Company (KPC) Targeted Energy Efficiency (TEE) program is designed to improve energy efficiency for low-income customers through energy audits coupled with installation of various energy conservation measures. The program specifically targets electric space heating and electric water heating measures, although other types of savings measures are utilized as well. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. Two iterations of the current and prospective cost-benefit tests were run, one that included the Weatherization Assistance Program (WAP) dollars and one that did not. This was done to account for all expenses incurred for items installed on program participants, regardless of the source of the funds. For 2009 and 2010, the TEE program weatherized the homes of 742 customers, providing 1,307 MWh of net annualized energy savings, 200 kW in summer peak demand reductions, and 328 kW of winter peak demand reductions. The process evaluation concluded that the promotion was effective, but the delivery mechanism could use further evaluation to ensure KPC and WAP funds are being used efficiently. The WAP funds expire on March 31, 2012, so they were not included in the prospective analysis.

Based on the results of the evaluation, the TEE program was determined to be cost-effective for the cost-benefit tests used in the California Standard Practice Manual. The prospective analysis of the program for 2012-2014 also predicts the program will be cost-effective. KPC should work with the Kentucky DSM Collaborative to suggest future utilization.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio (KPC)	Winter Peak Ratio (KPC)	Summer Peak Ratio (KPC+WAP)	Winter Peak Ratio (KPC+WAP)
Program Administrator Cost (PACT)	1.42	1.59	1.42	1.59
Total Resource Cost (TRC)	1.42	1.59	0.63	0.71
Ratepayer Impact Measure (RIM)	0.51	0.58	0.51	0.58
Participant Cost (PCT)	N/A	N/A	N/A	N/A

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	1.95
Total Resource Cost (TRC)	1.95
Ratepayer Impact Measure (RIM)	0.68
Participant Cost (PCT)	N/A

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Kentucky Targeted Energy Efficiency program was developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on December 4, 1995 (Case No. 95-427) to help meet Kentucky Power's goals.

Kentucky Power Company's Program was designed to improve energy efficiency through energy audits coupled with installation of various energy conservation measures. The program specifically targets electric space heating and electric water heating measures, although other types of savings measures are utilized as well. Measures installed in all-electric premises and non-all-electric premises include:

1) Energy audit and inspection of heating equipment (all households)
2) First-line weatherization (weather-stripping and caulking windows and exterior doors)
3) Blower door analysis with air and duct sealing measures
4) Domestic hot water heater measures (water heater blanket, pipe insulation, and thermostat setback)
5) Attic, floor, and wall insulation
6) Compact fluorescent bulbs
7) Structural repairs that have energy efficiency value; i.e., holes in outside walls, outer doors, windows, and ceilings ($100 maximum)

To implement this program, Kentucky Power Company utilizes existing not-for-profit agencies that focus on weatherizing low-income households. The major goals of the Targeted Energy Efficiency program are to:

1) Reduce energy consumption of electrically heated homes
2) Assist and encourage home owners to improve heating, ventilation, and air conditioning (HVAC) efficiency by installing weatherization measures
3) Increase customer satisfaction and services
4) Reduce Kentucky Power's long-range peak demand.

Process and Market Evaluation

Summary

The Program has been in place for many years, and therefore a detailed review of the basic program processes was deemed unnecessary. Rather, the primary emphasis related to the process and market evaluation was whether the program continues to utilize the time of the KPC in an optimal manner given the cooperation with Community Action Agencies (CAA). The 2011 survey of participants indicated that just over 32% of the all-electric and 38% of the non-all-electric participants would likely have purchased similar energy efficiency measures without the program, but were not treated as free riders due to the nature of a low income weatherization program such as the TEE. The promotion method employed was effective. The delivery mechanism continues to be effective; however the costs incurred indicate operational efficiencies can continue to be incorporated when found. Customer ~~satisfaction was very high.~~

Promotional Effectiveness

KPC promoted the program solely through an established network of Community Action Agencies. Five (5) agencies are involved with the TEE program, but only three (3) participate actively. Participation results were near KPC's expected goals, so it is assumed the promotional work done by the agencies is effective.

Delivery Mechanism

Community Action agencies are responsible for implementing the TEE program in the customers home. Each agency handled all facets of the installation and provided KPC with customer installation reports once per month. KPC staff entered the information into an Access database for participant tracking, including matching customer account numbers, and logging payments made by both KPC and the CAA. On-site inspections were performed to verify the measures were installed and to maintain a quality control check. KPC staff rated the quality of the relationship with the agencies (on a scale of one-to-five, five being best) a four. The relationship was not rated a five because the goals of the CAA is not always the same as those of KPC, and so some funds are not always spent by the agencies in a manner completely consistent with KPC's goals.

Total costs to implement the program indicate that operational efficiencies can be found. Costs attributable to KPC are within reason for a low income weatherization program; however, costs attributed to government stimulus indicate much of the items they installed did not provide much savings above the items that KPC performed, which reduced the savings per dollar ratio. While the total costs do not affect KPC ratepayers directly, any improved processes benefit all parties involved. As an example, if a process were improved that saved 5%, that money could be allocated to help weatherize more customers.

Data Tracking

Data collection and tracking could be improved. Participation numbers filed with the Collaborative were much higher than the detail implementation data. Sporadic pieces of data were missing -- such as heating source, blower door results, and heat pump EER -- that are required to produce engineering estimates.

A discrepancy in the participation tracking spreadsheet led to underestimated demand savings by 61% in Collaborative reports, but up-to-date summer and winter demand per participant savings data from the last two evaluations could alleviate this problem. Lower per participant estimates led to underreporting of 2009 summer demand savings by 21 kW and winter demand savings by 103 kW. Demand savings from 2010 were reported correctly.

Free Riders and Spillover

A free rider is a participant who would have installed energy efficiency measures had they not participated in the Program. Spillover refers to additional energy efficiency measures adopted by participants as a result of the program. Free ridership was determined by dividing the total survey responses by the positive responses to the questions "Had you planned on installing any weatherization measures before you heard about the program?" and "Would you have installed weatherization measures if the program was not available?" From the survey responses, 17% of all-electric and 16% of non-all-electric participants indicated they would have installed some measures without the program. However, they were not classified as free riders in this program because the basic premise of the low income program is that the participant cannot afford to install any measures without the program. Free ridership was calculated using the combination of customers that answered in the affirmative to the two questions asking if the customer would have installed measures outside the program, and at that time. No information on possible spillover effects was captured in the survey..

Market Potential

In the current U.S. marketplace, there will always be some economic winners and economic losers. Therefore it is anticipated that there will always be a low income segment to society that can benefit from having measures provided to them that helps with energy efficiency. However, since a large portion of the funds for measure installation were provided through government subsidy, it is expected that participation will be lower the next few years. Setting a goal of weatherizing 200 all-electric and 50 non-all-electric customers in each of the next two years seems reasonable.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was very high, with 85% of the all-electric survey respondents indicating they were very satisfied (39%) or satisfied (46%) with the program. For non-all-electric customers, 88% were either very satisfied (41%) or satisfied (47%). No all-electric respondents were very dissatisfied and only one was dissatisfied. Two (2) non-all-electric respondents were very dissatisfied and one was dissatisfied. From the comments received the source of the dissatisfaction was the recent KPC rate increase and an installer not returning to address a complaint.

Impact Evaluation

The TEE evaluation consisted of a billing analysis coupled with engineering estimates of the implementation data collected by KPC. The billing analysis was used to determine net savings by participant. The engineering estimates were used to develop gross measure savings by participant. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. To effectively capture the change in usage patterns, an evaluation needs both pre- and post-installation billing data. The per-participant billing analysis savings are compared to the per-participant engineering estimates to determine an estimated Net-to-Gross ratio. In theory, the billing analysis results should capture the free ridership and spillover behaviors of participant group. Those results are then compared to the survey results to see if the free ridership and spillover questions asked corroborate the analysis. Further details of the billing analysis and engineering estimates can be found in the appendixes.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. Once a valid set of customers was determined, the next step was to perform a billing analysis and create engineering estimates using the algorithms for installed measures (Appendix – Engineering Estimates) to determine an average per-participant energy, summer peak, and winter peak savings value. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings are in the below table.

2009 and 2010 Average Net Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
All-Electric Per Participant Savings	1,962	0.28	0.51
Non-All-Electric Per Participant Savings	873	0.22	0.14

All-Electric Results

For 2009, KPC had goals of weatherizing 210 all-electric homes and saving KPC customers 427 MWh. The program weatherized 259 all-electric homes, and produced net annualized total program savings of 508 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The summer peak demand reductions were 73 kW, and the winter peak demand reductions were 132 kW. KPC met 123% of the participant target and 119% of the energy target. No goals were provided for summer or winter demand savings.

For 2010, KPC had goals of weatherizing 415 all-electric homes and saving KPC customers 843 MWh. The program weatherized 346 all-electric homes, and produce net annualized total program savings of

679 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The summer peak demand savings were 97 kW, and the winter peak demand reductions were 176 kW. KPC met 83% of the participant target, and 80% of the energy target. No goals were provided for summer or winter demand savings.

For 2009 and 2010 of the TEE program, KPC weatherized 605 all-electric homes, producing net annualized program savings of 1,187 MWh of energy savings, reduction of 169 kW at summer peak and 309 kW at winter peak. KPC met 97% of the participant target and 93% of the energy target. Participation and annual energy savings were below the expected goals due to a large influx of WAP dollars to the CAAs, reducing the need for KPC dollars. The WAP dollars expire March 31, 2012.

Impact Evaluation Results by Year for All-Electric Customers

Category	Goal	Ex-Ante	Ex-Post	Percent of Goal
2009				
Participants	210	259	259	123%
Energy (MWh)	427	526	508	119%
Summer Demand (kW)	-	-	73	-
Winter Demand (kW)	-	-	132	-
2010				
Participants	415	346	346	83%
Energy (MWh)	843	703	679	80%
Summer Demand (kW)	-	-	97	-
Winter Demand (kW)	-	-	176	-
Total				
Participants	625	605	605	97%
Energy (MWh)	1,270	1,229	1,187	93%
Summer Demand (kW)	-	-	169	-
Winter Demand (kW)	-	-	309	-

Non-All-Electric Results

For 2009, KPC had goals of weatherizing 78 non-all-electric homes and saving KPC customers 89 MWh. The program weatherized 83 non-all-electric homes, and produced net annualized total program savings of 72 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The summer peak demand reductions were 18 kW, and the winter peak demand reductions were 12 kW. KPC met 106% of the participant target and 82% of the energy target. No goals were provided for summer or winter demand savings.

For 2010, KPC had goals of weatherizing 78 non-all-electric homes and saving KPC customers 89 MWh. The program weatherized 54 homes, and produced net annualized total program savings of 47 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The summer peak demand reductions were 12 kW, and the winter peak demand reductions were 8 kW. KPC met 69% of the participant target, and 53% of the energy target.

For 2009 and 2010 of the TEE program, KPC weatherized 137 non-all-electric homes, producing net annualized program savings of 120 MWh of energy savings, 30 kW in summer peak reductions, and 19 kW in winter peak reductions. KPC met 88% of the participant target and 68% of the energy target. Again, participation and annual energy savings were below the expected goals due to a large influx of WAP dollars to the CAAs, reducing the need for KPC dollars. The WAP dollars expire March 31, 2012.

Impact Evaluation Results by Year for Non-All-Electric Customers

Category	Goal	*Ex-Ante*	*Ex-Post*	Percent of Goal
2009				
Participants	78	83	83	106%
Energy (MWh)	89	94	72	82%
Summer Demand (kW)	-	-	18	-
Winter Demand (kW)	-	-	12	-
2010				
Participants	78	54	54	69%
Energy (MWh)	89	61	47	53%
Summer Demand (kW)	-	-	12	-
Winter Demand (kW)	-	-	8	-
Total				
Participants	156	137	137	88%
Energy (MWh)	177	156	120	68%
Summer Demand (kW)	-	-	30	-
Winter Demand (kW)	-	-	19	-

Total Results

For 2009 and 2010, the TEE program, KPC goals were to weatherize 781 homes and save KPC customers 1,447 MWh. The program weatherized 742 customers, and produced net annualized total program savings of 1,307 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. KPC met 95% of the participant target and 90% of the energy target. No goals were provided for summer or winter demand savings, however summer demand savings were 200 kW and winter demand savings were 328 kW. Participation and annual energy savings were slightly below the expected goals.

Impact Evaluation Results by Year for TEE Customers

Category	Goal	Ex-Ante	Ex-Post	Percent of Goal
2009				
Participants	288	342	342	119%
Energy (MWh)	515	621	581	113%
Summer Demand (kW)	-	-	91	-
Winter Demand (kW)	-	-	144	-
2010				
Participants	493	400	400	81%
Energy (MWh)	932	764	726	78%
Summer Demand (kW)	-	-	109	-
Winter Demand (kW)	-	-	184	-
Total				
Participants	781	742	742	95%
Energy (MWh)	1,447	1,385	1,307	90%
Summer Demand (kW)	-	-	200	-
Winter Demand (kW)	-	-	328	-

Net to Gross Complications

Because the TEE program is implemented in conjunction with community agencies that install more measures beyond what KPC requests, the billing analysis cannot be properly compared to the engineering estimate calculations. For the All-Electric participants, the billing analysis estimated per participant savings of 1,761 kWh and the engineering estimate algorithms calculated a per participant savings of 428 kWh. Because there is less certainty in the engineering estimates than in the billing analysis, the billing analysis is still used for all calculations, but all costs incurred by the community agencies must be accounted for in the cost-benefit analysis, if the costs were used to install items that would generate energy savings.

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects (see References). Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included for recovery purposes, unless new labor was utilized incrementally and specifically for DSM program implementation. For the TEE program, all costs of the implementation of the program are considered for cost-benefit tests, even if KPC did not bear the costs. All Weatherization Assistance Program (WAP) dollars were included to account for the government involvement in the program.

The expenditure goal for 2009 in the Collaborative Report was $233,430 for 210 all-electric and 78 non-all-electric participants. The total program costs as filed were $273,480 all listed as Equipment/Vendor costs. The costs were split into vendor admin and incentive costs of $78,364 and $195,116 respectively, using $737 as the average incentive cost. Unrecoverable administrative costs from KPC staff and AEPSC staff were not filed, but included for analysis. $7,000 was included under administration to account for unrecoverable costs; bringing the total to $280,480 in actual costs related to the program. The expenditure goal for 2010 in the Collaborative Report was $448,025 for 415 all-electric and 78 non-all-electric participants. The total filed program costs were $347,248, all listed as Equipment/Vendor costs. The costs were split into vendor admin and incentive costs of $89,492 and $257,756 respectively. To account for unrecoverable admin costs another $7,000 was included for 2010, bringing the total to $354,248 in actual costs related to the program. $25,000 was added in 2011 evaluation costs. WAP expenditures were included to account for the assistance provided to help install measures beyond what KPC performed. For 2009, $269,624 was included, and for 2010, $547,648 was added to account for incentive payments for installing extra measures.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analyses attempted to account for all costs related to the program. The following table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	KPC Total	WAP Total	TEE Total
2009	$7,000	$78,364	$195,116	$-	$280,480	$269,624	$550,104
2010	$7,000	$89,492	$257,756	$-	$354,248	$547,648	$901,896
2011	$-	$-	$-	$25,000	$25,000	$-	$25,000

Goals were reported as total amounts respective to the winter peak only, however, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter. Benefit costs tests were performed by All-Electric, Non-All-Electric, and Total participation. Results were near break-even, and unremarkable; which is expected in low-income programs.

All-Electric Results

Program goals for the All-Electric portion of the program were to have a Program Administrator Cost (PACT) ratio of 1.99, a Total Resource Cost (TRC) ratio of 1.99, and a Ratepayer Impact Measure (RIM) ratio of 0.78. The Participant Cost (PCT) ratio is not presented when the participant has no costs out of pocket. Goals were not included for ratios that include WAP dollars, because WAP dollars had never been included in program tests before. It is important to capture all costs related to the program, regardless of whether they were paid by KPC, or whether they had previously been recorded. Results for benefit cost ratios at summer peak are 1.61 for the PACT, 1.61 for the TRC without WAP dollars, 0.64 for the TRC with WAP dollars, and 0.53 for the RIM. Results for benefit cost ratios at winter peak are 1.84 for the PACT, 1.84 for the TRC without WAP dollars, 0.73 for the TRC with WAP dollars, and 0.61 for the RIM.

2009 and 2010 Summer Peak Cost Effectiveness Analysis – All-Electric Only

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.61	$ 316,132	$ 831,226	$ 515,094
Total Resource Cost (TRC)	1.61	$ 316,132	$ 831,226	$ 515,094
Ratepayer Impact Measure (RIM)	0.53	$ (725,912)	$ 831,226	$ 1,557,138
Participant Cost (PCT)	N/A	$ 1,078,774	$ 1,078,774	$ -
TRC with WAP	0.64	$ (461,112)	$ 831,226	$ 1,292,338
PCT with WAP	N/A	$ 1,822,780	$ 1,822,780	$ -

2009 and 2010 Winter Peak Cost Effectiveness Analysis – All-Electric Only

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.84	$ 432,321	$ 947,414	$ 515,094
Total Resource Cost (TRC)	1.84	$ 432,321	$ 947,414	$ 515,094
Ratepayer Impact Measure (RIM)	0.61	$ (609,724)	$ 947,414	$ 1,557,138
Participant Cost (PCT)	N/A	$ 1,078,774	$ 1,078,774	$ -
TRC with WAP	0.73	$ (344,924)	$ 947,414	$ 1,292,338
PCT with WAP	N/A	$ 1,822,780	$ 1,822,780	$ -

Non-All-Electric Results

Program goals for the Non-All-Electric portion of the program were to have a Program Administrator Cost (PACT) ratio of 7.83, a Total Resource Cost (TRC) ratio of 7.83, and a Ratepayer Impact Measure (RIM) ratio of 1.90. The Participant Cost (PCT) ratio is not presented when the participant has no costs out of pocket. Results for benefit cost ratios at summer peak are 0.55 for the PACT, 0.55 for the TRC without WAP dollars, 0.54 for the TRC with WAP dollars, and 0.33 for the RIM. Results for benefit cost ratios at winter peak are 050 for the PACT, 0.50 for the TRC without WAP dollars, 0.49 for the TRC with WAP dollars, and 0.31 for the RIM.

2009 and 2010 Summer Peak Cost Effectiveness Analysis – Non-All-Electric Only

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	0.55	$ (52,467)	$ 64,190	$ 116,657
Total Resource Cost (TRC)	0.55	$ (52,467)	$ 64,190	$ 116,657
Ratepayer Impact Measure (RIM)	0.33	$ (127,880)	$ 64,190	$ 192,070
Participant Cost (PCT)	N/A	$ 60,367	$ 60,367	$ -
TRC with WAP	0.54	$ (54,429)	$ 64,190	$ 118,619
PCT with WAP	N/A	$ 62,201	$ 62,201	$ -

2009 and 2010 Winter Peak Cost Effectiveness Analysis – Non-All-Electric Only

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	0.50	$ (57,979)	$ 58,677	$ 116,657
Total Resource Cost (TRC)	0.50	$ (57,979)	$ 58,677	$ 116,657
Ratepayer Impact Measure (RIM)	0.31	$ (133,392)	$ 58,677	$ 192,070
Participant Cost (PCT)	N/A	$ 60,367	$ 60,367	$ -
TRC with WAP	0.49	$ (59,941)	$ 58,677	$ 118,619
PCT with WAP	N/A	$ 62,201	$ 62,201	$ -

Total Results

Total program benefit cost results were cost-effective from Program Administrator, and Total Resource perspectives. Program design did not produce total program ratios, so nothing existed to which to compare.

2009 and 2010 Summer Peak Cost Effectiveness Analysis – All Participants

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.42	$ 263,665	$ 895,415	$ 631,750
Total Resource Cost (TRC)	1.42	$ 263,665	$ 895,415	$ 631,750
Ratepayer Impact Measure (RIM)	0.51	$ (853,792)	$ 895,415	$ 1,749,208
Participant Cost (PCT)	N/A	$ 1,139,141	$ 1,139,141	$ -
TRC with WAP	0.63	$ (515,541)	$ 895,415	$ 1,410,957
PCT with WAP	N/A	$ 1,884,981	$ 1,884,981	$ -

2009 and 2010 Winter Peak Cost Effectiveness Analysis – All Participants

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.59	$ 374,341	$ 1,006,092	$ 631,750
Total Resource Cost (TRC)	1.59	$ 374,341	$ 1,006,092	$ 631,750
Ratepayer Impact Measure (RIM)	0.58	$ (743,116)	$ 1,006,092	$ 1,749,208
Participant Cost (PCT)	N/A	$ 1,139,141	$ 1,139,141	$ -
TRC with WAP	0.71	$ (404,865)	$ 1,006,092	$ 1,410,957
PCT with WAP	N/A	$ 1,884,981	$ 1,884,981	$ -

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, the program will remain cost-effective in future years. Any number of a multitude of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the TEE program, results from the current evaluation were used as the starting point for the cost-benefit analysis. WAP dollars are set to expire on March 31, 2012, so they were not included in the prospective analysis. Due to KPC being a winter peaking utility, only the winter peak cost benefit analysis was run. Free ridership was kept at 0% during the prospective analysis and is not expected to increase, regardless of survey results. In general, low-income programs are treated as having zero free ridership due to not having the money to cover the normal incremental cost. KPC-only results were positive, and based solely on KPC's participation, the program should continue. However, since the program is implemented in cooperation with the CAAs, determination for continuing the program is reserved to KPC staff and the DSM Collaborative.

2012-2014 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.95	$ 993,214	$ 2,039,229	$ 1,046,015
Total Resource Cost (TRC)	1.95	$ 993,214	$ 2,039,229	$ 1,046,015
Ratepayer Impact Measure (RIM)	0.68	$ (960,280)	$ 2,039,229	$ 2,999,508
Participant Cost (PCT)	N/A	$ 1,898,661	$ 1,898,661	$ -

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the TEE program.

1) Results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective. It is our recommendation that this program be continued.
2) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
3) On-going program management should be handled by KPC staff, including tracking of customer participation and estimating ex-ante savings.
4) KPC staff labor time spent on the Program should be captured so that the true total cost of delivering the program can be known.
5) A snapback effect analysis should be conducted in the next evaluation to see if the customer's bills stay lower after the measures are installed, or if the customer uses the extra money to live at a higher comfort level.
6) KPC should consider adding another employee to help with in-the-field audits and ride-along trips so that current KPC staff can focus on program management.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

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Appendix – Impact Analysis and Methods

Impact Methodology

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in both the initial expected impact from an average installation and also the long-term savings from the specific installations. Only customers that passed certain validation criteria were used for analysis, however, this does not preclude them from ~~being counted towards total program impact savings.~~ All methods used for determining savings produce a set of per participant savings numbers. These numbers are then applied to all customers found in the implementation data, regardless of their usage in the actual analysis.

Billing Analysis

Impact evaluation consists of two stages, interim impact evaluation and full impact evaluation. Engineering estimates are used to develop measure savings without post-consumption data. Implementation data is utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. The full impact evaluation consists of a billing analysis. This analysis utilizes relevant weather data and billing data with the statistical regression models to determine the savings impact of the program. A comparison of customers' bills before and after the implementation of the program is used to determine changes in usage and demand that can be attributed to the program. In order to isolate the effects of the program from unassociated changes in consumption, a Participant Group and a distinct but similar Control Group is compared. The Control Group will not contain program participants, but its customers will be similar in consumption to the program participants. After defining these research groups, billing data is weather-normalized to eliminate any effects due to weather differences before and after program implementation. Finally, regression models will be used to analyze the normalized data and provide savings values.

The first step of the billing analysis is to create a valid participant list from which to analyze. Each customer is checked to ensure that data existed for at least one year pre and post measure installation. Participants were also required to have data for all of 2008 to develop a set of comparison metrics for drawing the control group. Any customers that did not have the requisite billing data, or were inactive at the time of analysis, were discarded from analysis.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. Participants that do not pass validation are still credited towards total program savings calculations, but are not usable when performing the impact calculations. However, only those participants listed in the implementation data were used for total program savings.

The first phase of validation is determining participants per year based on the implementation data provided by KPC. Each participant is assigned a year based on the date of the first measure installed on site due to energy savings beginning with the installation of the first measure. Because of this, some participants may move from the year they were filed with the Collaborative to a different year based on the implementation data. The Collaborative report for 2009 showed that 259 all-electric and 83 non-all-electric customers participated, however, the implementation data showed 258 all-electric and 90 non-all electric. The 2010 Collaborative report showed 346 all-electric, and 54 non-all-electric customers participated, however, the implementation data showed 273 all-electric and 87 non-all-electric. In total, implementation data for the all-electric customers showed 531 customers, while KPC reported that 605 customers had participated, and data for the non-all-electric customers showed 177 customers, while KPC reported 137 customers had participated. The missing 74 all-electric customers, having not been found in the implementation data, could not be verified to have participated and were not included in total program savings calculations. The increase in 40 customers in non-all-electric customers were added to the total program savings calculations, even though they were not reported in the Collaborative Report.

For 2009, the implementation data provided showed that 258 all-electric and 90 non-all-electric customers participated. Forty-five (45) all-electric and 12 non-all-electric customers were not found in AEP Customer Information System (CIS). In all, 213 all-electric and 78 non-all-electric customers were available for analysis. In 2010, after validation, 24 all-electric and 10 non-all-electric customers were not found in the AEP CIS. This left 249 all-electric and 77 non-all-electric customers available for analysis. In total there were 462 all-electric and 155 non-all-electric customers in the implementation data that were valid for analysis.

After the participant list was created, a set of energy statistics was developed to compare to the control group. For each customer, an annual kWh, summer peak month kWh, and winter peak month kW (formulas below) were calculated using 2008 billing data. KPC summer and winter peaks were pulled from the AEP Load Research system peak data and applied to each customer bill that contained that date, and was used to create a summer and winter monthly demand value.

Formula for determining comparison statistics between participant and control group

$$kWh_{annual} = 365 \times \frac{\sum kWh\_per\_Bill}{\sum Days\_per\_Bill} \qquad kW_s = 31 \times \frac{kWh\_per\_Bill_s}{Days\_per\_Bill_s} \qquad kW_w = 31 \times \frac{kWh\_per\_Bill_w}{Days\_per\_Bill_w}$$

After participant group selection is complete, the KPC population is validated to provide a list of potential control group customers. The population is usually constrained by one or more of program class (residential, C&I, etc…), building characteristics (single-family, mobile home, etc…), fuel type (all-electric, natural gas, etc…), and income level (HEAP, non-HEAP, all). Customers are removed from consideration if they are not continuously active from January 1, 2008 until current. After the control population has been validated, comparison statistics are calculated using the above formulas.

After the control population group has been established, and both the control population's and participant group's comparison statistics have been calculated, the control population's customers are compared to the participants to provide a baseline comparison. Each participant customer is matched to all control population customers, and the top 50 most accurate matches are kept for further analysis. Matching is determined by calculating an Absolute Relative Deviation (ARD) for the Annual kWh, summer kWh, and winter kWh comparison statistics. The customers with the lowest combined ARD are kept for further validation. For each of the 50 control customers, they are assigned the same installation date as the participant customer. Each of the 50 customers is then validated using the same pre/post rules as the participant customers. Each control customer must have at least one year of data pre and post the pseudo-installation of the measure.

Formula for comparing control population customer to participant

$$ARD = ARD_{kWha} + ARD_{kWhs} + ARD_{kWhw}$$

$$ARD_{kWha} = \frac{\left|kWha_{ctrl} - kWha_{part}\right|}{kWha_{ctrl}} \qquad ARD_{kWhs} = \frac{\left|kWhs_{ctrl} - kWhs_{part}\right|}{kWhs_{ctrl}} \qquad ARD_{kWhw} = \frac{\left|kWhw_{ctrl} - kWhw_{part}\right|}{kWhw_{ctrl}}$$

After the 50 customers have been compared to the participant, the top 20 are kept for further evaluation. Twenty control groups are used for comparison because of the variance of the population. The population variance is high because the AEP CIS does not contain enough demographic data on the customer to create a very accurate regression model. There are too many lurking variables in a billing analysis if enough data is not included, which can bias the results. Once the 20 control groups have been selected, each group is run, pairwise, with the participant group through the entire billing analysis process. Final results for each run of the analysis are compared to ensure that none of the control groups are extreme in either direction (load savings or load growth). Using an alpha of .05 for Type I error testing, and a beta of .10 for Type II, or power testing, checks are completed to ensure that the control group methodology is valid. Once the methodology is verified, the first control group, being the most accurate, is used for the regression portion and official savings calculations. If there are concerns about uncertainty, all 20 control groups will be run and the numbers will be aggregated as a replicated analysis.

The regression analysis is conducted by constructing two models, a baseline and treatment weather normalized panel model. A panel analysis is a two-dimensional time-series and cross-sectional model used to evaluate changes in the effects of a treatment on a treatment group compared to a control group over time. Weather Normal, or Typical Meteorological Year, data is created by the U.S. National Renewable Energy Laboratory (NREL) to represent weather data for a typical year. The TMY2 dataset was used for all KPC billing analysis, and is derived from the 1961-1990 National Solar Radiation Data Base (NSRDB).

The baseline model is created using at least one year of billing data pre-installation to develop a weather normalized billing function (see formula below). The treatment model is created using at least one year of billing data post-installation. Each customer is assigned a weather station, average daily temperature, cooling degree day, and heating degree day summaries to each bill. Degree days are calculated by summing the number of hours per day by the degrees per hour above or below a temperature break point. For heating degree days, the breakpoint temperature is set at 65 degrees Fahrenheit. Cooling degree days are calculated using 70 degrees Fahrenheit as the breakpoint. Once the necessary data has been created, an autoregressive model is fit to the data for each customer to create the betas necessary to predict data. Each beta represents the multiplier coefficient for the incremental value of each model variable. To forecast or estimate new kWh, multiply the regression betas by the new data.

Weather normalized regression model

$$kWh = \left(\beta_{daily\_kwh} \times Days\right) + \left(\beta_{ADT} \times ADT\right) + \left(\beta_{CDD} \times CDD\right) + \left(\beta_{HDD} \times HDD\right) + \left(\beta_{CDD^2} \times CDD^2\right) + \left(\beta_{HDD^2} \times HDD^2\right) + \varepsilon$$

Once the baseline and treatment models have been determined, the model betas are multiplied by weather normal data to create baseline weather normalized bills for each customer. Once the bills have been forecasted, the data is aggregated to create annualized normal energy usage per customer. Each customer has an estimated baseline and treatment annualized kWh. The difference between the estimated baseline and treatment kWh is the energy savings due to the program. The annualized energy estimates are then summarized by participant group and control group, and multiple t-tests are completed to compare the savings of each group, and their pairwise difference.

Once the annualized savings numbers have been calculated, the forecasted bills are used to create monthly and daily load shapes for DSMore. The monthly load shape is created by temporally disaggregating the bills from a cycle month to a calendar month. Traditional load research techniques use linear interpolation method of determining an average energy usage per day per bill, then creating a stepped daily load shape. This method maintains transformation under integration, meaning one can move from cycle month to billing month without loss of accuracy; however the ability to detect peaks using this method is very limited. The second method, utilized in this evaluation, is to create a daily load shape using cubic splines. This method is also closed under integration, and is the preferred method for temporal disaggregation when using SAS (Statistical Analysis Software®). AEP Load Research has compared the accuracy of both methods in predicting daily load shapes of interval metered customers, and found that the cubic spline disaggregation is more accurate when using goodness-of-fit statistics. However, the primary reason for using cubic splines is the ability to put more load on the peak days of the month. Using the cubic spline method, the forecasted bills are disaggregated to a 365 day daily load shape for each customer. Using the daily load shape, the customers are aggregated using traditional load research methods, to determine a domain load shape. For the TEE program, there are two domains: All-Electric and Non-All-Electric.

Next, the peak day history for KPC is used to create a typical peak day for both the summer and winter peak. This is done by averaging the day per year for each year to determine the average day-per-year. As an example, if the last five winter peaks occurred between January 11th and January 15th, it is expected that the average day-per-year peak day will be January 13th. After the typical peak date for the summer and winter peaks has been determined, the KPC Residential Load Research class load shape, as determined by AEP Load Research, is retrieved for each peak date. Using the Residential class load shape, the proportion of energy used at the peak hour, relative to the total energy for the day is determined as a load factor. To determine the summer and winter peaks, the daily energy from the cubic spline disaggregation is divided by the load factor and 24 (hours per day) to determine the average peak demand reduction for each season. The formula is below:

Peak demand reduction formulas

$$kWs = \frac{\frac{kWh_{peakdayS}}{24}}{LF_S} \qquad kWw = \frac{\frac{kWh_{peakdayW}}{24}}{LF_W}$$

Analysis Results

The below graphs contain the summary panel, profile plot, and agreement plot from SAS, created during the PROC TTEST procedure. Particular attention should be paid to the uncertainty of the parameter estimate for the mean. Because of the uncertainty involved in the model, any savings estimate within the Lower Confidence Level (LCL) and Upper Confidence Level (UCL) is within plus or minus two standard errors of the mean. What this means is that the findings of the billing analysis show that the *ex-ante* savings estimate of 2,032 kWh per all-electric participant is not statistically different from the *ex post* savings estimate to the 95% confidence level, and the *ex-ante* savings estimate of 1,136 kWh per non-all-electric participant is not statistically different from the *ex post* savings estimate to the 95% confidence level

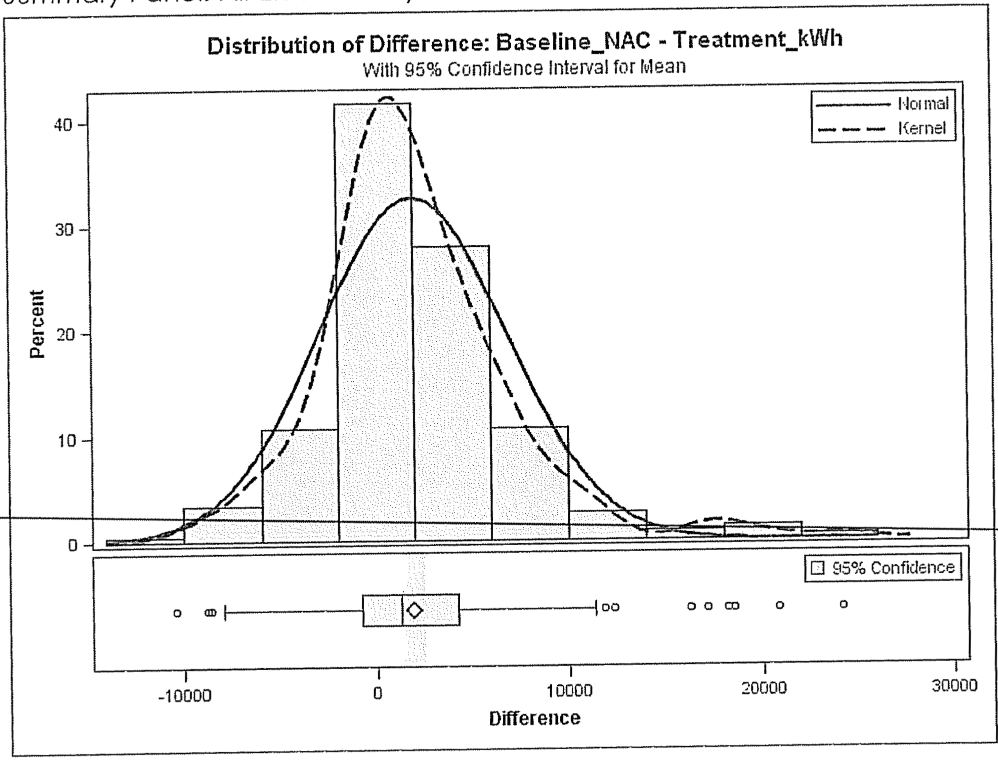
All twenty control groups were ran and aggregated. A cursory ~~glance of the control group baseline~~ and treatment comparisons show extreme variability. Had only one control group been run, the savings for all-electric could have been as low as 1,105 kWh or as high as 1,818 kWh. A single control group run for non-all-electric could have found savings as low as 940 kWh or as high as 1,919 kWh. Running multiple iterations of the billing analysis allows us to take advantage of the Central Limit Theorem and create a better estimate of the per participant savings. Control group variation numbers are presented after the charts and graphics.

Summary Statistics: By Sub Group

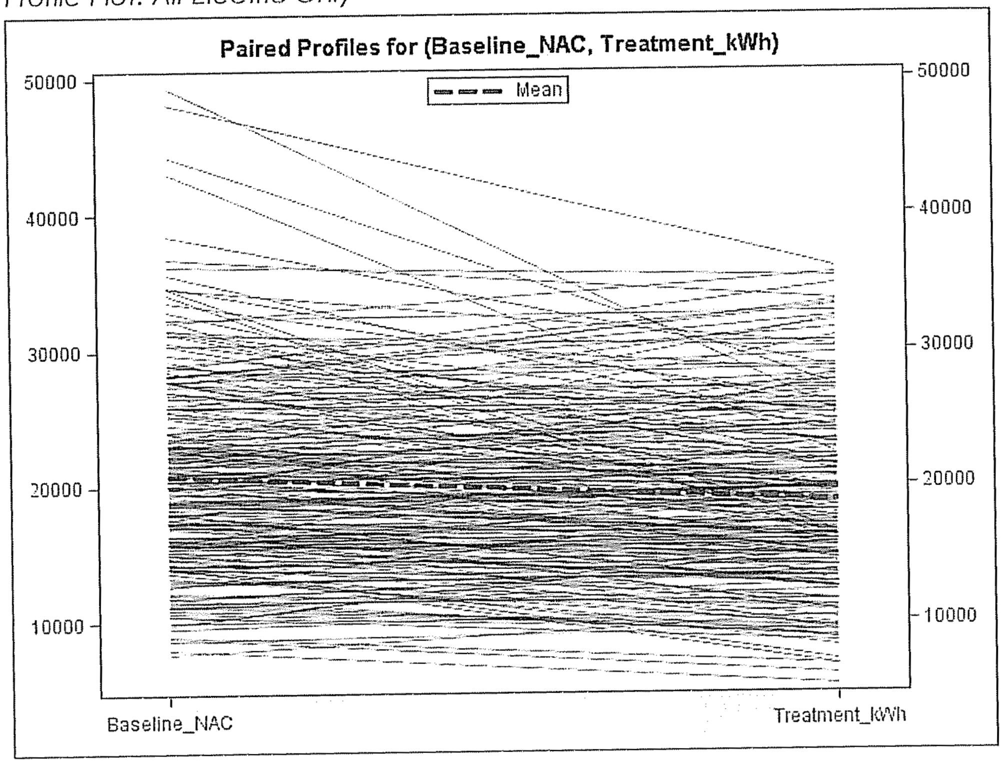
Sub Group	N	Mean	Std Dev	Std Err	95% CL Mean		Summer kW	Winter kW
All-Electric	233	**1,962.0**	4,899.8	321.0	1,329.5	2,594.4	**0.280**	**0.510**
Non-All-Electric	85	**873.4**	4,658.0	505.2	-131.3	1,871.1	**0.220**	**0.140**

Analysis Graphs

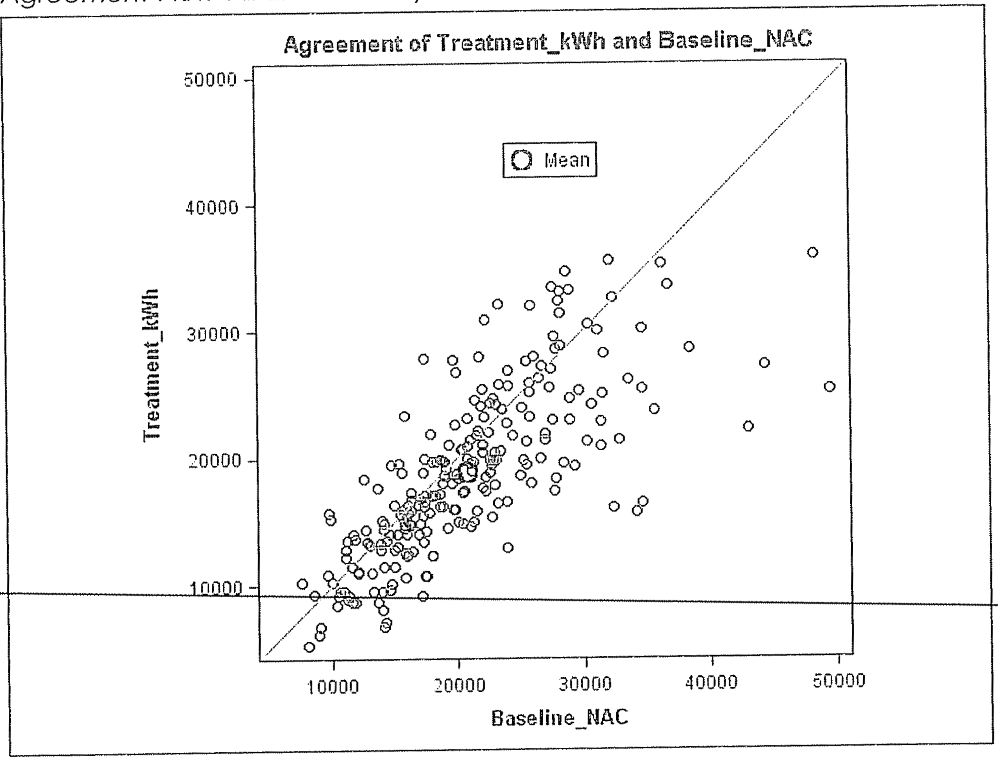
Summary Panel: All-Electric Only



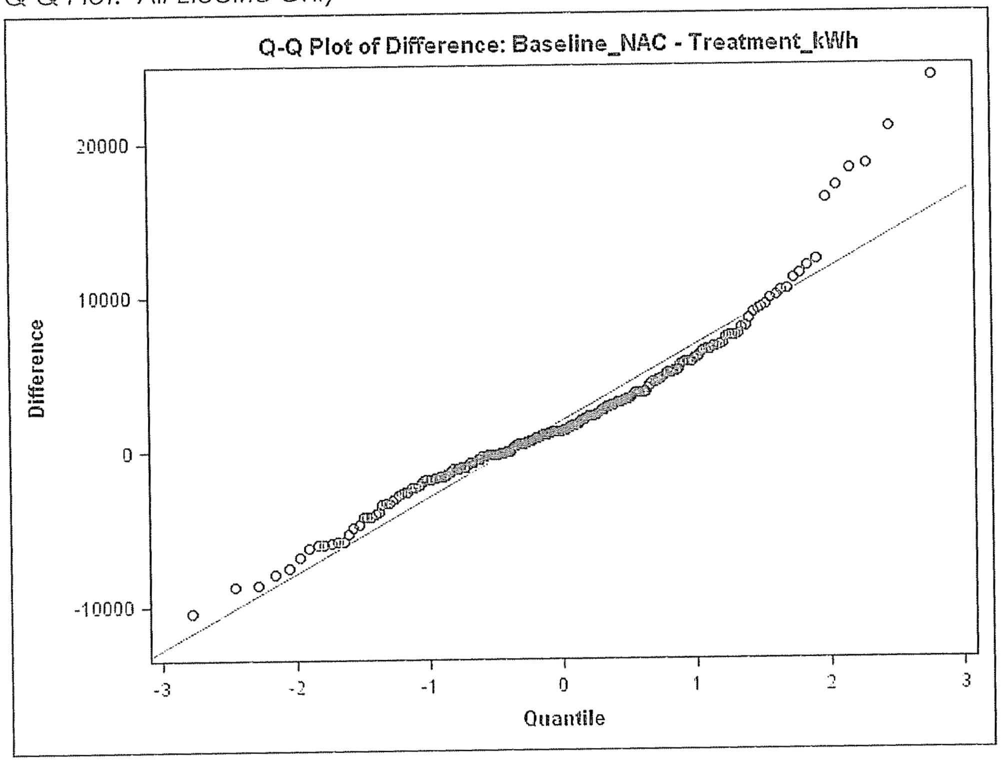
Profile Plot: All-Electric Only



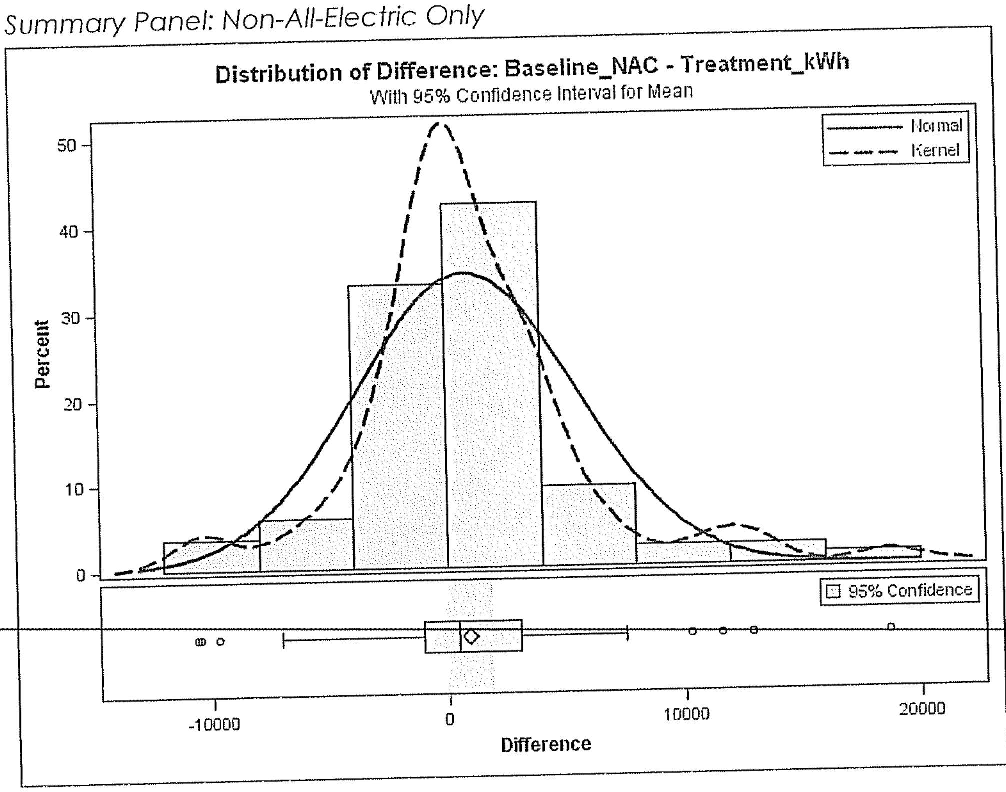
Agreement Plot: All-Electric Only



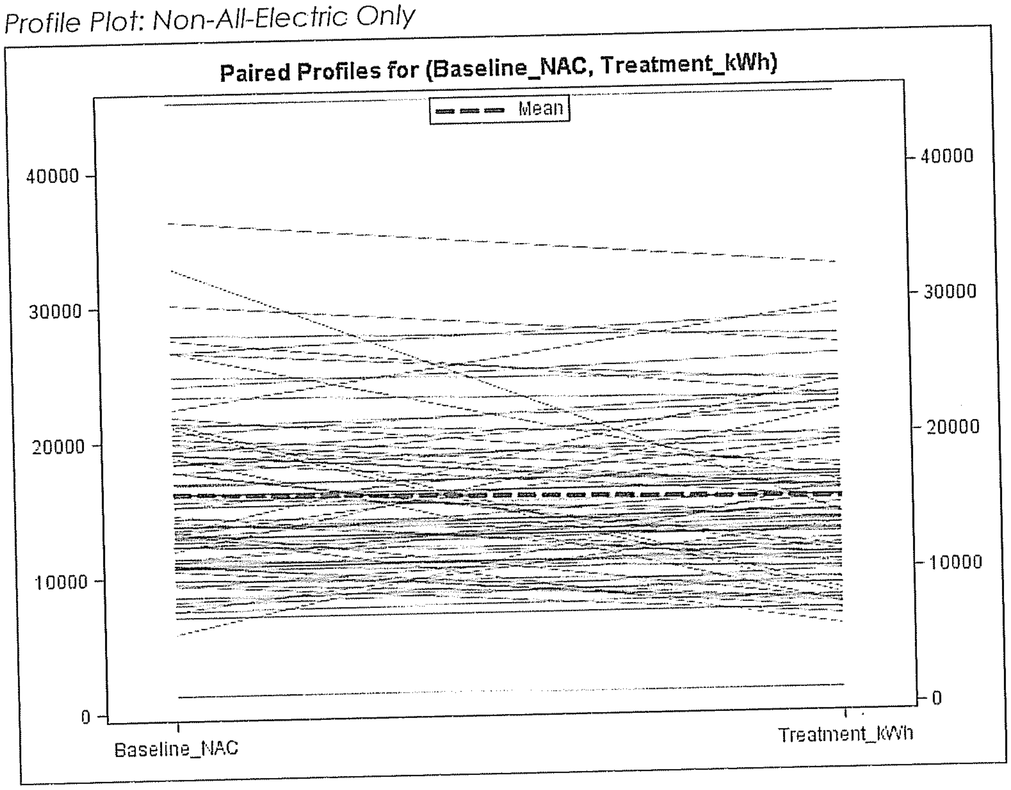
Q-Q Plot: All-Electric Only



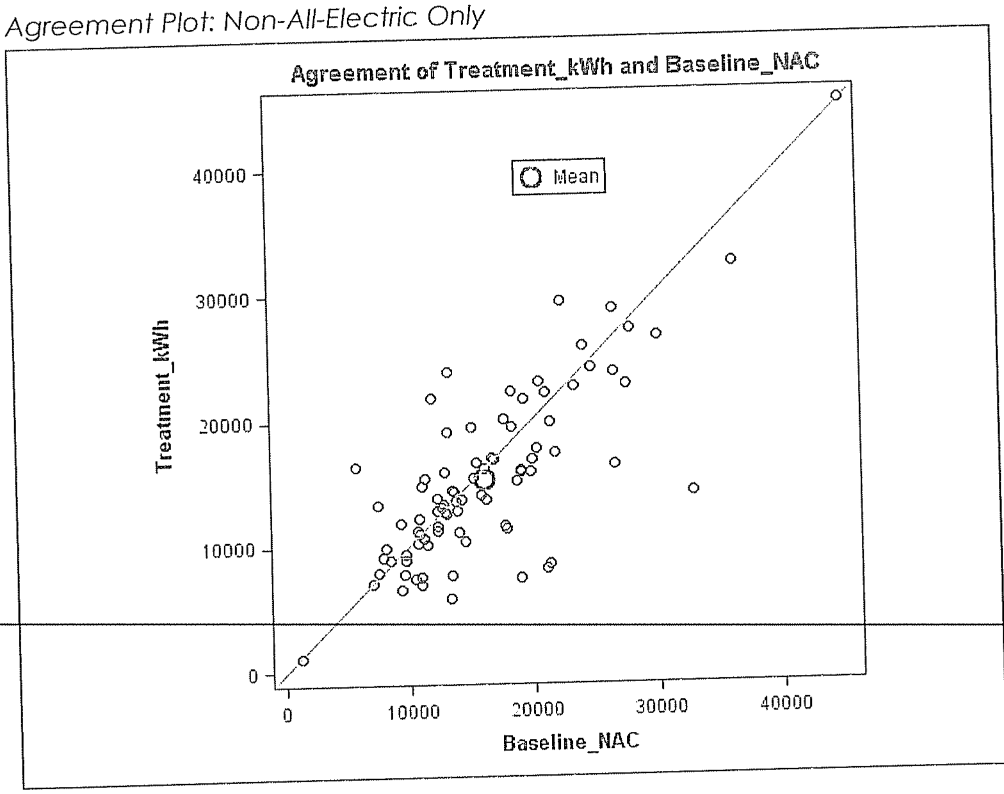
Summary Panel: Non-All-Electric Only



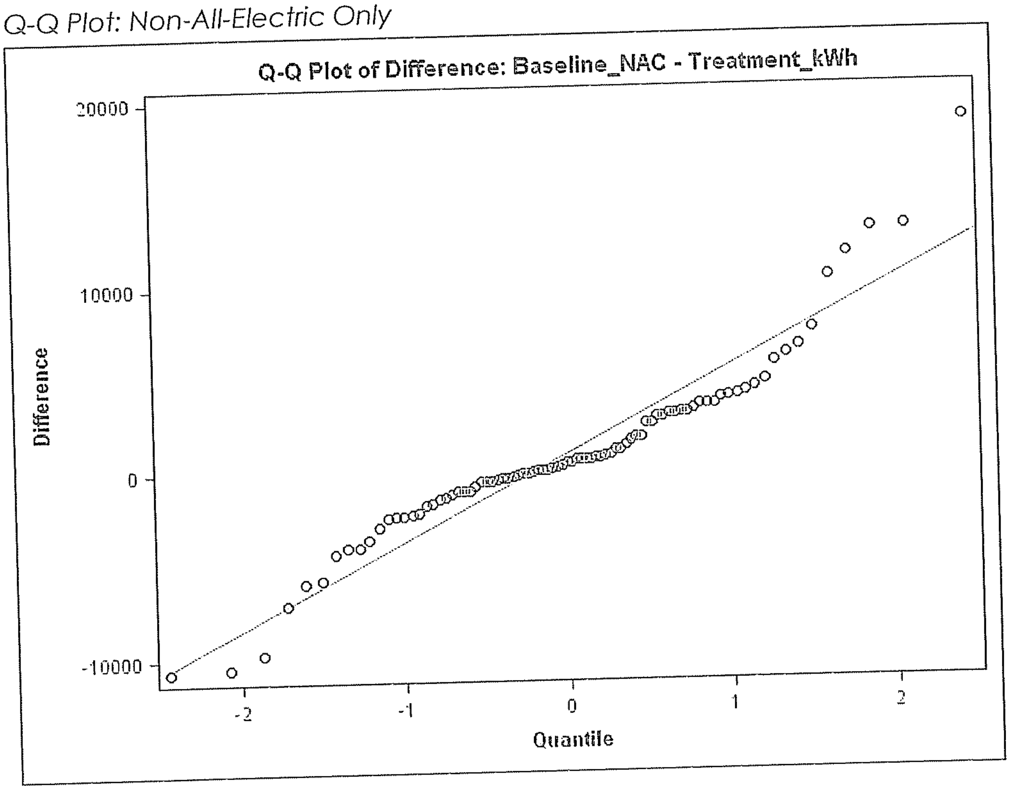
Profile Plot: Non-All-Electric Only



Agreement Plot: Non-All-Electric Only



Q-Q Plot: Non-All-Electric Only



Control Group Analysis

When performing a billing analysis to determine the impacts for program evaluation, the participant group needs to be matched to a set of control customers. For historical analyses, the literature suggests a single control group be matched to the participant list in order to provide a valid set of customers from which to compare. This is done to remove any activities that are related to free ridership: i.e. those activities that would have occurred without the program. However, this author feels that without a robust set of demographic data to make customers comparisons more accurate than AEP's current CIS contains, a billing analysis must treat the control group selection as a replication of quasi-experimental designs. Quasi-experimental design, or "before and after" design, is distinguished by the non-randomness of the control and participant selection groups. However, given the limited demographic data, we substitute the rigorous selection with an increase in replications. Classical statistics (sometimes called Frequentist statistics) is predicated on the notion of repeated trials to infinity, e.g. the relative frequency of a statistics as the trials near infinity. However, in practice, most statistics that is performed is done using a single trial without replication. In many cases, and disciplines, this is an accepted, even celebrated practice. However, in impact analysis of programs, the usage uncertainty and disparity of customer demographics at a premise (number televisions, HVAC usage, work schedule, occupants, etc....) demands that more than one replication be undertaken. Below is the list of control groups generated for this analysis and how each iteration would have compared to the per participant savings calculated in the billing analysis.

Control Group Comparison to Per Participant kWh – All-Electric Only

Analysis Group	Baseline Mean	Treatment Mean	Ratio	Per Participant kWh if Chosen	Loss/Gain From Mean
Control_01	21,695	20,465	94.3%	1,585	(377)
Control_02	21,152	20,566	97.2%	2,213	251
Control_03	21,214	20,360	96.0%	1,942	(20)
Control_04	21,822	21,141	96.9%	2,138	176
Control_05	21,717	20,666	95.2%	1,765	(197)
Control_06	21,725	20,686	95.2%	1,778	(184)
Control_07	21,828	20,913	95.8%	1,906	(56)
Control_08	21,182	20,924	98.8%	2,549	587
Control_09	21,413	21,251	99.2%	2,648	686
Control_10	21,291	20,342	95.5%	1,848	(114)
Control_11	21,117	20,084	95.1%	1,754	(208)
Control_12	20,745	19,526	94.1%	1,541	(421)
Control_13	21,222	20,763	97.8%	2,344	382
Control_14	20,795	19,817	95.3%	1,795	(167)
Control_15	20,901	20,247	96.9%	2,135	173
Control_16	20,930	19,761	94.4%	1,604	(358)
Control_17	21,249	19,993	94.1%	1,533	(429)
Control_18	21,604	20,871	96.6%	2,078	116
Control_19	21,327	20,536	96.3%	2,010	48
Control_20	21,634	20,886	96.5%	2,064	102

Control Group Comparison to Per Participant kWh – Non-All-Electric Only

Analysis Group	Baseline Mean	Treatment Mean	Ratio	Per Participant kWh if Chosen	Loss/Gain From Mean
Control_01	16,563	17,302	104.5%	2,025	1,151
Control_02	17,436	15,826	90.8%	(246)	(1,119)
Control_03	16,828	15,797	93.9%	270	(604)
Control_04	15,846	15,527	98.0%	952	79
Control_05	15,890	15,502	97.6%	880	7
Control_06	16,639	16,674	100.2%	1,320	447
Control_07	16,136	15,800	97.9%	940	67
Control_08	16,075	16,180	100.7%	1,394	521
Control_09	15,896	16,227	102.1%	1,631	757
Control_10	15,772	15,376	97.5%	870	(4)
Control_11	16,037	15,220	94.9%	440	(433)
Control_12	16,241	15,693	96.6%	725	(148)
Control_13	15,670	15,717	100.3%	1,335	462
Control_14	16,049	15,731	98.0%	957	84
Control_15	16,641	15,388	92.5%	37	(836)
Control_16	16,885	16,456	97.5%	864	(9)
Control_17	16,121	15,810	98.1%	965	92
Control_18	17,029	16,018	94.1%	301	(572)
Control_19	16,385	15,997	97.6%	893	19
Control_20	15,046	14,863	98.8%	1,083	210

Appendix - Engineering Estimates

Engineering Estimate Methodology

To calculate annualized energy savings, an average per-measure savings must be determined based on the heating and cooling savings from the increased efficiency of the heat pump. Heating savings are determined by the inverse difference of the Heating Seasonal Performance Factors (HSPF) between the baseline heat pump and the increased efficiency heat pump. Cooling savings are determined by the inverse difference of the Seasonal Energy Efficiency Rating (SEER) between the baseline and upgraded heat pumps. Each savings value is scaled based on the size of the heat pump by tonnage or British Thermal Unit Hours (BtuH) to determine the per-participant, per-year usage. The per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. This number is compared to the billing analysis values to see if the survey free ridership and spillover questions are comparable to the analytically determined values.

Technology Descriptions

ENERGY STAR CFL Bulbs

Description

A low wattage ENERGY STAR qualified compact fluorescent screw-in bulb (CFL) is purchased through a retail outlet in place of an incandescent screw-in bulb. The incremental cost of the CFL compared to the incandescent light bulb is offset via either rebate coupons or via upstream markdowns. Assumptions are based on a time of sale purchase, not as a retrofit or direct install installation. This characterization assumes that the CFL is installed in a residential location. Where the implementation strategy does not allow for the installation location to be known and absent verifiable evaluation data to support an appropriate residential versus commercial split, it is recommended to use this residential characterization for all purchases to be appropriately conservative in savings assumptions.

Algorithms

$$kWh = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times \left(H \times 365\right) \times \left(1 + IF\right)$$

$$kW = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times CF \times (1 + IF)$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
W_{base}	Wattage of bulb being removed
$W_{replace}$	Wattage of bulb being installed
H	Average Daily hours-of-use
IF	Interactive Factor
CF	Coincidence Factor

Assumptions:

The expected measure life is 8 years.

Air Sealing

Description

This measure characterization is for the improvement of a building's air-barrier, which together with its insulation defines the thermal boundary of the conditioned space. Air-leakage in buildings represents from 5% to 40% of the space conditioning costs but is also very difficult to control. The measure assumes that a trained auditor, contractor or utility staff member is on location, and will measure and record the existing air leakage rate and post air-sealing leakage using a blower door, and the efficiency of the heating and cooling system used in the home.

Algorithms

$$kWh = \frac{\left(\frac{(CFM50_{Exist} - CFM50_{New})}{Nfactor} \times 60 \times CDH \times DUA \times 0.018\right)}{1000 \times \eta Cool}$$

$$kW = \frac{\Delta kWh}{FLH_{cool}} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
$CFM50_{exist}$	Existing cubic feet per minute at 50 Pascal pressure differential as measured by the blower door before air sealing
$CFM50_{new}$	New cubic feet per minute at 50 Pascal pressure differential as measured by the blower door after air sealing
Nfactor	Conversion factor to convert 50 Pascal air flows to natural airflow

60	Constant to convert cubic feet per minute to cubic feet per hour
CDH	Cooling Degree Hours
DUA	Discretionary Use Adjustment to account for the fact that people do not always operate their air conditioning system when the outside temperature is greater than 75°F
0.018	The volumetric heat capacity of air
$\eta Cool$	Efficiency of Air Conditioning equipment
FLH_{cool}	Full load cooling hours
CF	Coincidence Factor

Assumptions

The expected measure life is 15 years.

Attic, Roof, Ceiling Insulation

Description

This measure characterization is for the installation of new additional insulation in the attic/roof/ceiling of a residential building. The measure assumes that an auditor, contractor or utility staff member is on location, and will measure and record the existing and new insulation depth and type (to calculate R-values), the surface area of insulation added, and the efficiency of the heating system used in the home.

Algorithms

$$kWh = \frac{\left(\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) \times CDH \times DUA \times Area\right)}{1000 \times \eta Cool}$$

$$kW = \frac{\Delta kWh}{FLH_{cool}} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
R_{exist}	Existing effective whole-assembly thermal resistance value or R-value
R_{new}	New total effective whole-assembly thermal resistance value or R-value
CDH	Cooling Degree Hours
DUA	Discretionary Use Adjustment to account for the fact that people do not always operate their air conditioning system when the outside temperature is greater than 75°F
Area	Square footage of insulated area
$\eta Cool$	Efficiency of Air Conditioning equipment
FLH_{cool}	Full load cooling hours
CF	Coincidence Factor

Assumptions:

The expected measure life is 8 years.

Duct Sealing

Description

This measure describes evaluating the savings associated with performing duct sealing using mastic sealant or metal tape to the distribution system of homes with either central air conditioning or a ducted heating system.

Algorithms

$$kWh = kWh_{AC} + kWh_{HP} + kWh_{ER}$$

$$kWh_{AC} = \frac{\Delta V_{DL} \times 60 \times CDD_{75°F} \times 24 \times 0.018}{1{,}000 \times SEER}$$

$$kWh_{HP} = \frac{\Delta V_{DL} \times 60 \times HDD_{60°F} \times 24 \times 0.018}{1{,}000 \times HSPF}$$

$$kWh_{ER} = \frac{\Delta V_{DL} \times 60 \times HDD_{60°F} \times 24 \times 0.018}{3{,}413}$$

$$kW = \frac{kWh}{FLH_{cool}} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
CDD	Cooling Degree Days
HDD	Heating Degree Days
SEER	SEER of existing system
HSPF	Heating Season Performance Factor
IF	Interactive Factor
FLH_{cool}	Full Load Cooling Hours
CF	Coincidence Factor

Assumptions:

The expected measure life is 20 years.

Water Heater Wrap

Description

This measure relates to a Tank Wrap or insulation "blanket" that is wrapped around the outside of a hot water tank to reduce stand-by losses. This measure applies only for homes that have an electric water heater that is not already well insulated. Generally this can be determined based upon the appearance of the tank.

Algorithms

$$kWh = kWh_{base} \times \frac{(EF_{new} - EF_{base})}{EF_{new}}$$

$$kW = \frac{\Delta kWh}{8,760}$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
kWh_{base}	Average kWh consumption of electric domestic hot water tank.
EF_{new}	Assumed efficiency of electric tank with tank wrap installed.
EF_{base}	Assumed efficiency of electric tank without tank wrap installed.
8,760	Number of hours in a year.

Assumptions

The expected measure life is 5 years.

Pipe Wrap

Description

This measure describes adding insulation to un-insulated domestic hot water pipes. The measure assumes the pipe wrap is installed to the first length of both the hot and cold pipe up to the first elbow.

Algorithms

$$kWh = \frac{\left(\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) \times L \times C \times \Delta T \times 8{,}760\right)}{\eta DHW \times 3{,}413}$$

$$kW = \frac{\Delta kWh}{8{,}760}$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
ISR	In Service Rate or fraction of units that get installed
R_{exist}	Pipe heat loss coefficient of non-insulated pipe (existing)
R_{new}	Pipe heat loss coefficient of insulated pipe (new)
L	Length of pipe from water heating source covered by pipe wrap (ft.)
C	Circumference of pipe (ft.)
ΔT	Average temperature difference between supplied water and outside air temperature (°F)
ηDHW	Recovery efficiency of electric hot water heater
3,413	Conversion from Btu to kWh
8,760	Number of hours in a year

Assumptions

The expected measure life is 15 years.

Low Flow Showerhead

Description

This measure relates to the installation of a low flow showerhead in a home. This is a retrofit direct install measure or a new installation. Both electric and fossil fuel savings are provided, although only savings corresponding to the hot water heating fuel should be claimed.

Algorithms

$$kWh = ISR \times (GPM_{base} - GPM_{low}) \times \frac{kWh}{GPM_{reduced}}$$

$$kW = \frac{\Delta kWh}{Hours} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
ISR	In Service Rate or fraction of units that get installed.
GPM_{base}	Gallons per minute of baseline faucet.
GPM_{low}	Gallons per minute of low flow faucet.
$kWh/GPM_{reduced}$	Assumed kWh savings per GPM reduction.
$r_{install}$	Rate of install.
$r_{persist}$	Rate of persistence.
Hours	Average number of hours per year spent using faucet.
CF	Coincidence Factor.

Assumptions

The expected measure life is 15 years.

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility. 2. Customer's account must have been active prior to the measure being received until the date of the analysis (or the end of the measure's expected life). 3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Program Assumptions

Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Free Ridership	0%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%

Appendix – Exhibits

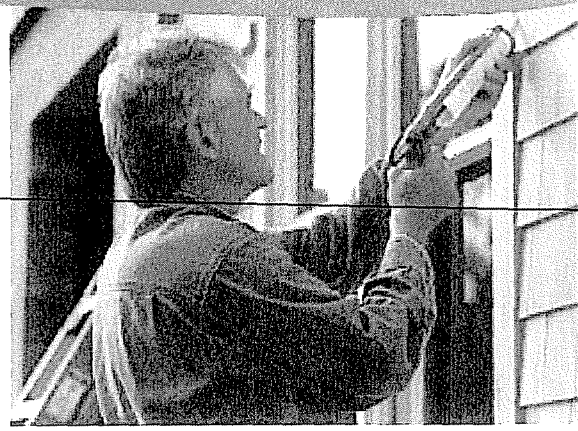
Exhibit 1 – Fact Sheet

AEP KENTUCKY POWER
A unit of American Electric Power

Targeted Energy Efficiency Program
Fact Sheet

Program Overview

The Kentucky Power Targeted Energy Efficiency Program provides weatherization and energy efficiency services to qualifying residential customers who need help reducing their energy bills. Kentucky Power provides funding for this program through the Kentucky Community Action network of not-for-profit community action agencies. The program funding is supplemental to the Weatherization Assistance Program offered by your community action agency.



If you're having trouble managing your energy cost, this Kentucky Power funded program can offer assistance. It will provide energy saving improvements to your existing home if you meet the eligibility qualifications. You'll enjoy the long-term benefits of reduced energy cost due to these home energy saving measures.

Program services can include these items, as applicable and per program guidelines:

- Energy audit
- Air infiltration diagnostic test to find air leaks
- Air leakage sealing
- Attic, floor, side-wall insulation
- Duct sealing and insulation
- High efficiency compact fluorescent light bulbs (CFLs)
- Domestic hot water heating insulation (electric)
- Customer education on home energy efficiency

Customer Eligibility

Customers who have primary electric heat and use an average of 700 kWh per month may be eligible for extensive weatherization and energy conservation measures through this program. Customers without primary electric heating may also be eligible for limited efficiency measures if they have electric water heating and use an average of 700 kWh from November through March. To qualify, a household's income cannot exceed the designated poverty guidelines as administered by your community action agency. To determine if you qualify for this program, please contact the local community action agency in your county of residence.

How to Participate

Find the contact information for your community action agency at kaca.org or by calling 1-800-456-3452. Then, contact your community action agency to determine if you qualify for this energy saving program.

Other Opportunities

Kentucky Power offers a suite of SMART Programs, which are energy efficiency programs for homes, businesses and schools. For more information on this program or other SMART Programs, call **1-800-572-1113** or visit **KentuckyPower.com/save.**

SMART Programs – *Saving Money And Resources Together*®

gridSMART®
From Kentucky Power

Exhibit 2 – Data Collection Form Page 1

American Electric Power/Kentucky Region
TEE Program: Wx Data Collection Form

Customer Name: ________________________

Account Holder Name: ________________________

Electric Company Account Number: ________________________

Address: ________________________

____

Agency: ________________

Job Number: ________________

Initial Contact Date: ____/____/____

All Work Completed Date: ____/____/____

Phone Number: (____) ______-________

Housing Type: Site-built ☐ Mobile Home ☐ Modular ☐ Combination ☐

Primary Heat: Electricity Type of Primary System: ________________

Secondary Heat: ________________ Type of Secondary System: ________________

% of heat supplied by electricity: ________ HSPF: ________________ (if heat pump)

Air Conditioning (AC)? Yes No Number: Window______ Central______ Heat Pump______

Cooling Capacity 1st AC Unit: __________ btu SEER or EER 1st Unit: __________ (N/A if missing)

Cooling Capacity 2nd AC Unit: __________ btu SEER or EER 2nd Unit: __________ (N/A if missing)

# of Occupants ________ # of Conditioned Rooms ________

Conditioned Volume: ________________ ft3 Total Conditioned Floor Area: ________________ ft2

Blower Door Information:

Shielding:	PreWeatherization	PostWeatherization
________ exposed	________ CFM50	________ Post Duct Sealing CFM50
________ average	________ Blocked Duct CFM 50	________ Final CFM50
________ shielded		

# of stories: ________

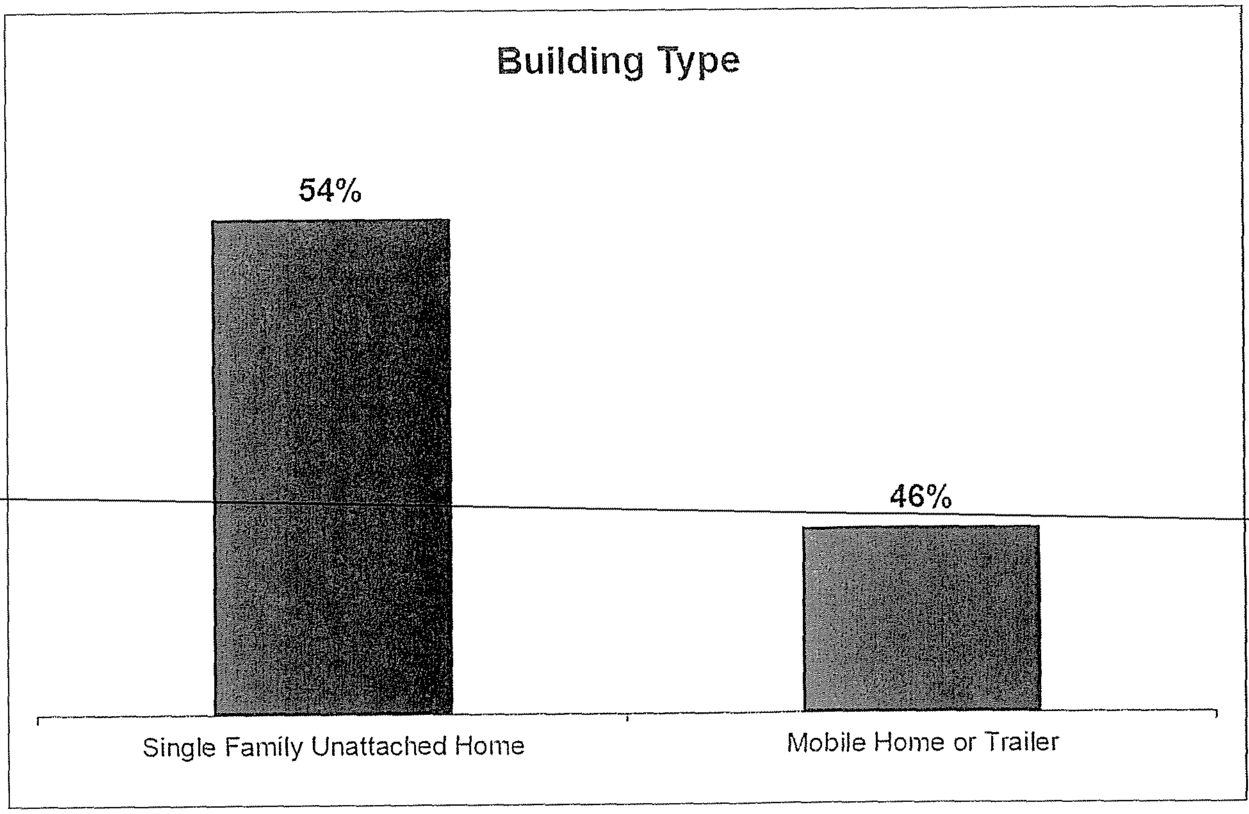
				SKPCO	SWAP	$ Other
Heating Repair work done?	Yes	No	Cost:			
Filter	Yes	No	Cost:			
Cooling work done?	Yes	No	Cost:			
Filter	Yes	No	Cost:			
Safety work done?	Yes	No	Cost:			
Repair work done?	Yes	No	Cost:			
Air leakage sealing done? CFM50 reduction attained: ________	Yes	No	Cost:			
Duct sealing performed? CFM50 reduction attained: ________	Yes	No	Cost:			
Attic insulation installed? Attic 1 area ________ ft2 Pre-R ________ Post-R ________ Attic 2 area ________ ft2 Pre-R ________ Post-R ________ Attic 3 area ________ ft2 Pre-R ________ Post-R ________	Yes	No	Cost:			
Sidewall insulation installed? Wall 1 Area ________ ft2 Pre-R ________ Post-R ________ Wall 2 Area ________ ft2 Pre-R ________ Post-R ________	Yes	No	Cost:			
Floor insulation installed? Floor 1 area ________ ft2 Pre-R ________ Post-R ________ Floor 2 area ________ ft2 Pre-R ________ Post-R ________	Yes	No	Cost:			

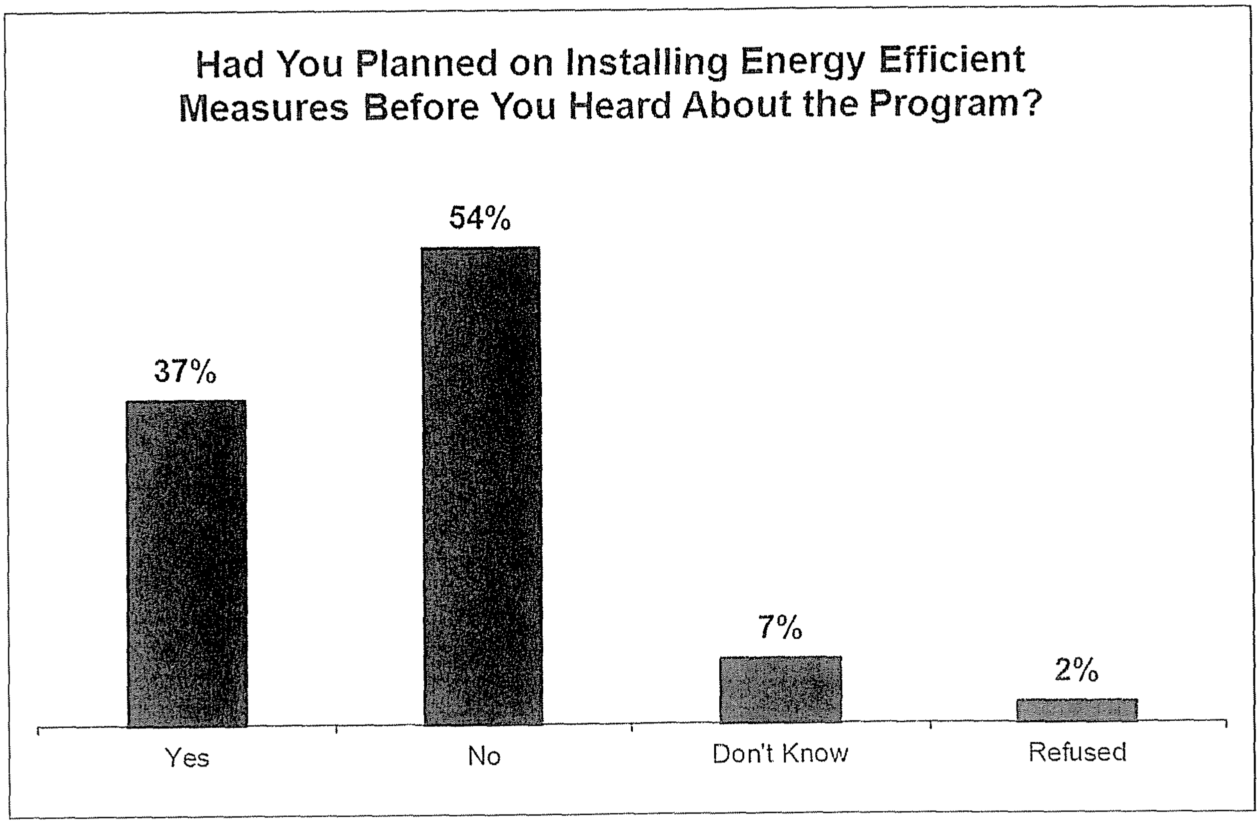
Exhibit 3 – Data Collection Form Page 2

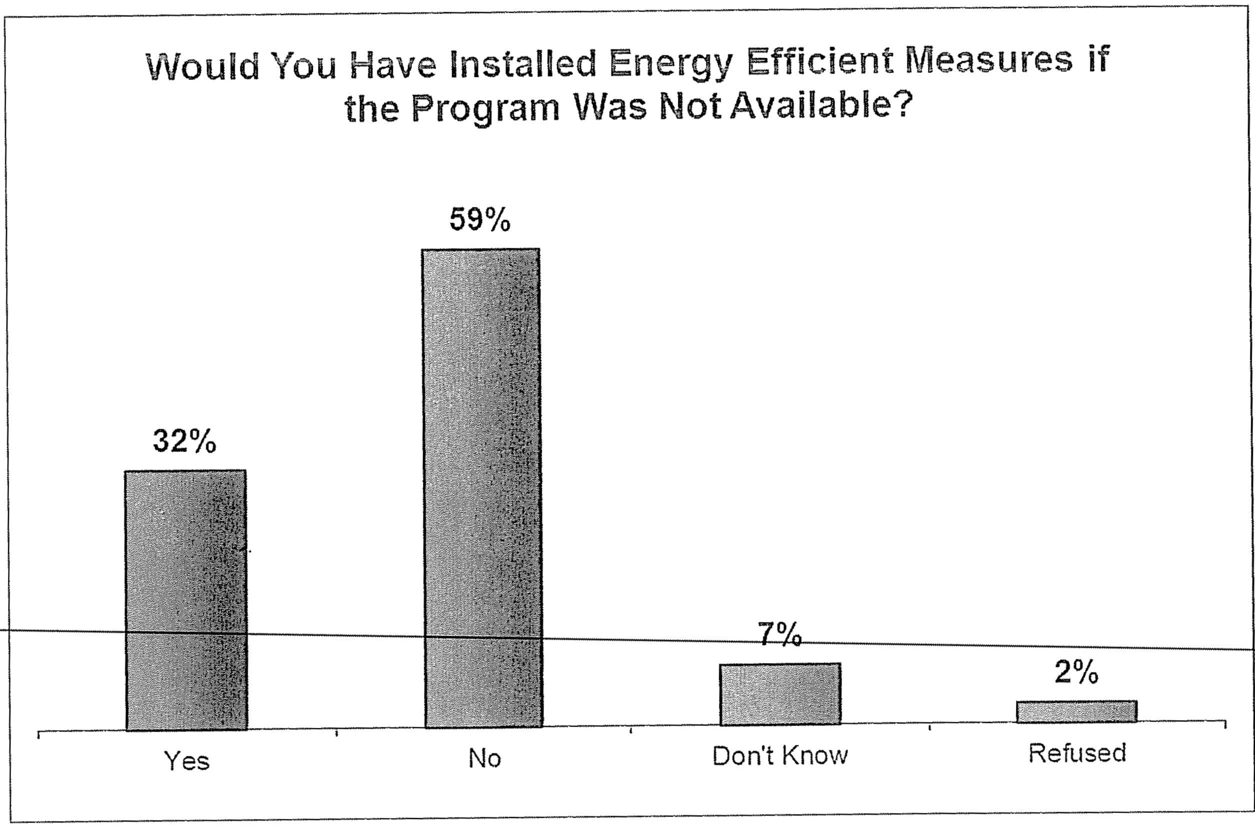
	$KPCO	$WAP	$Other
Ducts/Boiler Pipes insulated? Yes No Cost: Diameter/ Perimeter — Length — R-installed — Locations(s): (U)nconditioned (S)emiconditioned _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______ _______			
Heating system replacement? Yes No Cost: Electric Furnace Replacement with Heat Pump New Heat Pump Size:_______ SEER_______ HSPF_______			
Thermostat Consumer Energy Education Provided? Yes No Original day setpoint: _______F Original night setpoint: _______F New day setpoint: _______F New Night setpoint: _______F # hours day setback: _______ # hours night setback: _______			
Water bed covers installed? Yes No Cost: # installed_______			
Domestic hot water measures performed? Yes No Cost: Fuel Type (check one): ☐ electric ☐ gas Tank capacity: _______ gallons Tank age:_______ years Temperature: original _______ Setback to:_______ # of feet of pipe insulation installed: _______ Insulation jacket installed? Yes No If NO, reason why? _______ Number of low-flow shower head(s) installed: _______			
Compact Fluorescent bulb(s) installed? Yes No Cost: Wattage of bulb #1 installed: _______ Hours of Use: _______ Wattage of bulb #1 replaced: _______ Location of bulb #1_______ Wattage of bulb #2 installed: _______ Hours of Use: _______ Wattage of bulb #2 replaced: _______ Location of bulb #2_______ Wattage of bulb #3 installed: _______ Hours of Use: _______ Wattage of bulb #3 replaced: _______ Location of bulb #3 _______ PORCH			
Consumer Energy Education provided? Yes No Cost:	$50.00		
TEE Administrative Fee:	$175.00		
DOE Weatherization Overhead, Support and DNE Costs			
TOTAL COSTS FOR EACH COLUMN:			

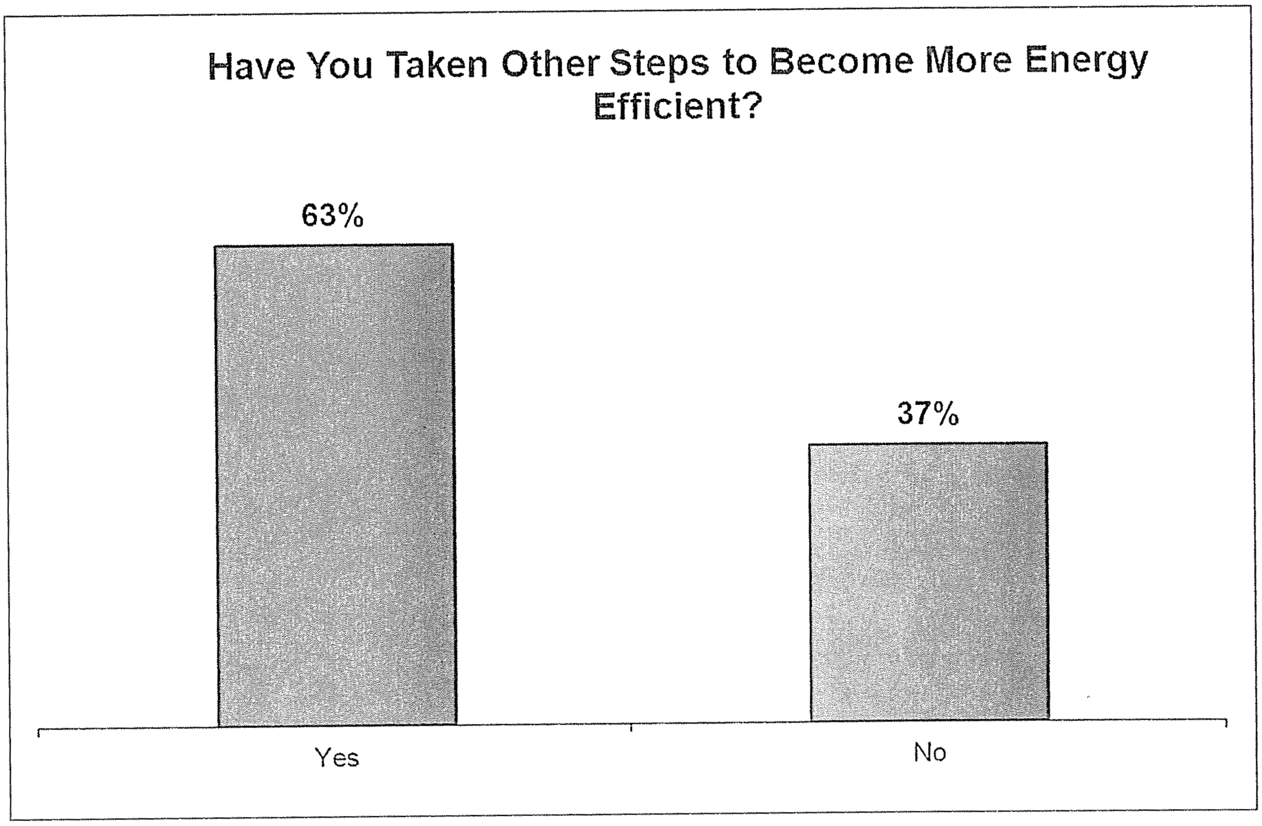
Page 2 of 2

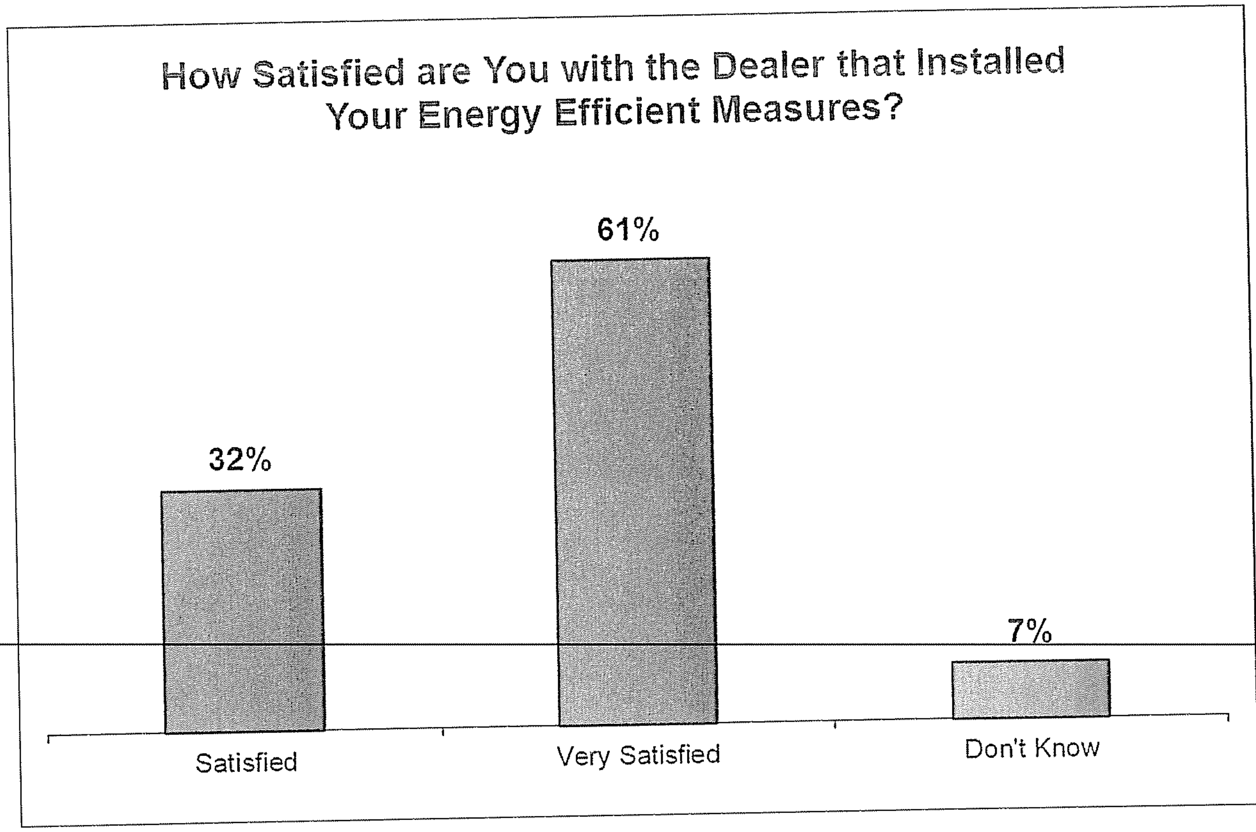
Appendix – All-Electric Survey

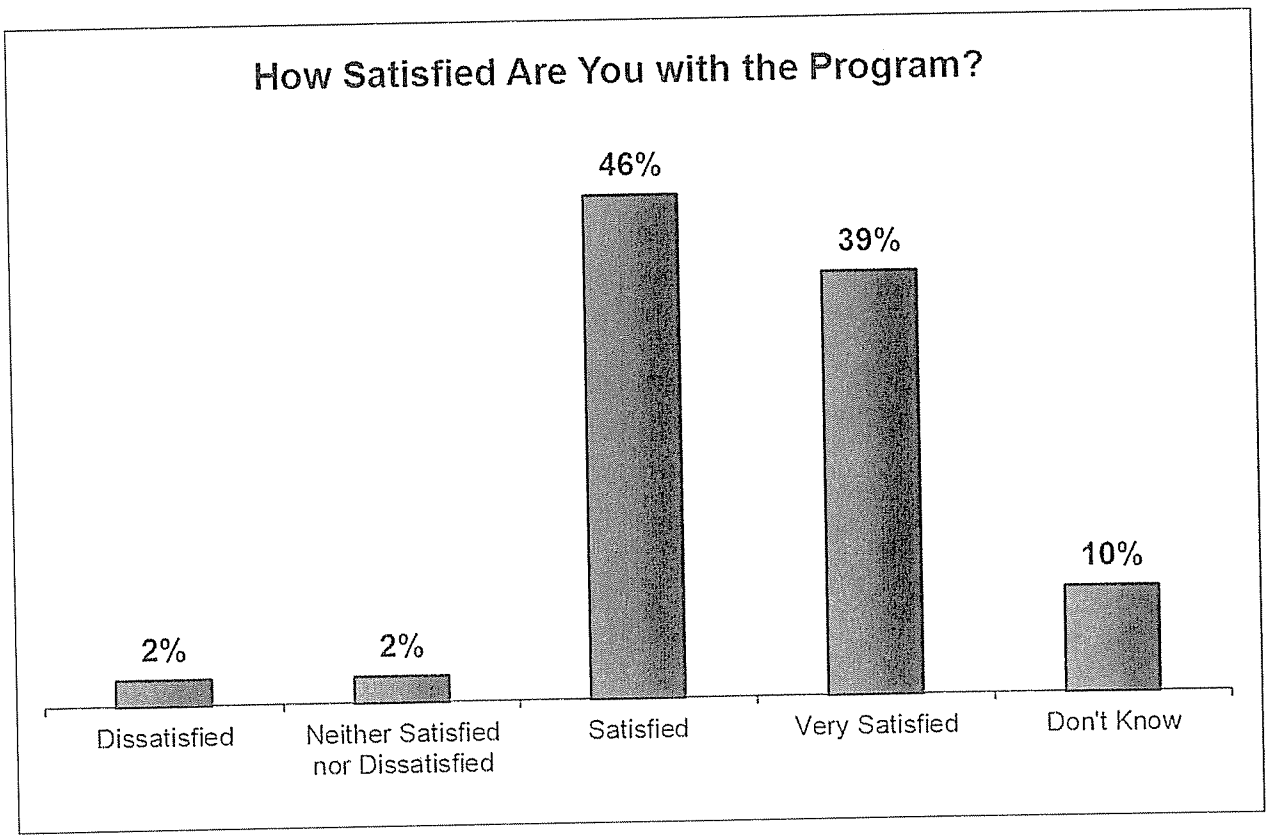




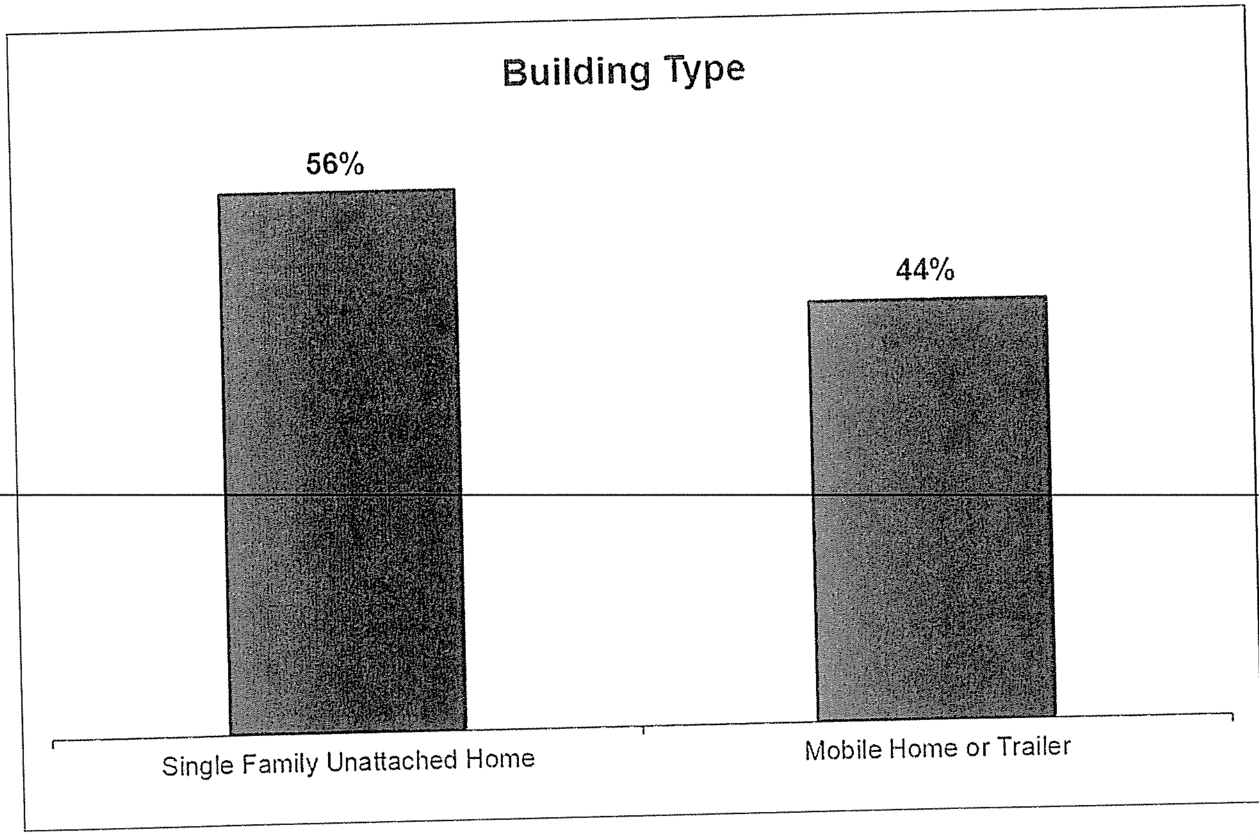

Would You Have Installed Energy Efficient Measures if the Program Was Not Available?
32%
59%
7%
2%
Yes
No
Don't Know
Refused

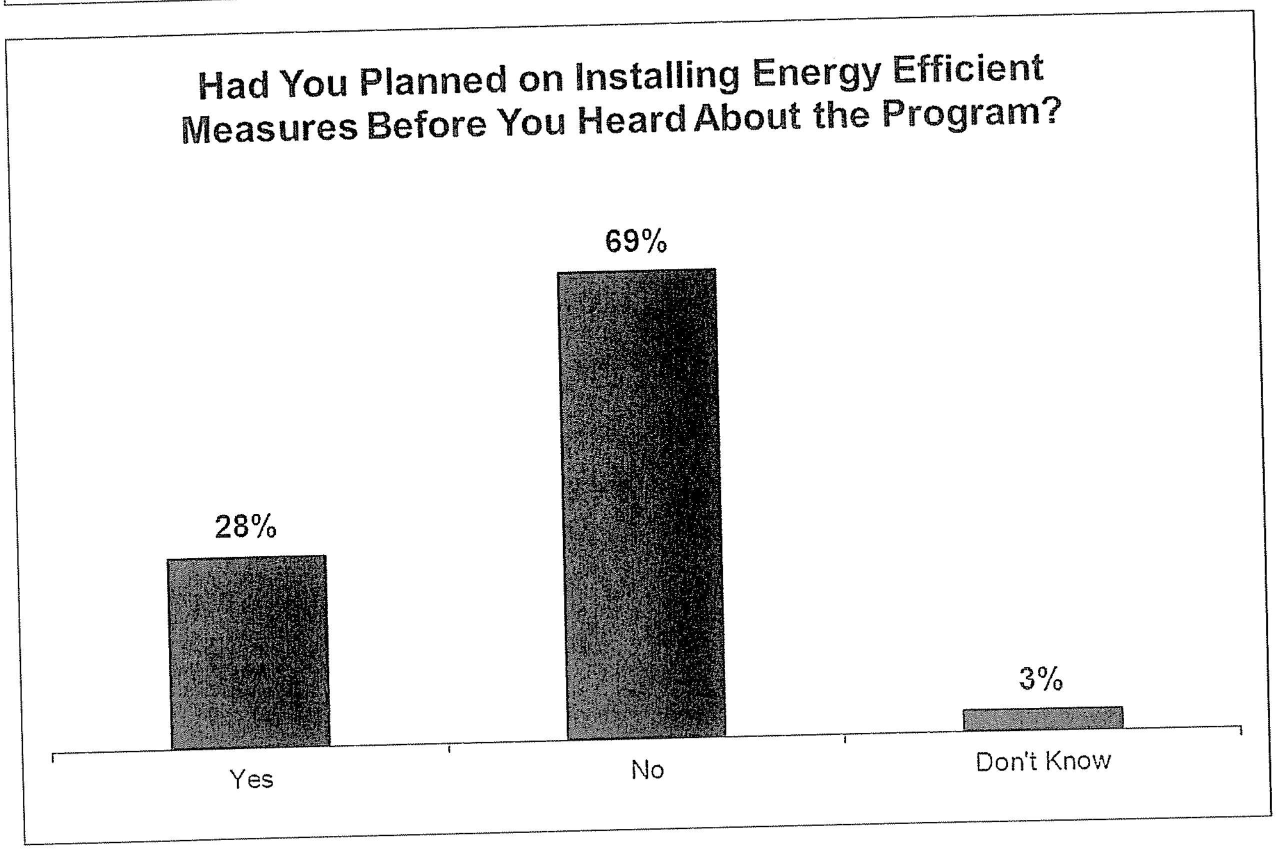

Have You Taken Other Steps to Become More Energy Efficient?
63%
37%
Yes
No

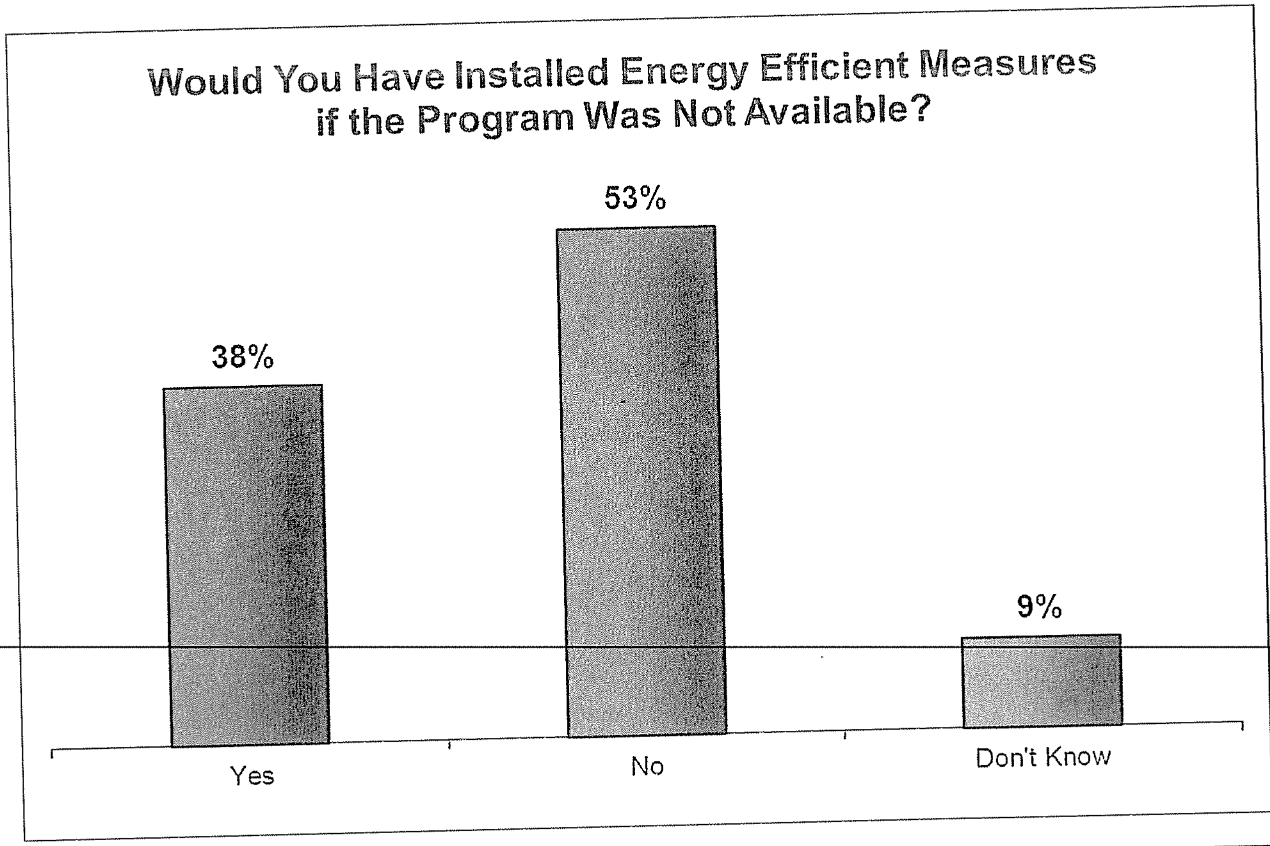

How Satisfied are You with the Dealer that Installed Your Energy Efficient Measures?
61%
32%
7%
Satisfied
Very Satisfied
Don't Know


How Satisfied Are You with the Program?
46%
39%
10%
2%
2%
Dissatisfied
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied
Don't Know

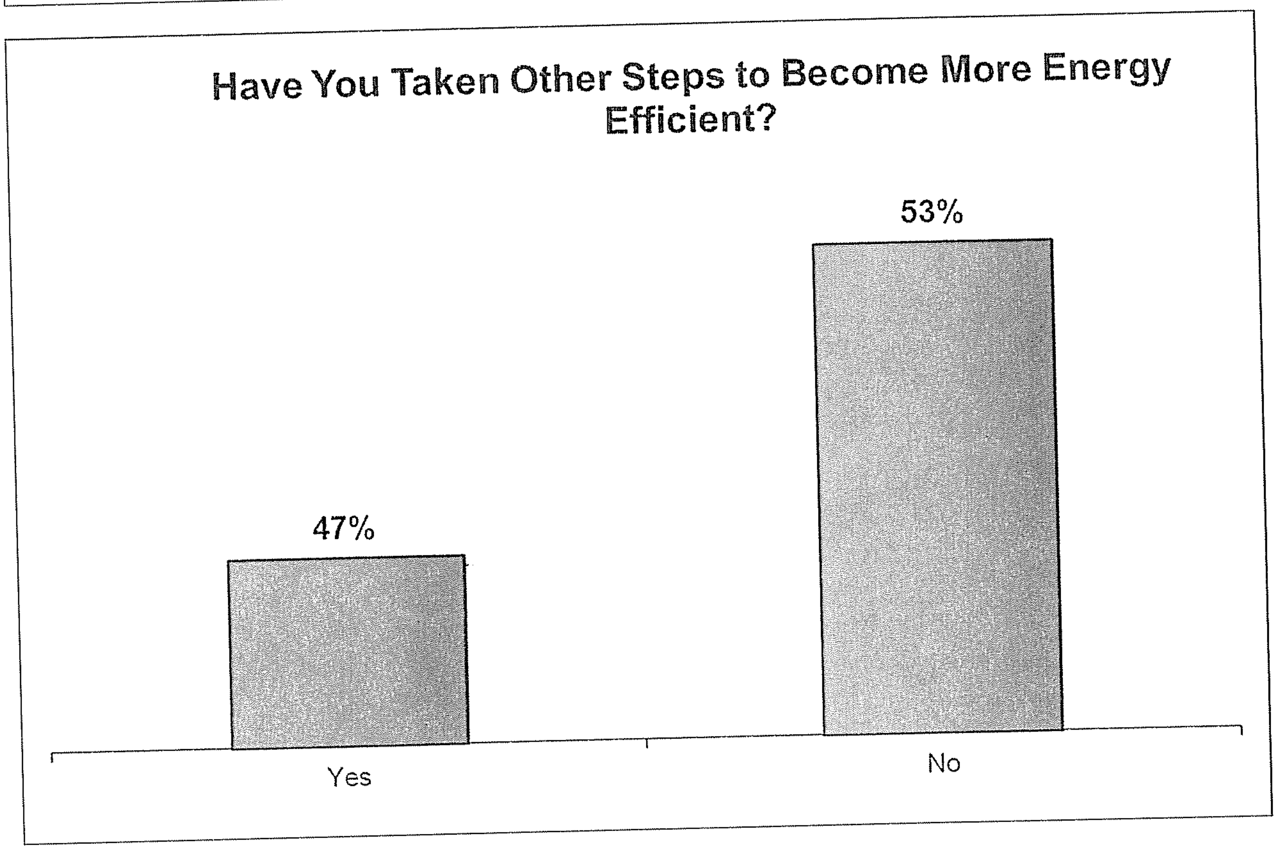
Appendix – Non-All-Electric Survey



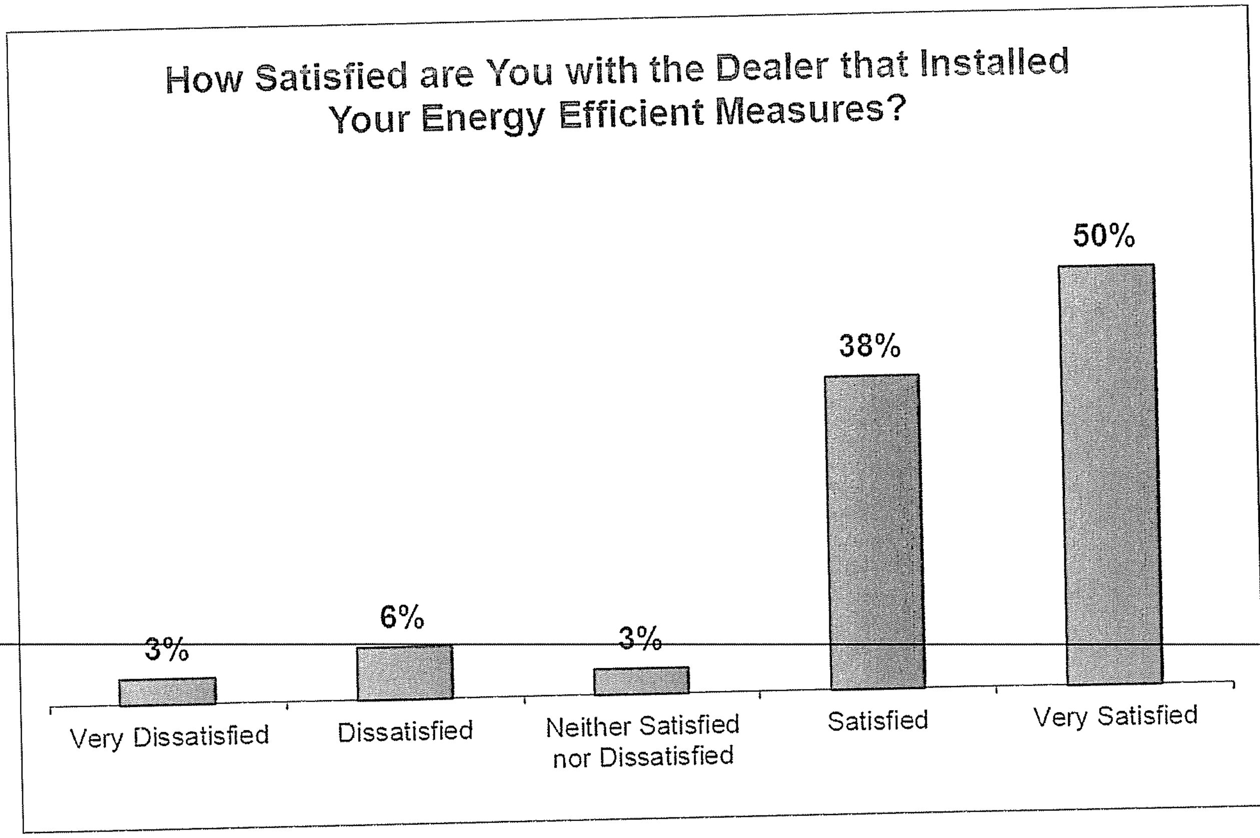


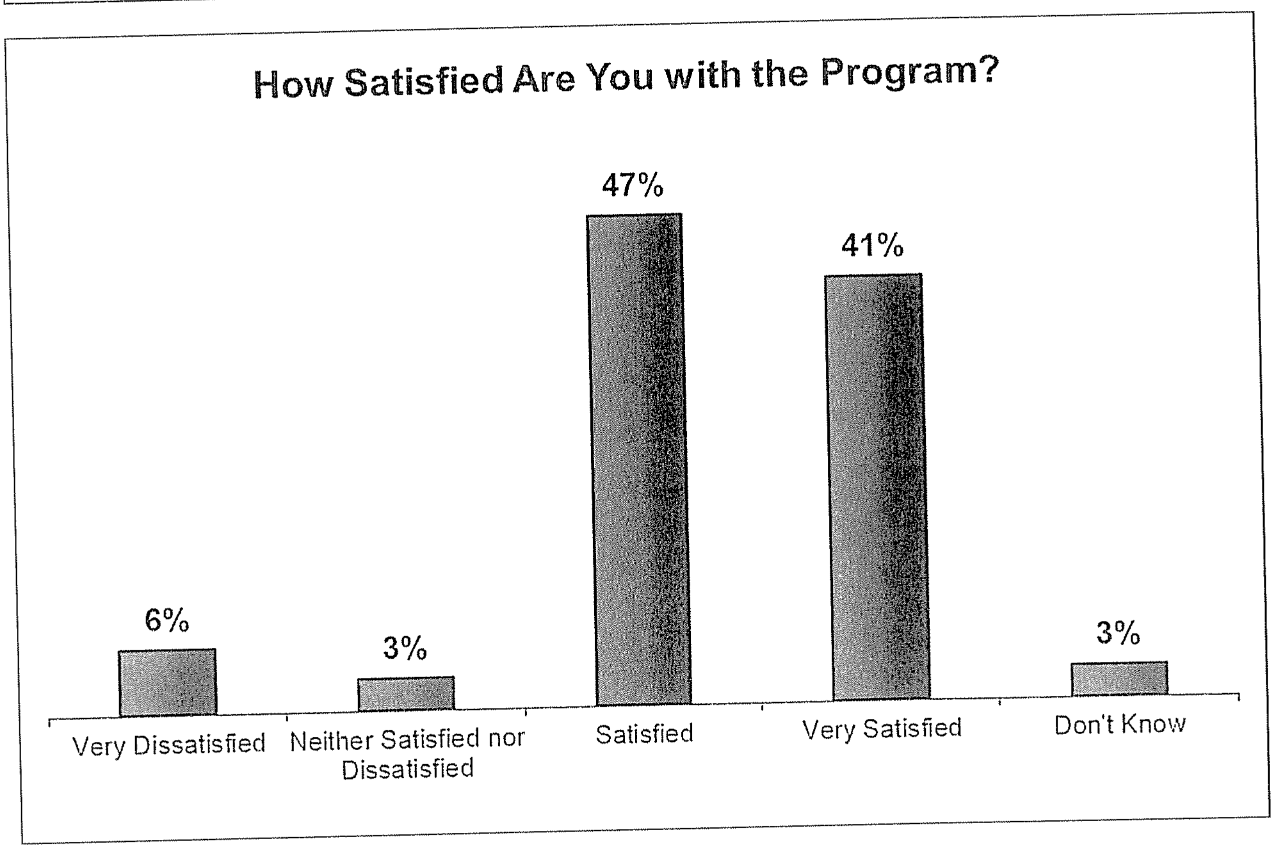


Would You Have Installed Energy Efficient Measures if the Program Was Not Available?
38%
53%
9%
Yes
No
Don't Know



Have You Taken Other Steps to Become More Energy Efficient?
47%
53%
Yes
No


How Satisfied are You with the Dealer that Installed Your Energy Efficient Measures?
50%
38%
6%
3%
3%
Very Dissatisfied
Dissatisfied
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied


How Satisfied Are You with the Program?
47%
41%
6%
3%
3%
Very Dissatisfied
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied
Don't Know

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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AEP

Evaluation Report

Kentucky Power Company

Mobile Home Heat Pump

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team
American Electric Power Service Corporation
1 Riverside Plaza, 13th Floor
Columbus, OH 43215

Table of Contents

Executive Summary

The Kentucky Power Company (KPC) Mobile Home Heat Pump (MHHP) program is designed to promote a more efficient HVAC system for mobile home owners. Approximately one third of all the Company's electric space heating residential customers live in mobile homes. Many of these mobile homes are heated and cooled by relatively inefficient HVAC systems. A significant gain in efficiency can be obtained by upgrading these HVAC systems with high efficiency heat pumps. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. For 2009 and 2010, the MHHP program replaced 393 heat pumps, providing 1,015 MWh of net annualized energy savings, 181 kW of summer peak demand savings, and 299 kW of winter peak demand reductions. The process evaluation concluded that the promotion and delivery processes continue to be effective.

Based on the results of the evaluation, the MHHP program was determined to be cost-effective for three of the cost-benefit tests used in the California Standard Practice Manual and KPC should continue to utilize the program through the remainder of the current program life (2011). The prospective analysis of the program for 2012-2014 predicts the program will be cost-effective and should be continued.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio	Winter Peak Ratio
Program Administrator Cost (PACT)	3.28	3.72
Total Resource Cost (TRC)	4.61	5.23
Ratepayer Impact Measure (RIM)	0.65	0.74
Participant Cost (PCT)	8.00	8.00

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	4.72
Total Resource Cost (TRC)	6.41
Ratepayer Impact Measure (RIM)	0.88
Participant Cost (PCT)	8.24

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Kentucky Mobile Home Heat Pump program was developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on December 4, 1995 (Case No. 95-427) to help meet Kentucky Power's goals.

Kentucky Power Company promoted the program through HVAC contractors and paid incentives to both the contractor and the customers who purchased a high-efficiency heat pump to replace their existing electric furnace. The major goals of the Mobile Home Heat Pump program are to:

1) Reduce energy consumption of electrically heated mobile homes
2) Assist and encourage mobile home owners to improve heating, ventilation, and air conditioning (HVAC) efficiency by installing high efficiency heat pumps
3) Increase customer satisfaction and services
4) Reduce Kentucky Power's long-range peak demand.

Process and Market Evaluation

Summary

The Program has been in place for many years, and therefore a detailed review of the basic program processes was deemed unnecessary. Rather, the primary concern related to the process and market evaluation was whether the program continues to influence purchasing decisions or whether the market has been fully transformed to the point where new heating system purchases would normally be high-efficiency heat pumps without the program. The 2011 survey of participants indicated that just over 50% of the participants would likely have purchased an equivalent high efficiency heat pump without the program, thus it can be inferred that the program still influenced the decision making of about 50% of customers making heating system replacement decisions in 2009 and 2010.

~~The promotion method employed was effective, but improvements in promotion could be considered.~~ The delivery mechanism continues to be effective, as customer satisfaction levels were high.

Promotional Effectiveness

KPC promoted the program solely through an established network of participating HVAC contractors. In 2010, KPC staff reviewed a database of all HVAC contractors in and near the KPC service territory, pursued recruitment of additional contractors, and successfully expanded the base of participating contractors. KPC staff estimated that 80% of HVAC contractors in KPC service territory are now participating in the program. Participants normally became aware of the program only after they contacted a participating HVAC contractor and inquired about heating system replacement. Some participants may have also heard about the program from neighbors and friends. A customer incentive of $400, as requested by the Kentucky Demand Side Management Collaborative, and approved by the Kentucky Public Service Commission, was provided to offset a significant portion of the incremental cost of the high-efficiency upgrade. Dealers received a $50 incentive for each installation to offset the cost of their time and effort. This promotional method is likely effective in reaching customers who need to replace their heating system, but direct program promotion to all customers could accelerate some heating system replacement decisions and provide a better understanding of the program for customers considering HVAC replacements.

Delivery Mechanism

To qualify for the program, each HVAC contractor was required to be licensed and certified. When contacted by a KPC customer, the HVAC contractor explained the program to the customer, described the incentive offered for installing a new high efficiency heat pump, and provided the customer with the KPC provided marketing material. Once selected for the project, the contractor handled all facets of the installation and provided the Company with customer installation reports from which incentive payments were made to the customer and the contractor. KPC staff entered the information into an Excel spreadsheet for participant tracking, worked with the contractors to resolve any missing or questionable information, and processed the rebates. No on-site inspections were performed to verify the provided heat pump information and quality of contractor installation.

Data Tracking

As a whole, data collection and tracking were adequately performed. Sporadic pieces of data were missing that are required to produce engineering estimates for Air Source Heat Pumps. Each customer must have the baseline and replacement Heating Seasonal Performance Factor (HSPF), Seasonal Energy Efficiency Rating (SEER), Energy Efficiency Rating (EER), and size in tonnage or British thermal unit hours (BtuH). The implementation data for this program was missing the EER of the new heat pumps. Without EER, accurate demand estimates cannot be made.

Free Riders and Spillover

A free rider is a participant who installed a high-efficiency heat pump system, but would have installed the same system had they not participated in the Program. Spillover refers to additional energy efficiency measures adopted by participants as a result of the program. Free ridership was determined by dividing the total survey responses by the positive responses to the questions "Had you planned on installing a heat pump before you heard about the program?" and "Would you have installed a heat pump if the program was not available?" From the survey responses, 53% of participants indicated they would have purchased the same high-efficiency heat pump without the program and thus were classified as likely free riders in this program. No information on possible spillover effects was captured in the survey.

Market Potential

The 2010 Residential Customer Survey showed that approximately 20,000 KPC households reside in mobile homes which they own. Almost 70% use electricity for heating and over 50% of those currently heat with a central forced air furnace. Over 6,000 of the HVAC systems in those homes are more than ten years old, and over 2,000 are older than 15 years. The 2011 participant survey indicated that 53% of the participants would have purchased a high-efficiency heat pump without the program, indicating that the choice of a high-efficiency heat pump is becoming more common. Even though the choice is becoming more common, there is clearly still a continuing need for encouraging high-efficient heat pump installations as replacements for central furnace systems. Setting a goal of influencing at least 200 purchases in each of the next two years seems achievable.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was very high, with 95% of the survey respondents indicating they were very satisfied (45%) or satisfied (50%) with the program. One respondent was very dissatisfied and two were dissatisfied. From the comments received the source of the very dissatisfied and one of the dissatisfied responses was the recent KPC rate increase and not the MHHP program itself. The lone dissatisfaction with the program appeared to be related to the heat output of the MHHP, which is not unexpected for someone who was used to the warmer air produced by a forced air furnace.

Impact Evaluation

The MHHP evaluation consisted of a billing analysis coupled with engineering estimates of the implementation data collected by KPC. The billing analysis was used to determine net savings by participant. The engineering estimates were used to develop gross measure savings by participant. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. To effectively capture the change in usage patterns, an evaluation needs both pre- and post-installation billing data. The per-participant billing analysis savings are compared to the per-participant engineering estimates to determine an estimated Net-to-Gross ratio. In theory, the billing analysis results should capture the free ridership and spillover behaviors of participant group. Those results are then compared to the survey results to see if the free ridership and spillover questions asked corroborate the analysis. Further details of the billing analysis and engineering estimates can be found in the appendixes.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. Once a valid set of customers was determined, the next step was to perform a billing analysis and create engineering estimates using the algorithm for Air Source Heat Pumps (Appendix – Engineering Estimates) to determine an average per-participant energy, summer peak, and winter peak savings value. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings are in the below table.

2009 and 2010 Average Net Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
Per Participant Savings	2,583	0.460	0.760

For 2009, KPC had goals of replacing 110 customers' heat pumps and saving KPC customers 192 MWh, 40 kW in summer peak demand, and 80 kW in winter peak demand. The program replaced 160 heat pumps, and produce net annualized total program savings of 413 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized summer peak demand reductions were 74 kW, and the winter peak demand reductions were 122 kW. KPC met 145% of their participant target, 215% of their energy target, 184% of summer demand target, and 152% of their winter demand target.

For 2010, KPC had goals of replacing 150 heat pumps and saving KPC customers 262 MWh, 55 kW in summer peak demand, and 109 kW in winter peak demand. The program replace 233 heat pumps, and produce net annualized total program savings of 602 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized summer peak demand reductions were 107 kW, and the winter peak demand reductions were 177 kW. KPC met 155% of their participant target, 229% of their energy target, 196% of their summer demand target, and 162% of their winter demand target.

For the first two years of the MHHP program, KPC replace 393 heat pumps, producing net annualized program savings of 1,015 MWh of energy savings, 181 kW in summer peak reductions, and 299 kW in winter peak reductions. KPC met 151% of their participant target, 223% of their energy target, 191% of their summer demand target, and 158% of their winter demand target. All numbers were at or above the expected goals.

Impact Results

The four key statistics used in an impact evaluation – number of participants, energy savings, summer peak demand reduction, winter peak demand reduction – are shown below. Included in the table are the program goals, the *ex-ante* savings, and the *ex-post* savings. *Ex-ante* savings are forecasted savings as reported by the program staff during the program's implementation. *Ex-post* savings are estimated savings as determined by the impact evaluation and reported in the evaluation report. Savings are presented by each segment of customers, resistance and replacement, and total savings are summarized at the end.

Below are the impact evaluation results for the customers that previously had resistance heating. The negative summer demand savings are actually load growth, not reduction.

Impact Evaluation Results by Year for MHHP Customers

Category	Goal	*Ex-Ante*	*Ex-Post*	Percent of Goal
2009				
Participants	110	160	160	145%
Energy (MWh)	192	280	413	215%
Summer Demand (kW)	40	58	74	184%
Winter Demand (kW)	80	116	122	152%
2010				
Participants	150	233	233	155%
Energy (MWh)	262	408	602	229%
Summer Demand (kW)	55	85	107	196%
Winter Demand (kW)	109	170	177	162%
Total				
Participants	260	393	393	151%
Energy (MWh)	455	687	1,015	223%
Summer Demand (kW)	95	143	181	191%
Winter Demand (kW)	189	286	299	158%

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects. Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included for recovery purposes, unless new labor was utilized incrementally and specifically for DSM program implementation.

The expenditure goal for 2009 in the Collaborative Report was $49,500 for 110 participants. The total program costs as filed were $71,900 of which $64,000 were listed as incentives for 160 participants. However, these costs do not include the unrecoverable administrative costs from KPC staff and AEPSC staff. An estimated $17,091 was included under administration to account for unrecoverable costs, bringing the total to $88,991 in actual costs related to the program. The expenditure goal for 2010 in the Collaborative Report was $67,500 for 150 participants. The total filed program costs were $104,800, of which $83,300 were incentives for 233 participants. To account for unrecoverable admin costs and the costs from the 2011 evaluation, another $11,775 was included for 2010 and $10,000 was added in 2011 to account for admin and evaluation costs respectively.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analysis attempted to account for all costs related to program implementation and evaluation. Therefore an estimate of the value of KPC and AEP Service Corporation (AEPSC) staff time utilized to implement and evaluate the program was added to the reported costs. The below table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	Total
2009	$17,091	$7,900	$64,000	$-	$88,991
2010	$11,775	$21,500	$83,300	$-	$116,575
2011	$-	$-	$-	$10,000	$10,000

Goals were reported as total amounts respective to the winter peak only, however, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter. Benefit costs tests were performed by Resistance Heat, Replacement, and Total participation. Results were lower than expected, though unremarkable. It is expected that prospective benefit cost ratios for some programs will be overestimated, sometimes wildly, due to the sunny disposition and uncertain nature of market potential studies.

Program goals were to have a Program Administrator Cost (PACT) ratio of 6.02, a Total Resource Cost (TRC) ratio of 9.79, a Ratepayer Impact Measure (RIM) ratio of 3.45, and a Participant Cost (PCT) ratio of 9.07. Results for benefit cost ratios at summer peak are 3.28 for the PACT, 4.61 for the TRC, 0.65 for the RIM, and 8.00 for the PCT. Results for benefit cost ratios at winter peak are 3.72 for the PACT, 5.23 for the TRC, 0.74 for the RIM, and 8.00 for the PCT.

Total program benefit cost results were cost-effective from Participant, Program Administrator, and Total Resource perspectives. All three ratios (PCT, PACT, and TRC) are considered greater than one, and cost beneficial, regardless of peak season.

2009 and 2010 Summer Peak Cost Effectiveness Analysis

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	3.28	$ 470,444	$ 676,565	$ 206,121
Total Resource Cost (TRC)	4.61	$ 529,875	$ 676,565	$ 146,690
Ratepayer Impact Measure (RIM)	0.65	$ (361,547)	$ 676,565	$ 1,038,112
Participant Cost (PCT)	8.00	$ 1,042,743	$ 1,191,775	$ 149,032

2009 and 2010 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	3.72	$ 560,865	$ 766,986	$ 206,121
Total Resource Cost (TRC)	5.23	$ 620,296	$ 766,986	$ 146,690
Ratepayer Impact Measure (RIM)	0.74	$ (271,126)	$ 766,986	$ 1,038,112
Participant Cost (PCT)	8.00	$ 1,042,743	$ 1,191,775	$ 149,032

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, there will be any changes to the cost effectiveness of the program in future years. Any number of a multitude of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the MHHP program, results from the current evaluation were used as the starting point for the cost-benefit analysis. Future savings values were discounted due to the nature of the program being a market transformation program. Free ridership was kept at 47% during the prospective analysis; it is not expected to increase at this time. The results were expected to be higher due to an increase in the cost of avoided energy in future years.

Due to KPC being a winter peaking utility, only the winter peak cost benefit analysis was run. The results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective and should be continued.

2012-2014 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	4.72	$ 1,261,556	$ 1,601,079	$ 339,523
Total Resource Cost (TRC)	6.41	$ 1,351,392	$ 1,601,079	$ 249,688
Ratepayer Impact Measure (RIM)	0.88	$ (214,856)	$ 1,601,079	$ 1,815,936
Participant Cost (PCT)	8.24	$ 1,797,976	$ 2,046,184	$ 248,208

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the MHHP program.

1) Results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective. It is our recommendation that this program be continued. SEER levels offered should continue as is, until the free ridership levels rise to near 50%.
2) Inclusion of EER for every heat pump installed, and if possible, the EER of the replacement heat pump should be collected.
3) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
4) On-going program management should be handled by KPC staff, including tracking of customer participation and estimated ex-ante savings.
5) KPC staff labor time spent on the Program should be captured so that the true total cost of delivering the program can be known.
6) KPC should request AEP add fields or processes to capture HVAC information on their customers, specifically the current type heating and cooling systems in the home. This would provide a more accurate way of comparing the participant group to the population for billing analyses.
7) KPC should request AEP add fields or processes to capture building type on their customers. One of the greatest levels of uncertainty in the analysis is not being able to easily and accurately match participant customers to control customers constrained by a population of mobile home customers only.
8) Program participants should be surveyed shortly after the rebate is processed.
9) KPC staff should perform on-site installation audits for a small sample of participants. This may necessitate adding another employee.
10) KPC should gather information from the dealers about customers that were interested in the program but declined to participate. Using that information, KPC should then sample the customer list and perform a non-participant survey to find any reasons for non-participation.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

I. California Public Utilities Commission. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

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VIII. Sonderegger, Robert C. A Baseline Model for Utility Bill Analysis Using Both Weather and Non-Weather Related Variables. June 1998.

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XI. DeBoor, Carl (1981), A Practical Guide to Splines, New York: Springer-Verlag.

XII. Kentucky Power DSM Collaborative Report. January 1, 2008 to December 31, 2008.

XIII. Kentucky Power DSM Collaborative Report. January 1, 2009 to December 31, 2009.

XIV. Kentucky Power DSM Collaborative Report. January 1, 2010 to December 31, 2010.

Appendix – Impact Methods and Assumptions

Impact Methodology

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in both the initial expected impact from an average installation and also the long-term savings from the specific installations.

Billing Analysis

Impact evaluation consists of two stages, interim impact evaluation and full impact evaluation. Engineering estimates are used to develop measure savings without post-consumption data. Implementation data is utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. The full impact evaluation consists of a billing analysis. This analysis utilizes relevant weather data and billing data with the statistical regression models to determine the savings impact of the program. A comparison of customers' bills before and after the implementation of the program is used to determine changes in usage and demand that can be attributed to the program. In order to isolate the effects of the program from unassociated changes in consumption, a Participant Group and a distinct but similar Control Group is compared. The Control Group will not contain program participants, but its customers will be similar in consumption to the program participants. After defining these research groups, billing data is weather-normalized to eliminate any effects due to weather differences before and after program implementation. Finally, regression models will be used to analyze the normalized data and provide savings values.

The first step of the billing analysis is to create a valid participant list from which to analyze. Each customer is checked to ensure that data existed for at least one year pre and post measure installation. Participants were also required to have data for all of 2008 to develop a set of comparison metrics for drawing the control group. Any customers that did not have the requisite billing data, or were inactive at the time of analysis, were discarded from analysis.

For 2009, the implementation data provided showed that 160 customers participated. One customer was not active in the AEP Customer Information System (CIS) at the time of installation, and 26 were not found in the CIS at all. In all, 138 customers were available for analysis. In 2010, after validation, 22 customers were not in the AEP CIS; leaving 206 customers available for analysis. In total there were 344 customers in the implementation data that were valid for analysis.

After the participant list was created, a set of energy statistics was developed to compare to the control group. For each customer, an annual kWh, summer peak month kWh, and winter peak month kWh (formulas below) were calculated using 2008 billing data. KPC summer and winter peaks were pulled from the AEP Load Research system peak data and applied to each customer bill that contained that date, and was used to create a summer and winter monthly energy value.

Formula for determining comparison statistics between participant and control group

$$kWh_{annual} = 365 \times \frac{\sum kWh\_per\_Bill}{\sum Days\_per\_Bill} \qquad kW_s = 31 \times \frac{kWh\_per\_Bill_s}{Days\_per\_Bill_s} \qquad kW_w = 31 \times \frac{kWh\_per\_Bill_w}{Days\_per\_Bill_w}$$

After participant group selection is complete, the KPC population is validated to provide a list of potential control group customers. The population is usually constrained by one or more of program class (residential, C&I, etc…), building characteristics (single-family, mobile home, etc…), fuel type (all electric, natural gas, etc…), and income level (HEAP, non-HEAP, all). Customers are removed from consideration if they are not continuously active from January 1, 2008 until current. After the control population has been validated, comparison statistics are calculated using the above formulas.

After the control population group has been established, and both the control population's and participant group's comparison statistics have been calculated, the control population's customers are compared to the participants to provide a baseline comparison. Each participant customer is matched to all control population customers, and the top 40 most accurate matches are kept for further analysis. Matching is determined by calculating an Absolute Relative Deviation (ARD) for the Annual kWh, summer kWh, and winter kWh comparison statistics. The customers with the lowest combined ARD are kept for further validation. For each of the 40 control customers, they are assigned the same installation date as the participant customer. Each of the 40 customers is then validated using the same pre/post rules as the participant customers. Each control customer must have at least one year of data pre and post the pseudo-installation of the measure.

Formula for comparing control population customer to participant

$$ARD = ARD_{kWha} + ARD_{kWhs} + ARD_{kWhw}$$

$$ARD_{kWha} = \frac{\left|kWha_{ctrl} - kWha_{part}\right|}{kWha_{ctrl}} \qquad ARD_{kWhs} = \frac{\left|kWhs_{ctrl} - kWhs_{part}\right|}{kWhs_{ctrl}} \qquad ARD_{kWhw} = \frac{\left|kWhw_{ctrl} - kWhw_{part}\right|}{kWhw_{ctrl}}$$

After the 40 customers have been compared to the participant, the top 20 are kept for further evaluation. Twenty control groups are used for comparison because of the variance of the population. The population variance is high because the AEP CIS does not contain enough demographic data on the customer to create a very accurate regression model. There are too many lurking variables in a billing analysis if enough data is not included, which can bias the results. Once the 20 control groups have been selected, each group is run, pairwise, with the participant group through the entire billing analysis process. Final results for each run of the analysis are compared to ensure that none of the control groups are extreme in either direction (load savings or load growth). Using an alpha of .05 for Type I error testing, and a beta of .10 for Type II, or power testing, checks are completed to ensure that the control group methodology is valid. Once the methodology is verified, the first control group, being the most accurate, is used for the regression portion and official savings calculations. If there are concerns about uncertainty, all 20 control groups will be run and the numbers will be aggregated as a replicated analysis.

The regression analysis is conducted by constructing two models, a baseline and treatment weather normalized panel model. A panel analysis is a two-dimensional time-series and cross-sectional model used to evaluate changes in the effects of a treatment on a treatment group compared to a control group over time. Weather Normal, or Typical Meteorological Year, data is created by the U.S. National Renewable Energy Laboratory (NREL) to represent weather data for a typical year. The TMY2 dataset was used for all KPC billing analysis, and is derived from the 1961-1990 National Solar Radiation Data Base (NSRDB).

The baseline model is created using at least one year of billing data pre-installation to develop a weather normalized billing function (see formula below). The treatment model is created using at least one year of billing data post-installation. Each customer is assigned a weather station, average daily temperature, cooling degree day, and heating degree day summaries to each bill. Degree days are calculated by summing the number of hours per day by the degrees per hour above or below a temperature break point. For heating degree days, the breakpoint temperature is set at 65 degrees Fahrenheit. Cooling degree days are calculated using 70 degrees Fahrenheit as the breakpoint. Once the necessary data has been created, an autoregressive model is fit to the data for each customer to create the betas necessary to predict data. Each beta represents the multiplier coefficient for the incremental value of each model variable. To forecast or estimate new kWh, multiply the regression betas by the new data.

Weather normalized regression model

$$kWh = \left(\beta_{daily\_kwh} \times Days\right) + \left(\beta_{ADT} \times ADT\right) + \left(\beta_{CDD} \times CDD\right) + \left(\beta_{HDD} \times HDD\right) + \left(\beta_{CDD^2} \times CDD^2\right) + \left(\beta_{HDD^2} \times HDD^2\right) +$$

Once the baseline and treatment models have been determined, the model betas are multiplied by weather normal data to create baseline weather normalized bills for each customer. Once the bills have been forecasted, the data is aggregated to create annualized normal energy usage per customer. Each customer has an estimated baseline and treatment annualized kWh. The difference between the estimated baseline and treatment kWh is the energy savings due to the program. The annualized energy estimates are then summarized by participant group and control group, and multiple t-tests are completed to compare the savings of each group, and their pairwise difference.

Once the annualized savings numbers have been calculated, the forecasted bills are used to create monthly and daily load shapes for DSMore. The monthly load shape is created by temporally disaggregating the bills from a cycle month to a calendar month. Traditional load research techniques use linear interpolation method of determining an average energy usage per day per bill, then creating a stepped daily load shape. This method maintains transformation under integration, meaning one can move from cycle month to billing month without loss of accuracy; however the ability to detect peaks using this method is very limited. The second method, utilized in this evaluation, is to create a daily load shape using cubic splines. This method is also closed under integration, and is the preferred method for temporal disaggregation when using SAS (Statistical Analysis Software®). AEP Load Research has done studies comparing the accuracy of both methods in predicting daily load shapes of interval metered customers, and found that the cubic spline disaggregation is more accurate when using goodness-of-fit statistics. However, the primary reason for using cubic splines is the ability to put more load on the peak days of the month. Using the cubic spline method, the forecasted bills are disaggregated to a 365 day daily load shape for each customer. Using the daily load shape, the customers are aggregated using traditional load research methods, to determine a domain load shape. For the MHHP program, there were no domains below the program level, just mobile home customers.

Next, the peak day history for KPC is used to create a typical peak day for both the summer and winter peak. This is done by averaging the day per year for each year to determine the average day-per-year. As an example, if the last five winter peaks occurred between January 11th and January 15th, it is expected that the average day-per-year peak day will be January 13th. After the typical peak date for the summer and winter peaks has been determined, the KPC Residential Load Research class load shape, as determined by AEP Load Research, is retrieved for each peak date. Using the Residential class load shape, the proportion of energy used at the peak hour, relative to the total energy for the day is determined as a load factor. To determine the summer and winter peaks, the daily energy from the cubic spline disaggregation is divided by the load factor and 24 (hours per day) to determine the average peak demand reduction for each season. The formula is below:

Peak demand reduction formulas

$$kWs = \frac{\frac{kWh_{peakdayS}}{24}}{LF_S} \qquad kWw = \frac{\frac{kWh_{peakdayW}}{24}}{LF_W}$$

Analysis Results

The below graphs contain the summary panel, profile plot, and agreement plot from SAS, created during the PROC TTEST procedure. Particular attention should be paid to the uncertainty of the parameter estimate for the mean. Because of the uncertainty involved in the model, any savings estimate within the Lower Confidence Level (LCL) and Upper Confidence Level (UCL) is within plus or minus two standard errors of the mean. What this means is that the findings of the billing analysis show that the *ex-ante* savings estimate of 1,749 kWh per participant is not statistically different from the ex *post* savings estimate to the 95% confidence level.

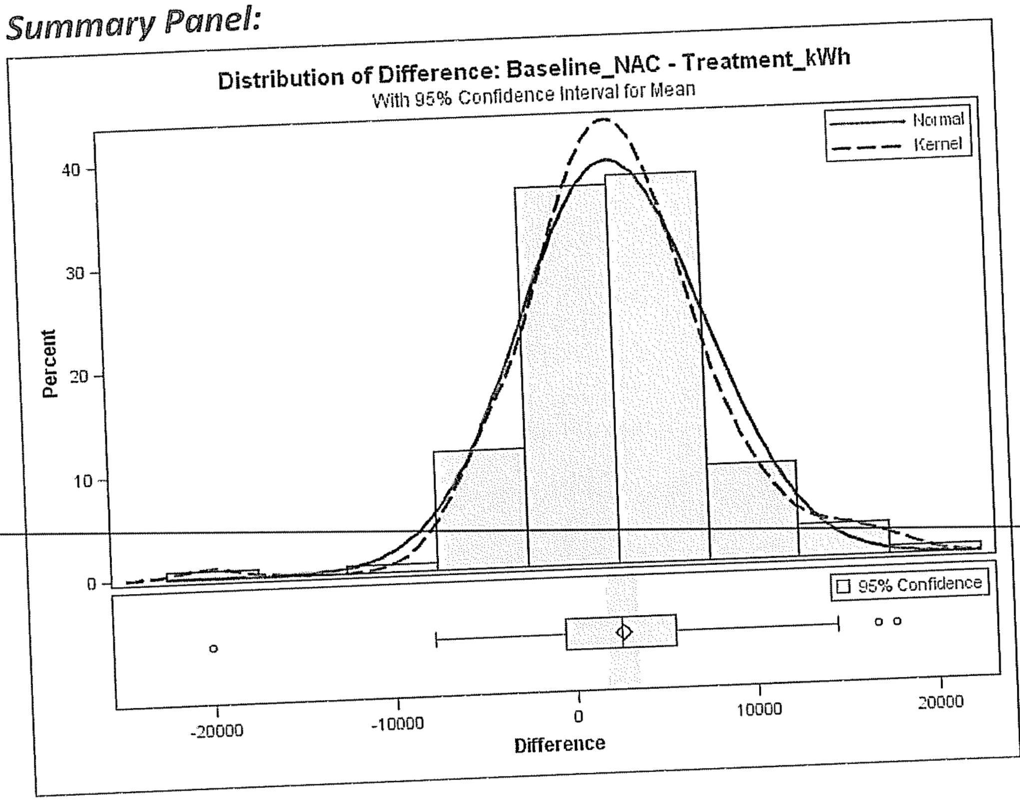
Because of the inability to produce a control group consisting of only mobile home customers, all twenty control groups were ran and aggregated. A cursory glance of the control group baseline and treatment comparisons show extreme variability. Had only one control group been run, the savings could have been as low as 1,229 kWh or as high as 2,323 kWh. Running multiple iterations of the billing analysis allows us to take advantage of the Central Limit Theorem and create a better estimate of the per participant savings. Control group variation numbers are presented after the charts and graphics.

Summary Statistics: All Customers

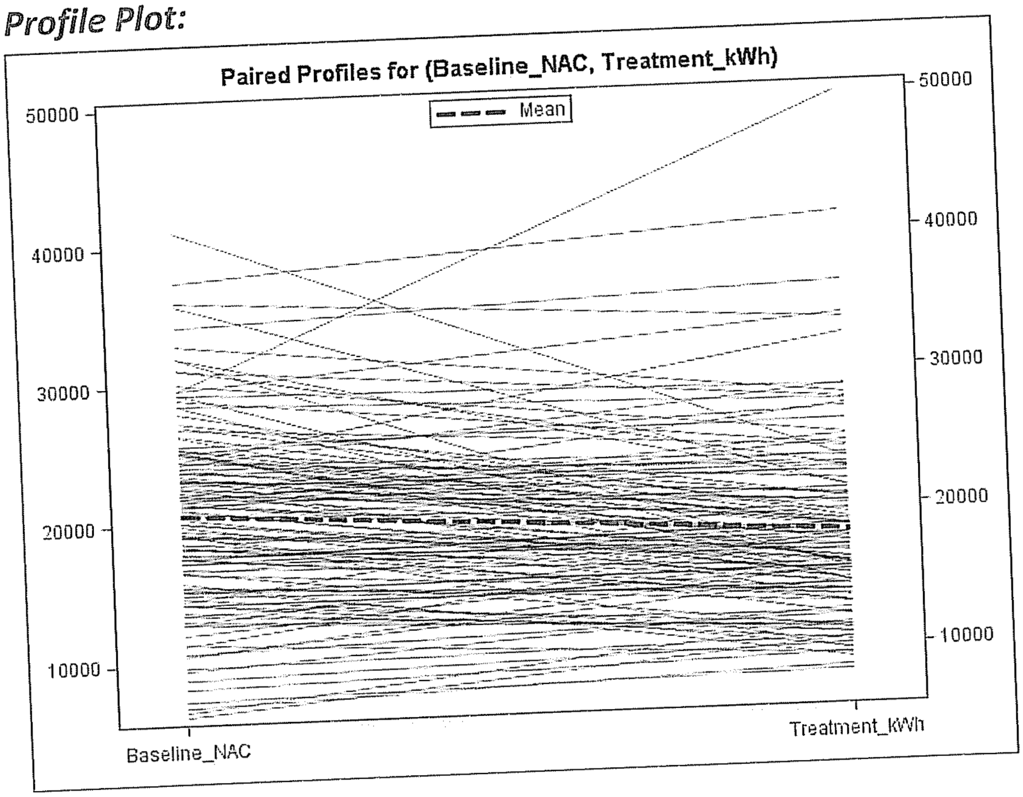
N	Mean	Std Dev	Std Err	95% CL Mean		Summer kW	Winter kW
131	**2,583.1**	5,127.9	448.0	1,696.8	3,469.5	**0.460**	**0.760**

Analysis Graphs

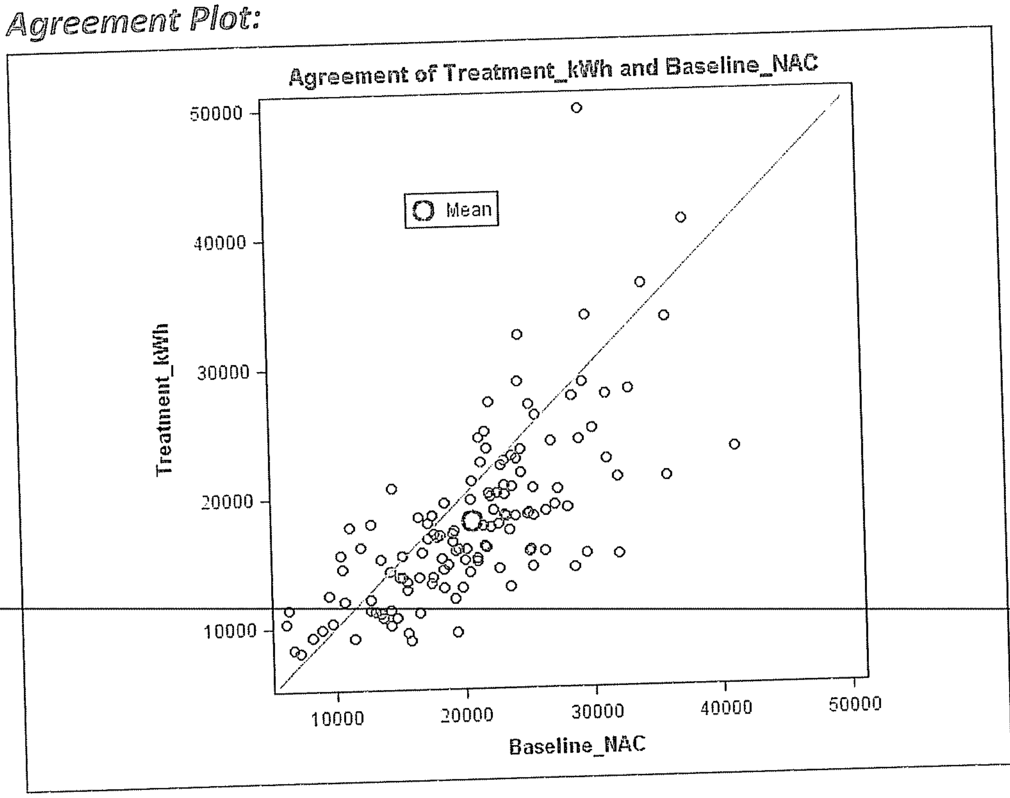
Summary Panel:



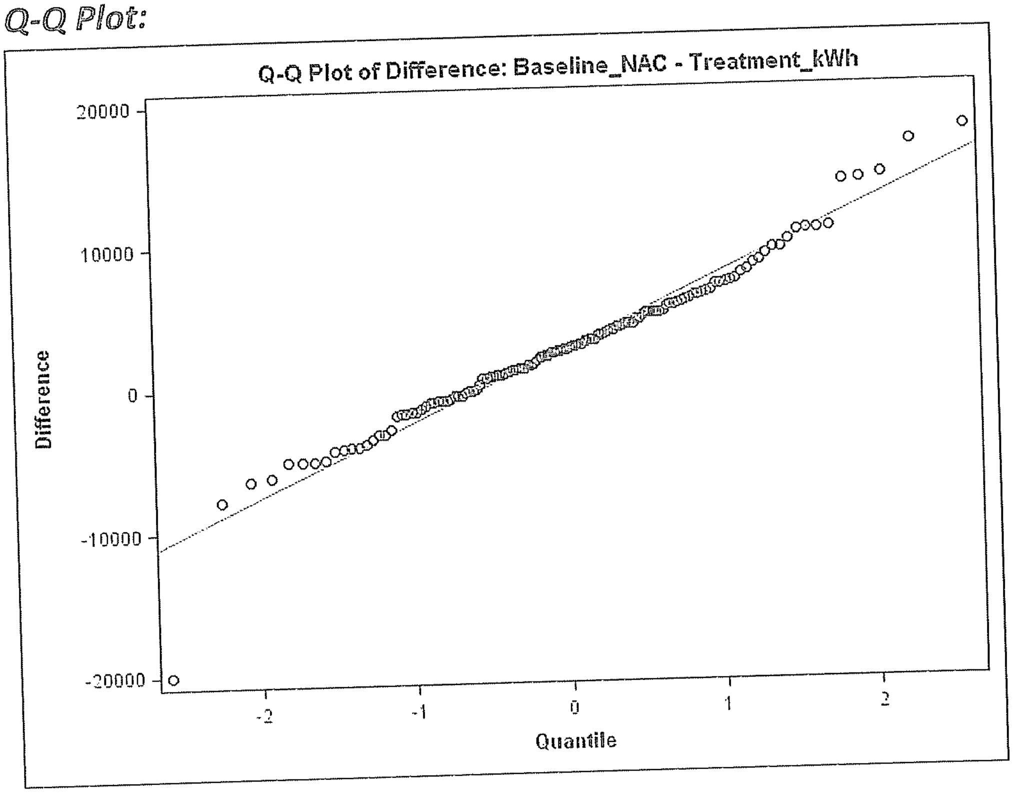
Profile Plot:



Agreement Plot:



Q-Q Plot:



Control Group Analysis

When performing a billing analysis to determine the impacts for program evaluation, the participant group needs to be matched to a set of control customers. For historical analyses, the literature suggests a single control group be matched to the participant list in order to provide a valid set of customers from which to compare. This is done to remove any activities that are related to free ridership: i.e. those activities that would have occurred without the program. However, this author feels that without a robust set of demographic data to make customers comparisons more accurate than AEP's current CIS contains, a billing analysis must treat the control group selection as a replication of quasi-experimental designs. Quasi-experimental design, or "before and after" design, is distinguished by the non-randomness of the control and participant selection groups. However, given the limited demographic data, we substitute the rigorous selection with an increase in replications. Classical statistics (sometimes called Frequentist statistics) is predicated on the notion of repeated trials to infinity, e.g. the relative frequency of a statistics as the trials near infinity. However, in practice, most statistics that is performed is done using a single repeated trial. In many cases, and disciplines, this is an accepted, even celebrated practice. However, in impact analysis of programs, the usage uncertainty and disparity of customer demographics at a premise (number televisions, HVAC usage, work schedule, occupants, etc….) demands that more than one replication be undertaken. Below is the list of control groups generated for this analysis and how each iteration would have compared to the per participant savings calculated in the billing analysis.

Control Group Comparison to Per Participant kWh

Analysis Group	Baseline Mean	Treatment Mean	Ratio	Per Participant kWh if Chosen	Loss/Gain From Mean
Control_01	21,472	20,600	95.94%	2,472	(111)
Control_02	21,120	20,288	96.06%	2,498	(85)
Control_03	21,819	20,995	96.22%	2,533	(51)
Control_04	21,109	20,658	97.86%	2,885	302
Control_05	20,966	20,528	97.91%	2,895	312
Control_06	22,422	21,638	96.51%	2,593	10
Control_07	22,346	21,374	95.65%	2,409	(174)
Control_08	21,273	20,689	97.26%	2,755	172
Control_09	21,517	20,977	97.49%	2,805	222
Control_10	21,414	20,591	96.16%	2,518	(65)
Control_11	21,204	19,731	93.05%	1,851	(732)
Control_12	21,222	21,206	99.93%	3,328	745
Control_13	21,742	21,347	98.19%	2,954	371
Control_14	21,330	20,534	96.27%	2,542	(41)
Control_15	21,878	20,926	95.65%	2,409	(174)
Control_16	21,454	20,770	96.81%	2,659	76
Control_17	20,857	19,767	94.77%	2,221	(362)
Control_18	22,090	20,779	94.07%	2,069	(514)
Control_19	20,963	19,622	93.60%	1,970	(613)
Control_20	21,365	21,329	99.83%	3,308	725

Appendix - Engineering Estimates

Estimation Methodology

To calculate annualized energy savings, an average per-measure savings must be determined based on the heating and cooling savings from the increased efficiency of the heat pump. Heating savings are determined by the inverse difference of the Heating Seasonal Performance Factors (HSPF) between the baseline heat pump and the increased efficiency heat pump. Cooling savings are determined by the inverse difference of the Seasonal Energy Efficiency Rating (SEER) between the baseline and upgraded heat pumps. Each savings value is scaled based on the size of the heat pump by tonnage or British Thermal Unit Hours (BtuH) to determine the per-participant, per-year usage. The per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. This number is compared to the billing analysis values to see if the survey free ridership and spillover questions are comparable to the analytically determined values.

Technology Description

A heat pump is a high efficiency year-round heating and cooling system operating entirely on electricity. The system is called a heat pump because it pumps or moves heat from one area to another. The basic components of a heat pump are a compressor; circulating fluid (refrigerant); and two heat exchangers, one outside and one inside. In winter, heat in extracted from cold outdoor air even when the temperature is well below freezing. The heat is absorbed by the refrigerant, and then is pumped through the compressor to the indoor coil (heat exchanger) where the refrigerant releases its heat to the indoor air. Since there is less heat available at low outdoor temperatures, the heat pump system includes a supplemental resistance heater that automatically provides additional heat when the outdoor air temperature is too low for the heat pump compressor to supply the home's total heating demand. In the summer, the heat is absorbed by the refrigerant in the indoor coil from the circulating indoor air. The heat-laden refrigerant from the indoor coil is pumped to the outdoor coil where the heat is transferred to the outdoor air. The heat pump system is the most efficient way to heat and cool electrically. The most significant energy savings are obtained during the heating season since it utilizes the "free" heat that already exists in the outdoor air. The heat pump energy efficiency is determined by the seasonal energy efficiency ratio (SEER) for summer and the heating seasonal performance factor (HSPF) for winter.

Algorithms

$$kWh = \left[\left(FLH_{cool} \times \frac{BtuH}{1000} \times \left(\frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}} \right) \right) + \left(FLH_{heat} \times \frac{BtuH}{1000} \times \left(\frac{1}{HSPF_{base}} - \frac{1}{HSPF_{ee}} \right) \right) \right]$$

$$kW = \frac{\left(BtuH \times \left(\frac{1}{EER_{base}} - \frac{1}{EER_{ee}} \right) \right)}{1000} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
~~FLH_{cool}~~	~~Full Load Cooling Hours by closest weather related large~~ city
FLH_{heat}	Full Load Heating Hours by closest weather related large city
BtuH	Size of equipment in British Thermal Unit Hours
$SEER_{base}$	SEER efficiency of baseline unit
$SEER_{ee}$	SEER efficiency of installed unit
$HSPF_{base}$	Heating Season Performance Factor for baseline unit
$HSPF_{ee}$	Heating Season Performance Factor for installed unit
EER_{base}	EER efficiency of baseline unit
EER_{ee}	EER efficiency of installed unit
CF	Coincidence Factor

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility.
2. Customer's account must have been active prior to the measure being received until the date of the analysis.
3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Assumptions

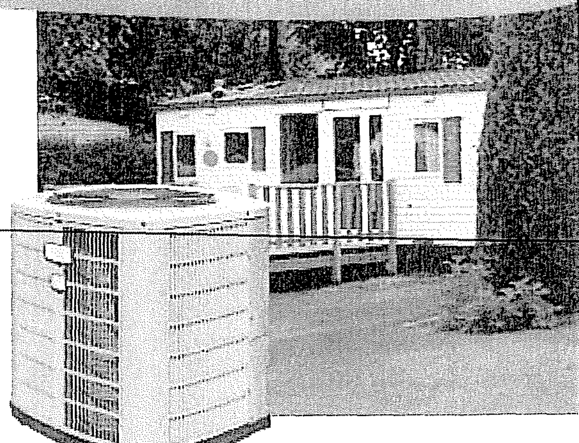
Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Free Ridership	47%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%
Measure's expected life in years	15
Fully Loaded Cooling Hours	1,150
Fully Loaded Heating Hours	1,975
Summer Coincidence Factor	0.7
Winter Coincidence Factor	0.5

Appendix – Exhibits

Exhibit 1 – Fact Sheet

AEP KENTUCKY POWER
A unit of American Electric Power

Mobile Home High Efficiency Heat Pump Program
Fact Sheet



Program Overview

Kentucky Power's Mobile Home Heat Pump Program offers $400 to residential customers who live in a mobile home and upgrade their central electric resistance heating system with a new, high efficiency heat pump unit. To qualify, the new heat pump unit must have a minimum rating of 13 SEER (Seasonal Energy Efficiency Ratio) and 7.7 HSPF (Heating Seasonal Performance Factor).

Electric resistance heat is a very efficient form of heating, but it can be costly. A heating element, like the inside of a toaster, heats up and a fan blows the heated air into your mobile home. Heat pumps can easily cut electricity use when compared with electric resistance heating.

Simply put, a heat pump is an air conditioner that is able to reverse cycle to provide heating. It is a very efficient and economical way to heat and cool your home using electricity. It's also a wise energy investment for mobile homeowners that can help reduce your monthly electric bills without sacrificing comfort.

Customer Eligibility

All residential customers who have had electric service with Kentucky Power for the past twelve months and who live in a mobile home with a central electric resistance heating system are eligible to participate.

How to Participate

Call our Customer Solution Center at 1-800-572-1113 or contact your local, licensed HVAC dealer who is participating in the Kentucky Power SMART Programs. Kentucky Power recommends getting at least two quotes and does not endorse any specific heating and cooling dealer.

Other Opportunities

The High Efficiency Heat Pump Program is part of Kentucky Power's suite of SMART Programs, which are energy efficiency programs for homes, businesses and schools. For more information on this program or other SMART Programs, call 1-800-572-1113 or visit KentuckyPower.com/save.

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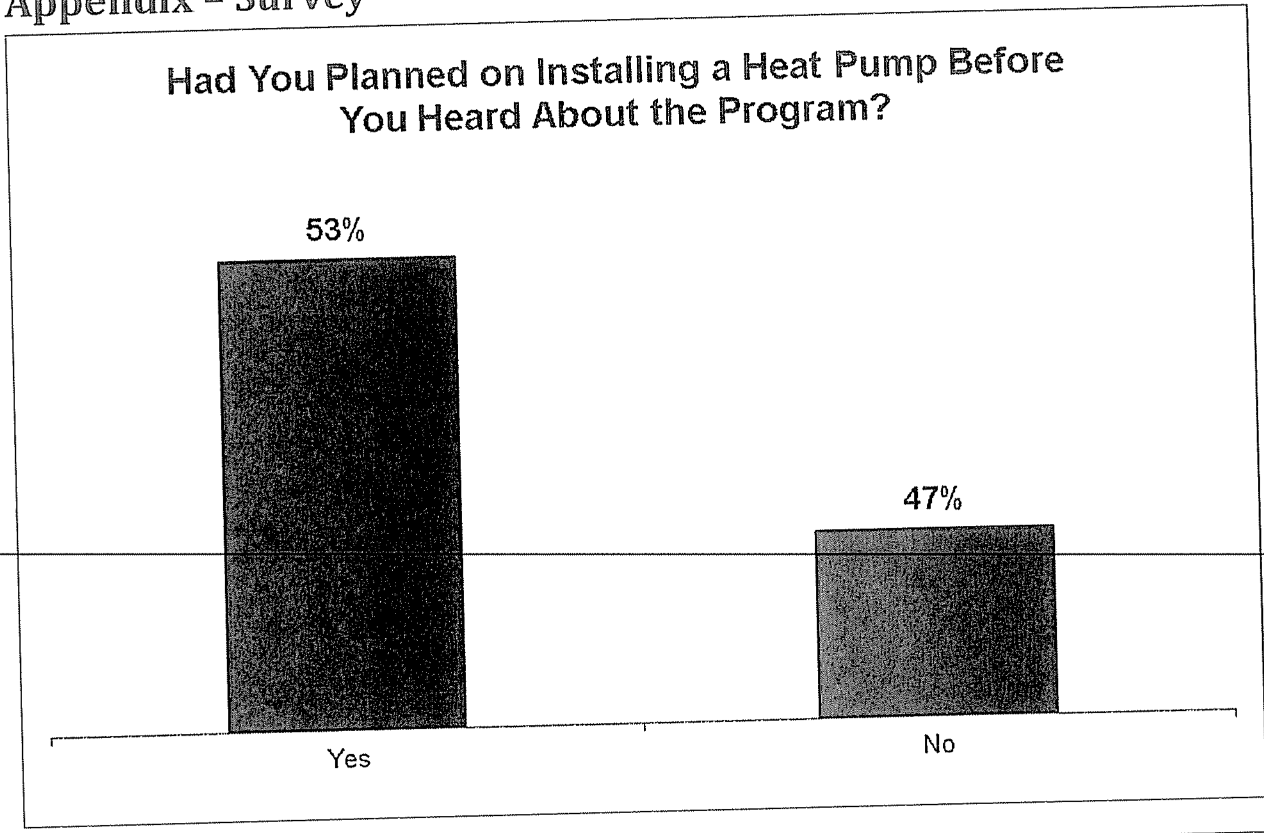
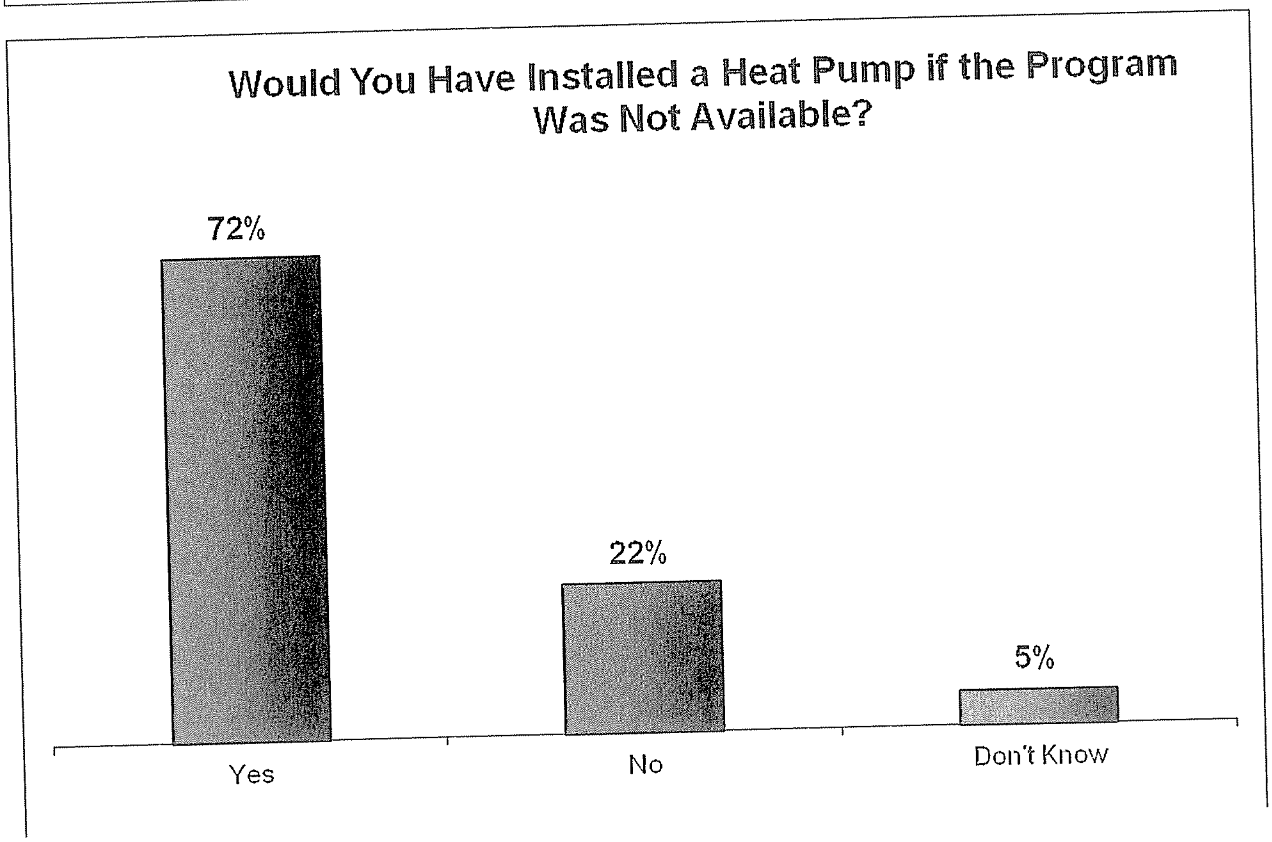
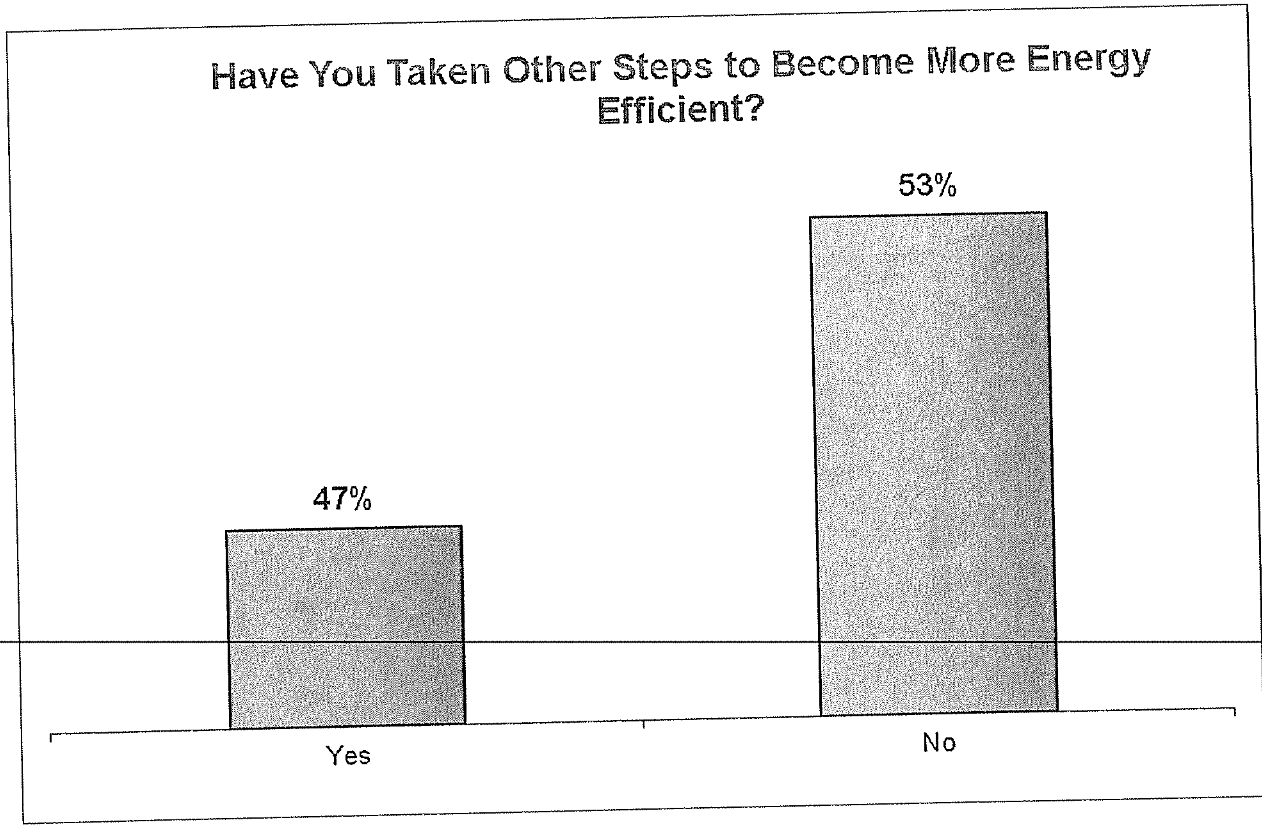
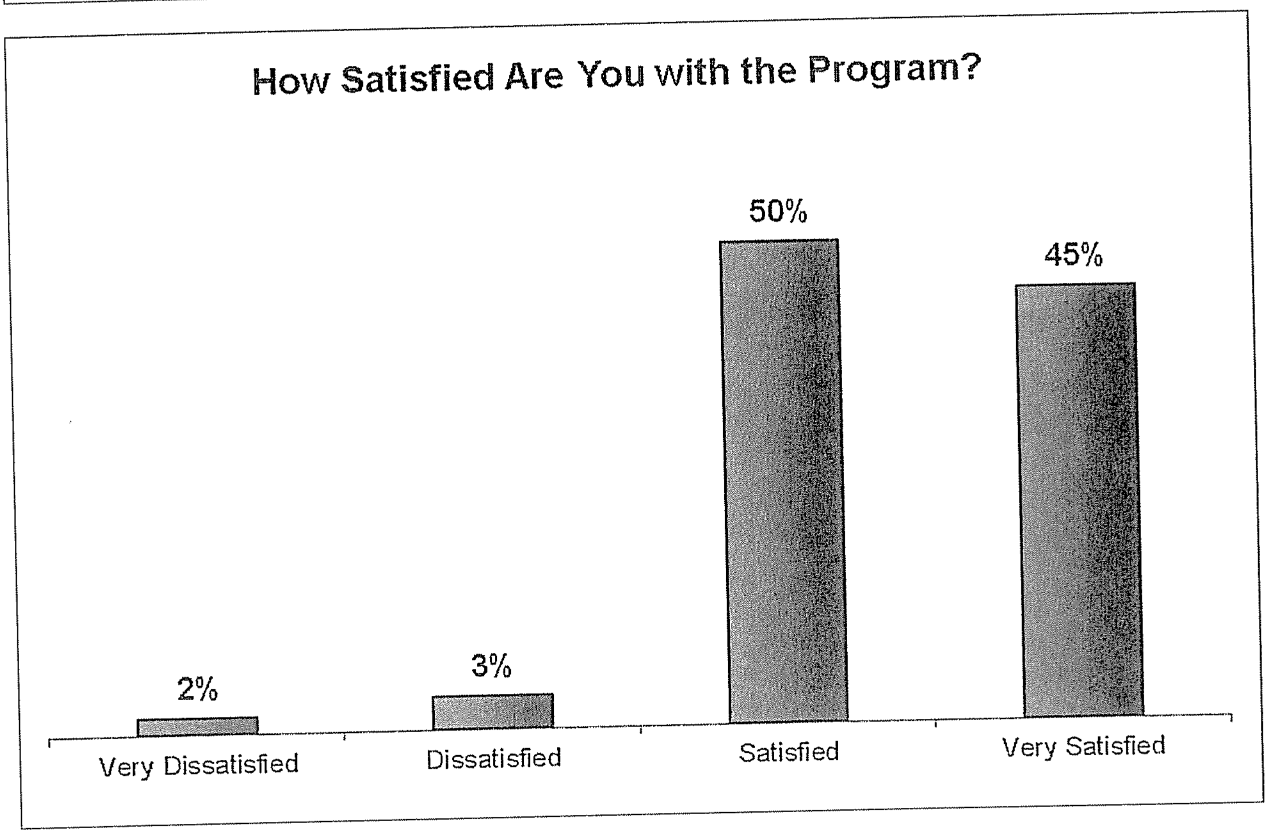
Appendix – Survey






Have You Taken Other Steps to Become More Energy Efficient?
53%
47%
Yes
No


How Satisfied Are You with the Program?
50%
45%
2%
3%
Very Dissatisfied
Dissatisfied
Satisfied
Very Satisfied

Appendix – Heat Pump Dealers

A W R
77 Cow Hollow
Drift, KY 41619
(606) 377-9730

AAA Heating and Air Cond.
340 Amos Newsome Ln
Virgie, KY 41572
(606) 639-6860

Adams Heating & Cooling
P. O. Box 719
Delbarton, WV 25670
(304) 475-3878

Aire Serv
2106 1/2 13th Street
Ashland, KY 41101
(606) 324-1033

American Heating & Cooling
P. O. Box 4321
Pikeville, KY 41502
(606) 639-4307

Appalachian Htg & Cooling
P. O. Box 4141
Pikeville, KY 41502
(606) 422-5643

Appalachian Refrigeration
P. O. Box 400
Avawam, KY 41713
(606) 436-0682

Ar-tron Heating & Air Conditioning
2744 Roberts drive
Ashland, KY 41101
(606) 920-9700

Ashland Furnace
2700 Winchester Avenue
Ashland, KY 41101
(606) 325-3211

B & B Heating & Cooling
P. O. Box 308
Harold, KY 41635
(606) 478-9400

Big Sandy Heating & Cooling
P. O. Box 330
Hager Hill, KY 41222
(606) 297-4328

Blanton Heating & AC
135 Railroad Street
Dwale, KY 41621
(606) 874-0130

Bobby Howard & Sons
P. O. Box 38
Whitesburg, KY 41858
(606) 633-9580

Breathitt Plumbing & Heating
1261 Main Street
Jackson, KY 41339
(606) 666-4313

Breeding's Plumbing & Electric
P. O. Box 86
Isom, KY 41824
(606) 633-5961

Burchett's Heating & Air Conditioning
P. O. Box 665
Wittensville, KY 41274
(606) 297-6224

C & H Heating & Air Conditioning
P. O. Box 946
Flatwoods, KY 41139
(606) 833-1995

C.N.C. Services
895 Nebo Road
Catlettsburg, KY 41129
(606) 686-2298

Cadco Heating & Air Conditioning
2181 Winchester Avenue
Ashland, KY 41101
(606) 928-3041

Caldwell Heating & Air Conditioning
9630 Grandview Lake Road
Ashland, KY 41102
(606) 928-3618

Castle Heating & Cooling
5917 Bybee Road
Ashland, KY 41102
(606) 928-1148

Clay's Heating & Cooling
P. O. Box 1764
Prestonsburg, KY 41653
(606) 874-2256

Coleman Heating & Cooling
P. O. Box 580
Regina, KY 41559
(606) 754-5763

Cox Commercial
149 Clover lane
Greenup, KY 41144
(606) 473-1016

Crab Mechanical Services Inc
621 3rd Street

Cullop's Heating & Cooling
P. O. Box 2637

Delta Supply Heating & Cooling
455 Hambley Blvd.

Portsmouth, OH 45662
(740) 355-5300

Williamson, WV 25661
(606) 237-4823

Pikeville, KY 41501
(606) 432-0787

Dils & Company
2359 Town Mountain Road
Pikeville, KY 41501
(606) 437-4609

East Hills Heating & Cooling
P. O. Box 135
Ivel, KY 41642
(606) 226-4593

Elite Comfort HVAC Inc
8192 KY 1261
Campton, KY 41301
(606) 272-7141

Elliott Supply & Glass, Inc.
P. O. Box 3038
Pikeville, KY 41502
(606) 437-7368

Fannin's Plumbing Heating & Electric Company, Inc.
432 Main Street
Paintsville, KY 41240
(606) 789-3696

Fletcher Services
1572 Ratliff Creek Rd
Pikeville, KY 41501
(606) 433-1151

Frederick & May Lumber & Supply
P. O. Box 218
West Liberty, KY 41472
(606) 743-3136

G & W Heating & Cooling
273 Paul Road
Wurtland, KY 41144
(606) 922-8402

General Heating & Air Conditioning
P. O. Box 964
Flatwoods, KY 41139
(606) 836-8143

Grayson Mechanical HVAC
405 Robert & Mary Street
Grayson, KY 41143
(606) 474-4550

Griffith Plumbing & Heating
338 Broadway
Jackson, KY 41339
(606) 666-2316

Hatton Heating & Cooling
69 Beagle Road
Whitesburg, KY 41858
(606) 632-2790

HCE Systems Inc.
P. O. Box 879
Norton, VA 24273
(276) 679-5829

HELP Air Conditioning & Htg
731 E. Main St.
Grayson, KY 41143
(606) 475-0826

Howard's Heating & Air
P. O. Box 569
Baxter, KY 40806
(606) 573-2944

Huff's HVAC
P. O. Box 547
Cornettsville, KY 41731
(606) 476-2942

Imperial Heating & Cooling
P.O. Box 526
Ashland, KY 41105
(606) 324-0610

KB HVAC
145 Shady Creek
Greenup, KY 41144
(606) 923-7534

Kentucky Wide Htg & Clg
P.O. Box 384
Thelma, KY 41260
(606) 424-5684

Lafferty Heating & Cooling
P. O. Box 208
Dwale, KY 41621
(606) 874-9357

Mabry's Heating & Cooling
2423 Greenbriar Rd
Olive Hill, KY 41164
(606) 286-6007

Maggard's Heating & Cooling
140 County Line Branch
Garrett, KY 41630
(606) 358-2466

Marco Heating & Cooling
P. O. Box 585
Hyden, KY 41749
(606) 672-2431

Miller's Heating & Cooling
3752 Stone Coal Rd
Pikeville, KY 41501
(606) 432-9599

Mooney's Heating & Cooling
P. O. Box 1313
Inez, KY 41224

Mulvaney & Son's Inc.
P. O. Box 368
Catlettsburg, KY 41129

Patterson Repair Services, Inc.
4264 Marsh Hill Dr
Catlettsburg, KY 41129

(606) 298-4784

(606) 739-4042

(606) 571-1715

Pike's Heating & Cooling
490 Steerfork Road
Mallie, KY 41836
(606) 785-9430

Pratts Heating & Cooling
317 Upper Doty Branch
Happy, KY 41746
(606) 476-9690

Quality Air Conditioning & Heating
P. O. Box 751
Pound, VA 24279
(276) 796-5366

Randy Suttles General Construction
208 Miranda Lane
Grayson, KY 41143
(606) 474-9286

Ray Brown Inc.
726 National Ave.
Lexington, KY 40502
(859) 278-0281

Roosevelt's Heating & Cooling
26595 Highway 32
Martha, KY 41159
(606) 652-4972

Roy's Electric Repair
4802 Roberson Road
Ashland, KY 41101
(606) 833-8019

Scurlock Heating & Cooling
1005 Woodland Drive
Paintsville, KY 41240
(606) 788-9188

Service Incorporated
800 Old Flemingsburg Road
Morehead, KY 40351
(606) 784-4918

Shelton Heating & Air
560 Shelton Dr.
Eolia, KY 40826
(606) 632-9542

Slone's Heating & Refrigeration
P. O. Box 82
Regina, KY 41559
(606) 432-3912

Smith Heating, Cooling & Electric
P. O. Box 1594
Hazard, KY 41702
(606) 439-4874

Tennell Refrigeration
157 One Mile Branch
Hyden, KY 41749
(606) 672-5252

Thompson Heating & AC
6858 Mockingbird Trail
Catlettsburg, KY 41129
(606) 739-6880

Todds Refrigeration
456 Pine Frk
Shelbyanna, KY 41562
(606) 437-5320

Tony's Electrical HVAC
P. O. Box 228
Melvin, KY 41650
(606) 452-4394

Tri-County Heating & Air
P. O. Box 108
Salyersville, KY 41465
(606) 349-2308

Tri-County Heating & Air
P. O. Box 108
Salyersville, KY 41465
(606) 349-2283

Tri-State Heating & cooling
P. O. Box 65
Banner, KY 41603
(606) 874-5472

Webb's Heating & Cooling
P. O. Box 146
Lowmansville, KY 41232
(606) 673-3050

Williams Electric
P. O. Box 635
Salyersville, KY 41465
(606) 349-1234

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

Load Research

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614-716-1605 fax
bsberson@aep.com

AEP®

Evaluation Report

Kentucky Power Company

Mobile Home New Construction

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team

American Electric Power Service Corporation

1 Riverside Plaza, 13th Floor

Columbus, OH 43215

Table of Contents

Executive Summary

The Kentucky Power Company (KPC) Mobile Home New Construction (MHNC) program is designed to lower energy usage in new mobile homes by paying incentives to mobile home dealerships and the customers who purchased a new mobile home with a high efficiency heat pump and a Zone 3 insulation package. Kentucky Power Company's MHNC Program was designed as a market transformation program with a goal to promote the awareness of, and to increase the penetration of, high efficiency heat pumps and to improve the insulation levels in new mobile homes. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. For 2009 and 2010, the MHNC program helped upgrade 412 customer heat pumps, providing 692 MWh of net annualized energy savings, 188 kW of summer peak demand reductions, and 101 kW of winter peak demand reductions. The process evaluation concluded that the promotion and delivery processes continue to be effective.

Based on the results of the evaluation, the MHNC program was determined to be cost-effective for three of the cost-benefit tests used in the California Standard Practice Manual and KPC should continue to utilize the program through the remainder of the current program life (2011). The prospective analysis of the program for 2012-2014 predicts the program will be cost-effective and should be continued.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio	Winter Peak Ratio
Program Administrator Cost (PACT)	1.92	1.67
Total Resource Cost (TRC)	2.58	2.25
Ratepayer Impact Measure (RIM)	0.61	0.53
Participant Cost (PCT)	3.66	3.66

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	1.78
Total Resource Cost (TRC)	2.64
Ratepayer Impact Measure (RIM)	0.60
Participant Cost (PCT)	3.84

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Kentucky Mobile Home New Construction program was developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on December 4, 1995 (Case No. 95-427) to help meet Kentucky Power's goals.

The major goals of the program are to:

1) Transform the mobile home market towards high efficiency heat pumps and better insulation.
2) Reduce customer usage of electric energy
3) ~~Increase customer satisfaction and services~~
4) Reduce Kentucky Power's long-range peak demand.

The Mobile Home New Construction Program (MHNC) was designed to transform the market for new mobile homes within the KPC service territory and to determine the energy implications of current (1996) design and installation practices. The MHNC Program, initiated by the Kentucky DSM Collaborative, has been operating in the KPC service area since 1996. Since this program is considered fully developed, not much attention will be paid to the program description.

Process and Market Evaluation

Summary

The Program has been in place since 1996, and therefore a detailed review of the basic program processes was deemed unnecessary. Rather, the primary concern related to the process and market evaluation was whether the program continues to influence purchasing decisions or whether the market has been fully transformed to the point where all new mobile homes would normally be equipped with high-efficiency heat pumps without the program. Review of mobile home dealer information indicates mobile homes can still be purchased in Kentucky with heating systems other than high-efficiency heat pumps. The 2011 survey of participants indicated that 50% of the participants would likely have purchased an equivalent mobile home, thus it can be inferred that the program still influenced the decision making of 50% of the home purchasers. The promotion methods employed and the delivery mechanism continue to be effective.

Promotional Effectiveness

KPC implemented the program through a network of participating mobile home dealerships. The dealers provided each potential buyer a brochure describing the program. Dealer participation was critical to the success of the program. KPC relied entirely on its network of dealers to promote the program. This promotional method is likely the most effective available, as KPC has no other cost-effective way to reach out to potential buyers of new mobile homes.

Delivery Mechanism

The sales representative at the dealer explained the program to the customer and provided them with the brochure (Appendix) which also described the program, and explained the incentive offered for purchasing a new mobile home with a high efficiency heat pump and upgraded Zone 3 insulation package. The dealers provided the Company with customer installation reports from which incentive payments were made to the dealers and customers. KPC employees entered the information into an Excel spreadsheet for participant tracking. KPC was able to deliver this program with minimal KPC staff overhead expenses.

Data Tracking

A number of problems were found when examining the data tracking efforts of KPC staff. Many pieces of data were missing that are required to produce engineering estimates for Air Source Heat Pumps. Specifically, each customer must have the baseline/replacement and new Heating Seasonal Performance Factor (HSPF), Seasonal Energy Efficiency Rating (SEER), Energy Efficiency Rating (EER), size in tonnage or British thermal unit hours (BtuH) for every customer. The baseline measure is the equivalent to what measure would have been installed without the program. Even though the program only deals with new construction, the engineering estimates must be compared to some other item, either what already exists (replacement), or what would have existed (baseline). The implementation data for this program excluded all baseline information, and there were no data related to the EER of the heat pumps. Without EER, accurate demand estimates cannot be made. There was also no information regarding the Zone 3 insulation package, so it was excluded from the impact evaluation. In addition, 13 customers could not be located at all in implementation data, but were listed in the monthly participation summary in the Collaborative Report.

Finally, the participation spreadsheet used by KPC to calculate ex *ante* savings using the last evaluation contained an incorrect application of free ridership. The previous evaluation calculated the Net annualized per-participant energy savings at 2,073 kWh. In the spreadsheet, this number was listed as the gross savings. Free ridership was then re-applied to the net number and used for ex *ante* estimates. This resulted in a 17% loss of savings in documents filed with the Collaborative.

Free Riders and Spillover

A free rider is a participant who purchased a mobile home with the high-efficiency heat pump system, but would have purchased the same home had they not participated in the Program. Spillover refers to additional energy efficiency measures adopted by participants as a result of the program. Free ridership was determined by dividing the total survey responses by the positive responses to the questions "Had you planned on upgrading the heat pump before you heard about the program?" and "Would you have installed upgraded the heat pump if the program was not available?" From the survey responses, 49% of participants indicated they would have purchased the same home without the program and thus were classified as likely free riders in this program. No information on possible spillover effects was captured in the survey.

Market Potential

The 2010 Residential Customer Survey showed that about 30% of the new mobile homes placed in KPC service territory in the past five years were not equipped with heat pumps. These figures include the effect of the increased heat pump saturation due to the program. Although heat pumps are in the majority of new mobile homes being sold in the KPC service area, there is still potential to continue influence the market.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was very high, with 92% of the survey respondents indicating they were very satisfied (56%) or satisfied (36%) with the program overall, and 95% indicating they were very satisfied (62%) or satisfied (33%) with the mobile home dealer. Only one person expressed dissatisfaction with the program (the other customers not classified as satisfied had no opinion), and from the comments received that dissatisfaction appeared to be related to some color issues with some panels and improperly stretched carpet, items that had no relation to KPC's program itself.

Impact Evaluation

The evaluation began with an engineering estimate analysis of the implementation data collected by KPC. The engineering estimates were used to develop gross measure savings without post-consumption data or a billing analysis. A billing analysis was not performed because no pre-implementation billing data is available. To effectively capture the change in usage patterns, the evaluation needs both pre- and post-billing data. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. For Net-To-Gross calculations, survey results provided a basis for net savings estimates.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. Once a valid set of customers was determined, the next step was to use the engineering estimate algorithm for Air Source Heat Pumps (Appendix – Impact Methods and Assumptions) to determine an average per-participant energy, summer peak, and winter peak savings value. To calculate annualized energy savings, an average per-measure savings must be determined based on the heating and cooling savings from the increased efficiency of the heat pump. Heating savings are determined by the inverse difference of the Heating Seasonal Performance Factors (HSPF) between the baseline heat pump and the increased efficiency heat pump. Cooling savings are determined by the inverse difference of the Seasonal Energy Efficiency Rating (SEER) between the baseline and upgraded heat pumps. Each savings value is scaled based on the size of the heat pump by tonnage or British Thermal Unit Hours (BtuH) to determine the per-participant, per-year usage. The per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. Because the MHNC program is a market transformation program, we expect the free ridership to increase every year, as the dealers begin to offer fewer alternatives to the heat pump. At the previous evaluation, free ridership was found to be 17% of participation. This iteration of the evaluation, the free ridership increased to 31%, as expected. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings should be as follows

2009 and 2010 Average Net Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
Per-Participant Savings	1,681	0.455	0.101

For 2009, KPC had goals of upgrading 185 customers with higher efficiency heat pumps and saving KPC customers 318 MWh, 107 kW in winter peak demand and 130 kW in summer peak demand savings. The program was able to upgrade 208 participants, and produce net annualized total program savings of

350 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized winter peak demand reductions were 51 kW and the net annualized summer peak demand reductions were 95 kW. KPC met 112% of the participant target, 110% of the energy target, 47% of the winter demand target, and 73% of the summer demand target.

For 2010, KPC had goals of upgrading 170 customers with higher efficiency heat pumps and saving KPC customers 293 MWh, 99 kW in winter peak demand and 119 kW in summer peak demand savings. The program was able to upgrade 204 participants, and produce net annualized total program savings of 343 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized winter peak demand reductions were 50 kW and the net annualized summer peak demand reductions were 93 kW. KPC met 120% of the participant target, 117% of the energy target, 50% of the winter demand target, and 78% of the summer demand target.

For the years 2009 and 2010 of the MHNC program, KPC was able to upgrade 412 customers, producing net annualized program savings of 692 MWh of energy savings, 10 kW in winter demand and 188 kW in summer demand peak reductions. As a whole, KPC was able to meet 116% of the participant target, 113% of the energy target, 49% of the winter demand target, and 75% of the summer demand target.

Participation and annual energy savings numbers were near the expected goals; however, the summer and winter demand savings were lower than expected. The reasons for lower numbers are two-fold. First, unavailable information in the data collected led to inaccurate estimates. The Air Source Heat Pump algorithm requires EER to accurately estimate demand savings. Because EER was not available, SEER and HSPF had to be used, which can undervalue demand savings. Second, the participant survey results showed that free ridership was higher than the previous evaluation. However, increased free ridership is expected in market transformation programs.

Impact Results

The four key statistics used in an impact evaluation – number of participants, energy savings, summer peak demand reduction, winter peak demand reduction – are shown below. Included in the table are the program goals, the *ex-ante* savings, and the *ex-post* savings. *Ex-ante* savings are forecasted savings as reported by the program staff during the program's implementation. *Ex-post* savings are estimated savings as determined by the impact evaluation and reported in the evaluation report.

Impact Evaluation Results by Year

Category	Goal	*Ex-Ante*	*Ex-Post*	Percent of Goal
2009				
Participants	185	208	208	112%
Energy (MWh)	318	358	350	110%
Summer Demand (kW)	130	146	95	73%
Winter Demand (kW)	107	121	51	47%
2010				
Participants	170	204	204	120%
Energy (MWh)	293	351	343	117%
Summer Demand (kW)	119	143	93	78%
Winter Demand (kW)	99	119	50	50%
Total				
Participants	355	412	412	116%
Energy (MWh)	611	709	692	113%
Summer Demand (kW)	249	288	188	75%
Winter Demand (kW)	206	239	101	49%

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects. Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). In addition to the tests, costs of conserved energy will be calculated from the utility perspective. Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included for recovery purposes, unless new labor was utilized incrementally and specifically for DSM program implementation.

The expenditure goal for 2009 in the Collaborative Report was $101,750 for 185 participants. The total program costs as filed were $104,700 of which $95,000 were listed as incentives for 208 participants. However, these costs do not include the unrecoverable administrative costs from KPC staff and AEPSC staff. An estimated $7,000 was included under administration to account for unrecoverable costs, bringing the total to $111,700 in actual costs related to the program. The expenditure goal for 2010 in the Collaborative Report was $93,500 for 170 participants. The total filed program costs were $127,200, of which $115,500 were incentives for 204 participants. To account for unrecoverable admin costs and the costs from the 2010 evaluation of 2009 activity, another $7,000 and $10,000 were added to account for admin and evaluation costs respectively. The costs per-participant was also higher in each year (not including admin). The estimated cost per participant in the Collaborative Report was $550, and the actual costs per-participant was $563.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analysis attempted to account for all costs related to program implementation and evaluation. Therefore an estimate of the value of KPC and AEP Service Corporation (AEPSC) staff time utilized to implement and evaluate the program was added to the reported costs. The below table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	Total
2009	$7,000	$9,450	$95,000	$250	$111,700
2010	$7,000	$11,450	$115,500	$250	$134,200
2011	$-	$-	$-	$10,000	$10,000

Goals were reported as total amounts respective to the winter peak only, however, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter.

The results for the benefit/cost tests show that the program was cost-effective from Participant, Program Administrator, and Total Resource perspectives, although each ratio underperformed compared to projections in the program filing. The expected Total Resource Cost ratio was 3.66, Participant Cost ratio was 3.46, Ratepayer Impact Measure ratio was 2.59, and Program Administrator Cost ratio was 3.75. Contributing factors for the decline include an increase in free ridership, higher cost per participant, and unaccounted for participants due to lack of data.

2009 and 2010 Summer Peak Cost Effectiveness Analysis

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.92	$ 225,232	$ 470,462	$ 245,230
Total Resource Cost (TRC)	2.58	$ 287,998	$ 470,462	$ 182,464
Ratepayer Impact Measure (RIM)	0.61	$ (304,310)	$ 470,462	$ 774,772
Participant Cost (PCT)	3.66	$ 519,667	$ 715,102	$ 195,435

2009 and 2010 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.67	$ 165,093	$ 410,323	$ 245,230
Total Resource Cost (TRC)	2.25	$ 227,859	$ 410,323	$ 182,464
Ratepayer Impact Measure (RIM)	0.53	$ (364,449)	$ 410,323	$ 774,772
Participant Cost (PCT)	3.66	$ 519,667	$ 715,102	$ 195,435

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, there will be any changes to the cost effectiveness of the program in future years. Any number of a multitude of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the MHNC program, results from the current evaluation were used as the starting point for the cost-benefit analysis. Future savings values were discounted due to the nature of the program being a market transformation program. A higher free ridership value was included in the prospective analysis, from 31% to 40%. However, the lower annualized energy savings due to increased free ridership is offset by an increase in the cost of avoided energy in future years.

Due to the closeness of the 2009 and 2010 cost benefit analysis, only the winter peak cost benefit analysis was run. The results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective.

2012-2014 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.78	$ 272,254	$ 620,754	$ 348,500
Total Resource Cost (TRC)	2.64	$ 385,433	$ 620,754	$ 235,321
Ratepayer Impact Measure (RIM)	0.60	$ (417,170)	$ 620,754	$ 1,037,924
Participant Cost (PCT)	3.84	$ 754,954	$ 1,020,639	$ 265,685

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the MHNC program.

1) Results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective. It is our recommendation that this program be continued.
2) Greater scrutiny should be applied to data collection and tracking. Every customer list should have at a minimum, the customer's utility bill account number in the same format as it is stored in the CIS, the install date of the measure (handout date), and the HSPF, SEER, EER, and BtuH for both the installed measure, and the baseline measure. It is best practices to always include what measures were installed, and what measures would have been there had the program not been in place.
3) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
4) On-going program management should be handled by KPC staff, including tracking of customer participation and estimated ex-ante savings.
5) KPC staff labor time spent on the Program should be captured so that the true total cost of delivering the program can be known.
6) Program participants should be surveyed shortly after the rebate is processed.
7) KPC should gather information from the dealers about customers that were interested in the program but declined to participate. Using that information, KPC should then sample the customer list and perform a non-participant survey to find any reasons for non-participation.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

I. California Public Utilities Commission. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

II. State of California Governor's Office of Planning and Research. California Standard Practice Manual: Economic Analysis of Demand Side Programs and Projects. July 2002.

III. PJM Forward Market Operations. Energy Efficiency Measurement & Verification. Revision 01. March 1, 2010.

IV. Vermont Energy Investment Corporation. State of Ohio Energy Efficiency Technical Reference Manual. ~~*Ohio TRM – Draft 8-6-2010*~~. Public Utilities Commission of Ohio, 2010. PDF. 6 August 2010.

V. Ohio Electric Utilities. Draft Technical Reference Manual (TRM) for Ohio Senate Bill 221 Energy Efficiency and Conservation Program and 09-512-GE-UNC. September/October 2009.

VI. Morrison, Richard. Kentucky Power Company DSM Program Template. *Kentucky Power Company Program Template for DSM Programs Revised 052010 Expand Redline*. MS Excel Workbook. 20 May 2010.

VII. AEP Load Research Analysis Evaluation Report for the Mobile Home New Construction Program in Kentucky Power Company Program Period: January 2006 – December 2007. October 2008.

VIII. Sonderegger, Robert C. A Baseline Model for Utility Bill Analysis Using Both Weather and Non-Weather Related Variables. June 1998.

IX. Kentucky Power DSM Collaborative Report. January 1, 2008 to December 31, 2008.

X. Kentucky Power DSM Collaborative Report. January 1, 2009 to December 31, 2009.

XI. Kentucky Power DSM Collaborative Report. January 1, 2010 to December 31, 2010.

Appendix - Impact Methods and Assumptions

Impact Methods

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in both the initial expected impact from an average installation and also the long-term savings from the specific installations.

Technology Description

A heat pump is a high efficiency year-round heating and cooling system operating entirely on electricity. The system is called a heat pump because it pumps or moves heat from one area to another. The basic components of a heat pump are a compressor; circulating fluid (refrigerant); and two heat exchangers, one outside and one inside. In winter, heat in extracted from cold outdoor air even when the temperature is well below freezing. The heat is absorbed by the refrigerant, and then is pumped through the compressor to the indoor coil (heat exchanger) where the refrigerant releases its heat to the indoor air. Since there is less heat available at low outdoor temperatures, the heat pump system includes a supplemental resistance heater that automatically provides additional heat when the outdoor air temperature is too low for the heat pump compressor to supply the home's total heating demand. In the summer, the heat is absorbed by the refrigerant in the indoor coil from the circulating indoor air. The heat-laden refrigerant from the indoor coil is pumped to the outdoor coil where the heat is transferred to the outdoor air. The heat pump system is the most efficient way to heat and cool electrically. The most significant energy savings are obtained during the heating season since it utilizes the "free" heat that already exists in the outdoor air. The heat pump energy efficiency is determined by the seasonal energy efficiency ratio (SEER) for summer and the heating seasonal performance factor (HSPF) for winter.

Algorithms

$$kWh = \left[\left(FLH_{cool} \times \frac{BtuH}{1000} \times \left(\frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}} \right) \right) + \left(FLH_{heat} \times \frac{BtuH}{1000} \times \left(\frac{1}{HSPF_{base}} - \frac{1}{HSPF_{ee}} \right) \right) \right]$$

$$kW = \frac{\left(BtuH \times \left(\frac{1}{EER_{base}} - \frac{1}{EER_{ee}} \right) \right)}{1000} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
FLH_{cool}	Full Load Cooling Hours by closest weather related large city
FLH_{heat}	Full Load Heating Hours by closest weather related large city
BtuH	Size of equipment in British Thermal Unit Hours
$SEER_{base}$	SEER efficiency of baseline unit
$SEER_{ee}$	SEER efficiency of installed unit
$HSPF_{base}$	Heating Season Performance Factor for baseline unit
$HSPF_{ee}$	Heating Season Performance Factor for installed unit
EER_{base}	EER efficiency of baseline unit
EER_{ee}	EER efficiency of installed unit
CF	Coincidence Factor

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility.
2. Customer's account must have been active prior to the measure being received until the date of the analysis (or the end of the measure's expected life).
3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Assumptions

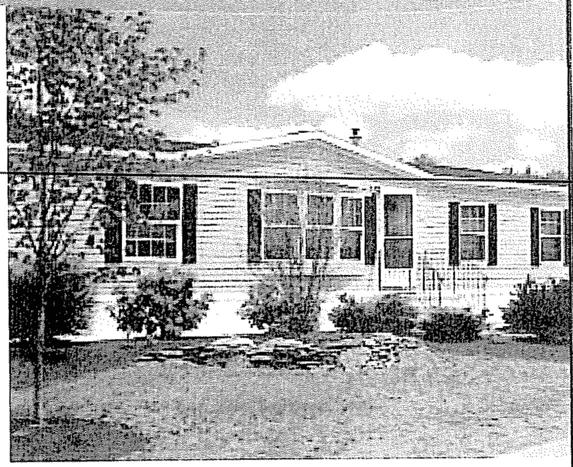
Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Free Ridership	31%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%
Measure's expected life in years	15
Fully Loaded Cooling Hours	1,150
Fully Loaded Heating Hours	1,975
Summer Coincidence Factor	0.7
Winter Coincidence Factor	0.5

Appendix – Exhibits

Exhibit 1 – Fact Sheet

AEP KENTUCKY POWER®
A unit of American Electric Power

Mobile Home New Construction Program
Fact Sheet



Program Overview

If you are thinking about purchasing a new mobile home, Kentucky Power can help you make a smart energy choice with the Mobile Home New Construction Program. This program is designed to help you offset the cost of improvements to your new home's insulation and heating and cooling systems, giving you greater savings, comfort and value for years to come.

With the Mobile Home New Construction Program, we provide a $500 incentive to mobile home buyers who purchase a new home with zone 3 insulation levels and a high efficiency heat pump.

Insulating your home properly is a good way to reduce energy costs. Insulation zone levels refer to the energy code/ r-value climate zone map that addresses insulation requirements specified by the U.S. Department of Energy. Regions across the U.S. are placed into specific 'climate zones.' These zones help code officials and building designers to determine the level of insulation required within specific regions. While Kentucky is technically in zone 2, the upgrade to zone 3 provides a buffer to extreme weather conditions, and keeps more heat in during the winter, and out during the summer.

Typically, new mobile homes have heating and cooling systems consisting of electric central furnace and a central air conditioning unit. Upgrading to a heat pump is a very efficient and economical way to heat and cool your home using electricity. Simply put, a heat pump is an air conditioner that is able to reverse cycle to provide heating. It is a wise energy investment for homeowners that can help reduce your monthly electric bills without sacrificing comfort.

Customer Eligibility

All Kentucky Power residential customers are eligible to participate.

How to Participate

Call our Customer Solution Center at 1-800-572-1113 or contact a participating manufactured home dealer.

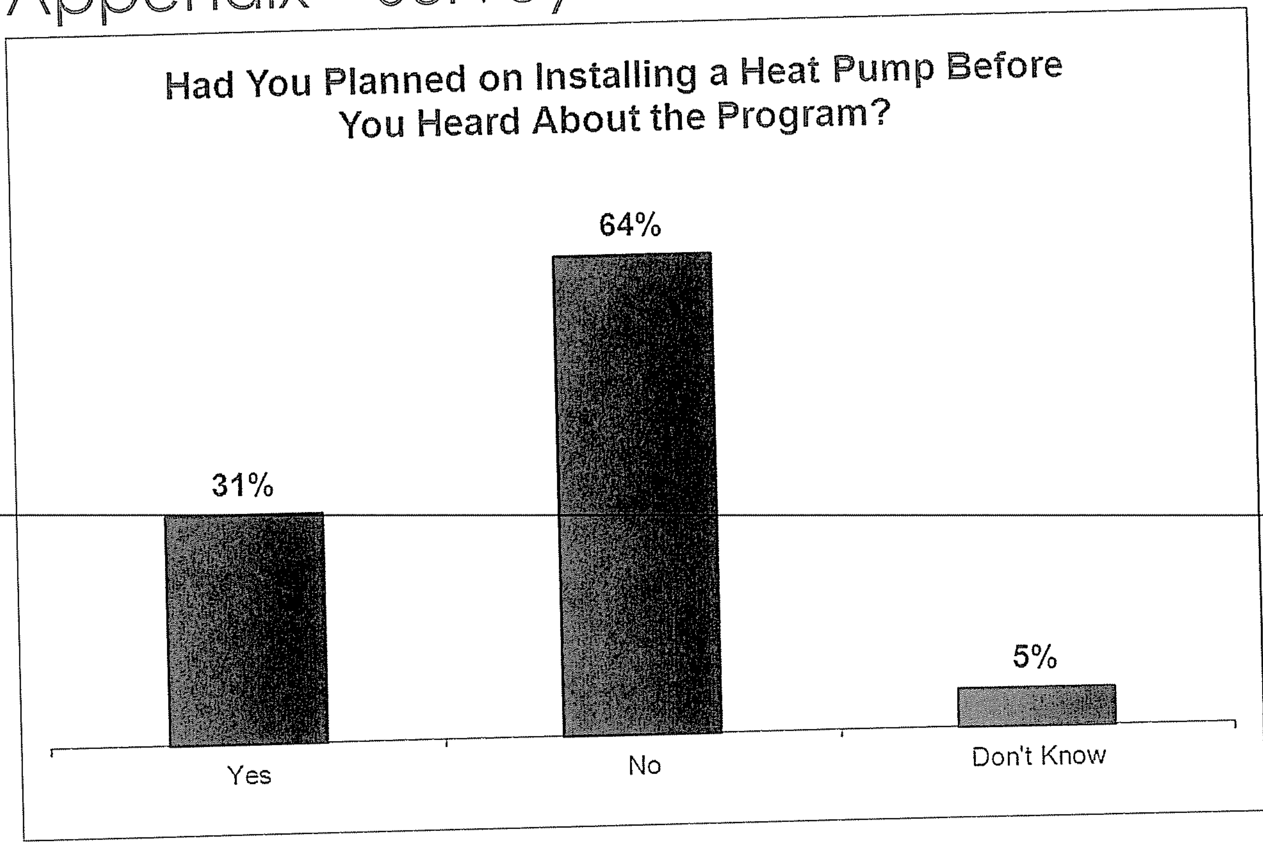
Other Opportunities

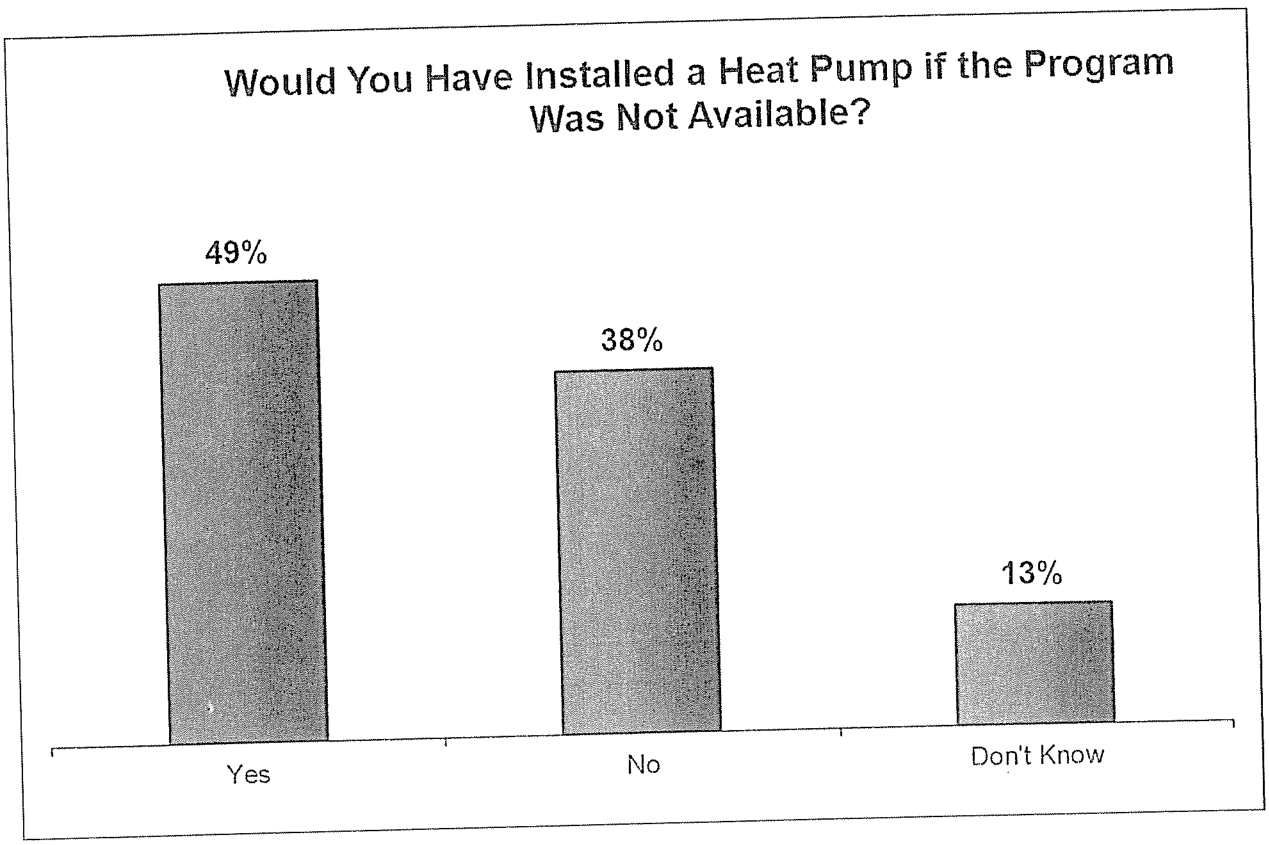
The Mobile Home New Construction Program is part of Kentucky Power's suite of SMART Programs, which are energy efficiency programs for homes, businesses and schools. For more information on this program or other SMART Programs, call 1-800-572-1113 or visit KentuckyPower.com/save.

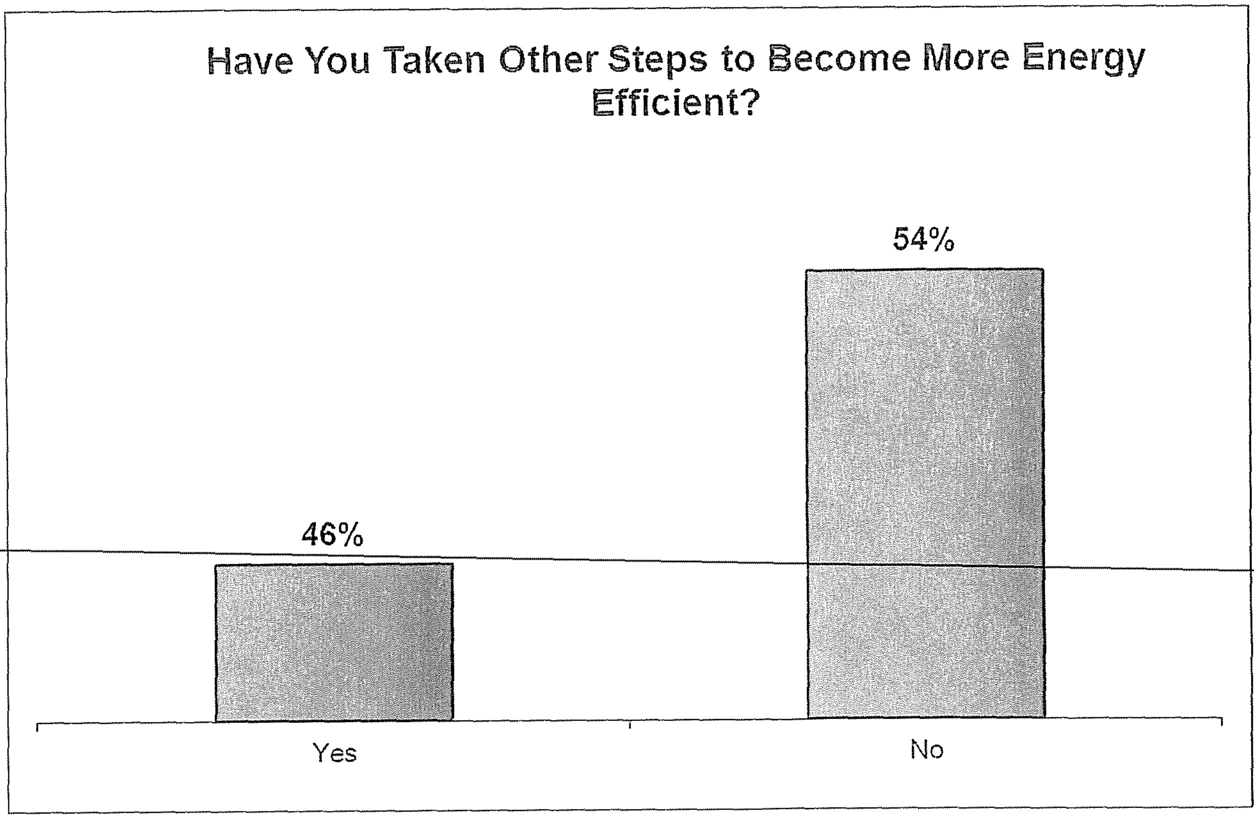
SMART Programs – Saving Money And Resources Together®

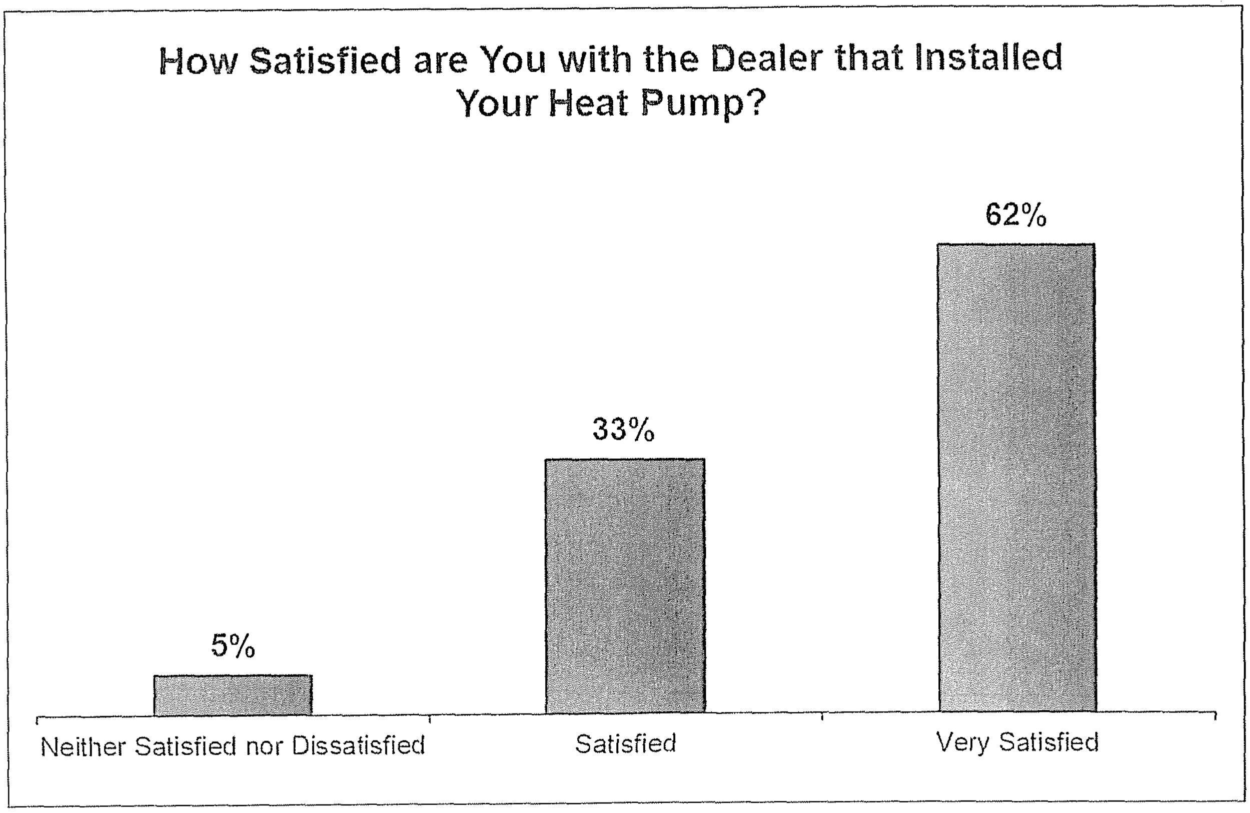
gridSMART®
From Kentucky Power

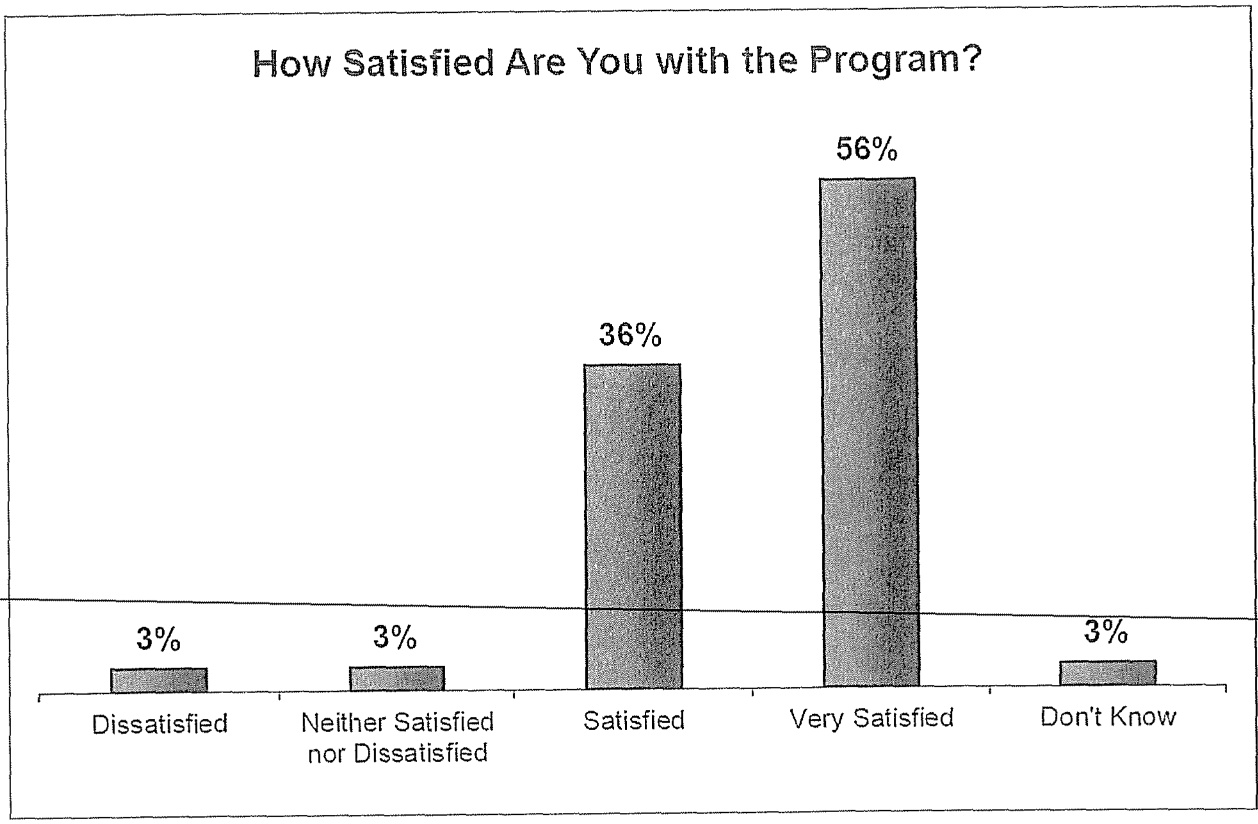
Appendix – Survey






Have You Taken Other Steps to Become More Energy Efficient?
46%
54%
Yes
No


How Satisfied are You with the Dealer that Installed Your Heat Pump?
5%
33%
62%
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied


How Satisfied Are You with the Program?
56%
36%
3%
3%
3%
Dissatisfied
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied
Don't Know

Appendix – Mobile Home Dealers

A & L Homes, Inc.
P O Box 331
Flemingsburg, KY 41041

Barker's Mobile Homes
7641 US 321 South
Hager Hill, KY 41222

Best Buy Homes
P. O. Box 2707
Pikeville, KY 41502

Bluegrass State Home Showcase
P O Box 223
Banner, KY 41603

Brown's Mobile Homes
P. O. Box 476
765 North Carol Malone Blvd
Grayson, KY 41143

By-Pass Mobile Homes
1595 Maysville Rd
Flemingsburg, KY 41041

~~**Cheap's Mobile Housing, Inc.**~~
P. O. Box 348
Flemingsburg, KY 41041-0348

Clayton Homes
12658 U S Hwy 23 S
Harold, KY 41635

Clayton Homes
~~State Route 1947 Box 404~~
Grayson, KY 41143

Clayton Homes
917 Morton Blvd.
Hazard, KY 41702

Clayton Homes
10409 Orby Cantrell Hwy
Pound, VA 24279

Doug Dawson Mobile Homes
745 Mt. Sterling Rd
Flemingsburg, KY 41041

Doyle Mobile Homes
KY 11 North, Maysville Rd
Flemingsburg, KY 41041

Dream Homes Mobile Home Sales
580 C. W. Stevens Blvd.
Grayson, KY 41143

Dream Mobile Homes Inc.
P. O. Box 360
331 Fitz Gilbert Rd
Hazard, KY 41701

Edgewood Homes
1530 US Highway 25 E
Middlesboro, KY 40965

Fleetwood Home Center
208 Kentucky Ave.
Norton, VA 24273

Freedom Homes
13121 Slone Court
Ashland, KY 41102

George Humfleet Homes
PO Box 189
London, KY 40743

Glenn's Finer Homes
615 Kentucky Avenue
Norton, VA 24273

Grayson Mobile Homes, Inc.
P. O. Box 8
1090 N State Hwy 7
Grayson, KY 41143

Greenup Home Sales
499 St. Rt. 503
Greenup, KY 41144

Home Show of Ashland
13135 State Route 180
Ashland, KY 41102

Horizon Homes
P. O. Box 437
5115 Kent Junction Rd
Norton, VA 24273

Hylton Sales & Rentals, LLC
P. O. Box 203
Ivel, KY 41642

Jerry Adkins Mobile Home Sales
2741 U. S. 23 South
Pikeville, KY 41501

Lakeside Homes, Inc.
42 Jetts Drive
Jackson, KY 41339

LUV Homes
P. O. Box 105
4840 S US 23
Ivel, KY 41642

Mountain Homes, Inc.
775 Mountain Parkway Spur
Campton, KY 41301

Oakwood Homes
P. O. Box 897
24 Loftis Tipple Rd
Belfry, KY 41514

Oakwood Homes
17151 Highway 23
Louisa, KY 41230

Osborne Mobile Homes
41 Piney Point Way
Ulysses, KY 41264

Paradise Mobile Homes
1464 Hwy 15 North
Jackson, KY 41339

Premium Homes
P. O. Box 2404
Middlesboro, KY 40965

Rainbow Homes
P. O. Drawer 232
Paintsville, KY 41240

The Home Show of Barboursville
5898 Route 60 East
Barboursville, WV 25504

White Hall Mobile Homes, Inc.
171 Citizens Lane
Hazard, KY 41701

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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AEP®

Evaluation Report

Kentucky Power Company

Modified Energy Fitness

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team
American Electric Power Service Corporation
1 Riverside Plaza, 13th Floor
Columbus, OH 43215

Table of Contents

Executive Summary

The Kentucky Power Company (KPC) Modified Energy Fitness (MEF) program is designed to promote conservation and efficient use of electricity by improving the "energy fitness" of electrically heated residences. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. For 2009 and 2010, the impact analysis showed that the MEF program weatherized 2,001 homes, providing 1,304 MWh of net annualized energy savings, and 480 kW of winter peak demand reductions. Load growth in the amount of 60 kW occurred in the summer, most likely due to snap back. The process evaluation concluded that the promotion and delivery processes were effective but can be improved greatly to target homes that are more suited for weatherization.

Based on the results of the evaluation, the MEF program was cost-effective for only one of the cost-benefit tests used in the California Standard Practice Manual, and only at winter peak. In addition, the prospective analysis of the program for 2012-2014 predicts the program could be cost-effective. It is recommended to extend the program beyond 2011, for one to two years, and have a new impact analysis completed which will ensure the billing analysis models were not underspecified. A positive recommendation for program continuation is predicated if the next impact analysis includes detailed demographic data for all KPC residential customers and positive cost-benefit test results for at least three of the winter cost-benefit tests. Below are the cost-benefit results for the program.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio	Winter Peak Ratio
Program Administrator Cost (PACT)	0.62	0.90
Total Resource Cost (TRC)	0.80	1.15
Ratepayer Impact Measure (RIM)	0.32	0.46
Participant Cost (PCT)	N/A	N/A

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	1.07
Total Resource Cost (TRC)	1.37
Ratepayer Impact Measure (RIM)	0.55
Participant Cost (PCT)	N/A

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Kentucky Modified Energy Fitness program was developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on September 24, 2002 (Case No. 2002-00304) to help meet Kentucky Power's goals.

Since 2003, the MEF program has provided services to thousands of customers. Under the terms of the contract with the implementation contractor, Honeywell International, KPC pays for in-home audits and weatherization services for KPC all-electric customers. MEFP was developed to promote conservation and efficient use of electricity by improving the "energy fitness" of electrically heated residences. The major goals of the program are:

1) Reduce customer usage of electricity for space heating
2) Reduce customer usage of electricity for water heating
3) Encourage customers to use energy efficient measures
4) Increase customer service and satisfaction
5) Educate customers on using high efficiency measures
6) Reduce the Company's long-range peak demand.

To achieve the MEFP goals the program is offered to residential customers in the KPC service territory who have an electric heating system and an electric water heater who have a minimum average monthly usage of at least 1,000 kWh.

Honeywell promoted the MEFP through a direct mail brochure on KPC letterhead, which describes the program by explaining all of the services provided, and that Honeywell will contact the customer directly and arrange a time for the audit at the customer's residence. Customers are targeted by zip code.

Process and Market Evaluation

Summary

The Program has been in place for many years, and therefore a detailed review of the basic program processes was deemed unnecessary. Rather, the primary concern related to the process and market evaluation was whether the program continues to effectively save energy. The 2011 survey of participants indicated that 27% of participants would likely have purchased similar energy efficiency measures without the program. Most promotions were handled by Honeywell, and the method employed was effective. The delivery mechanism is effective, though could use improvement. Customer satisfaction was very high.

Promotional Effectiveness

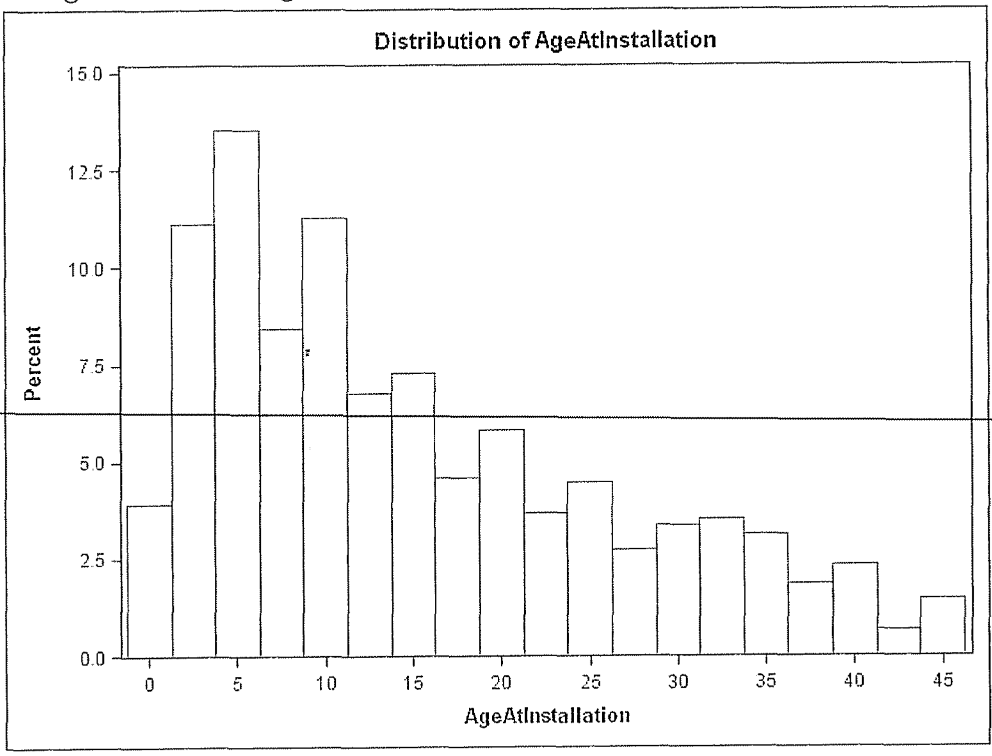
KPC has traditionally promoted the program solely through Honeywell. Recently, KPC staff updated the Kentucky Power website and created a program fact sheet to help with promotion. Participation results were near KPC's expected goals, so it is assumed the promotional work done is effective.

Delivery Mechanism

Honeywell is responsible for implementing the MEF program, performing on-site audits, providing the customer a report from the audit, and performing measure installations at the customer's home. Honeywell provided KPC with customer installation reports once per month. KPC staff monitors participant and expenditure reports monthly, and pays invoices to Honeywell. Audits were performed by KPC staff to verify the measures were installed and align with invoices from Honeywell. KPC personnel perform a quarterly audit to inspect installation of measures. Honeywell only utilized two (2) crews for implementation of the program until recently when a third crew was added, which led to a geographic concentration of the installations. This may lead to some over or under estimation of the impact analysis due to the homogenization of the participating customers. Honeywell also surveyed KPC management to ascertain their performance with the program. Follow-up meetings were conducted with Honeywell and KPC personnel to evaluate survey results and recommendations for improvement.

This evaluation was the second consecutive evaluation to find that the billing analysis did not support the validity of previous energy savings values used. The root cause of the disagreement appears to be the same as the previous evaluation indicated, mainly, that the mechanism for choosing participants is selecting homes to weatherize that do not extract the most savings from the measures installed. The median age of the homes weatherized was 12 years; with 25% of the homes being 6 years or younger at the time of installation. The following chart shows a detailed histogram of the age of the homes, indicating that many homes weatherized were newer homes.

Histogram of Home Age at Time of Installation



Data Tracking

As a whole, data collection and tracking was performed adequately from Honeywell's perspective. However, the exchange of data between Honeywell and AEP is very troublesome. The Honeywell data files are stored in an antiquated file format and do not align with any of AEP's common solution platforms. If Honeywell wishes to transfer the data using dbase, its current format (a normalized database snowflake-schema), then they must transfer the data to a tool approved by AEP, such as SAS, Microsoft Access, Oracle, SQL Server, or DB2. If they cannot provide the data in one of those formats, then the data must be de-normalized into a star-schema and provided in a spreadsheet or CSV file.

Sporadic pieces of data were missing that are required to produce engineering estimates. Discrepancies in the participation tracking spreadsheet led to underestimating demand savings by 61% in Collaborative reports. This was most likely due to not having up-to-date summer and winter demand per participant savings numbers from the last two evaluations. Even without up-to-date estimates, the spreadsheet chose an older, and lower, per participant estimate which led to underreporting of 2009 summer program kW savings by 21 kW and winter demand savings by 103 kW. Demand savings from 2010 were reported correctly.

Free Riders and Spillover

A free rider is a participant who installed energy efficiency measures had they not participated in the Program. Spillover refers to additional energy efficiency measures adopted by participants as a result of the program. Free ridership was determined by dividing the total survey responses by the positive responses to the questions "Had you planned on installing any weatherization measures before you heard about the program?" and "Would you have installed weatherization measures if the program was not available?" From the survey responses, 27% of participants indicated they would have installed some measures without the program. No information on possible spillover effects was captured in the survey.

Market Potential

At this time, the market potential for weatherization appears good. Participation goals should continue at levels comparable to previous years. However, a larger market potential could be found if program participants were not limited to customers with electric water heating. The majority of savings available to participants comes from other measures and participation should not be prohibited. In addition, more time and effort should be spent to ensure that customers that are marketed to would actually benefit from the weatherization. More emphasis should be placed on weatherizing older homes, or manufactured and mobile homes.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was very high, with 85% of the survey respondents indicating they were very satisfied (33%) or satisfied (52%) with the program. One respondent was very dissatisfied and three were dissatisfied. From the comments received the source of the dissatisfaction was the recent KPC rate increase and an installer cracking a door.

Impact Evaluation

The MEF evaluation consisted of a billing analysis coupled with engineering estimates of the implementation data collected by KPC. The billing analysis was used to determine net savings by participant. The engineering estimates were used to develop gross measure savings by participant. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. To effectively capture the change in usage patterns, an evaluation needs both pre- and post-installation billing data. The per-participant billing analysis savings are compared to the per-participant engineering estimates to determine an estimated Net-to-Gross ratio. In theory, the billing analysis results should capture the free ridership and spillover behaviors of participant group. Those results are then compared to the survey results to see if the free ridership and spillover questions asked corroborate the analysis. Further details of the billing analysis and engineering estimates can be found in the appendixes.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. Once a valid set of customers was determined, the next step was to perform a billing analysis and create engineering estimates using the algorithms for installed measures (Appendix – Engineering Estimates) to determine an average per-participant energy, summer peak, and winter peak savings value. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings are in the below table; the billing analysis savings results should be used until such time as KPC has had an opportunity to reevaluate the program.

2009 and 2010 Average Net Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
Per Participant Savings	651	-0.030	0.240

Impact Results

For 2009, KPC had goals of weatherizing 800 homes and saving KPC customers 696 MWh, 127 kW in summer peak demand, and 402 kW in winter peak demand. The program weatherized 801 homes. The billing analysis showed that the program produced net annualized total program energy savings of 522 MWh, including transmission and distribution losses, persistence, and free ridership, net winter peak demand reductions of 192 kW, and a net summer peak demand increase of 24 kW.

For 2010, KPC had goals of weatherizing 1,200 homes and saving KPC customers 1,044 MWh, 190 kW in summer peak demand, and 603 kW in winter peak demand. The program weatherized 1,200 homes. The billing analysis showed that the program produced net annualized total program energy savings of

782 MWh, including transmission and distribution losses, persistence, and free ridership, net winter peak demand reductions of 288 kW, and a net summer peak demand increase of 36 kW.

The summer demand growth shown in the billing analysis is most likely attributable to snap back. In instances where customers are living below their level of comfort, a potential for energy savings will not result in realized energy savings but will instead produce an increase in energy usage so that the customer can live closer to their desired comfort level. As an example, if a customer would prefer a residence cooled to 74 degrees in the summer, but can only afford 76 degrees, when presented with monetary savings from a reduced bill will move their thermostat to 74 degrees, rather than retain their lower bills.

The reasoning for the lower energy and winter demand savings in respect to the expected goals was due to not having a completed billing analysis in previous evaluations. Engineering estimates for most measures rely on averages calculated across the entire United States and in all types of structures. The estimates can vary greatly from what actually occurs at the participant's home. Because of the large variation, and reduction, in annualized energy savings estimates, 20 control groups were ran against the sample to ensure as much uncertainty could be reduced.

Impact Evaluation Results by Year for MEF Customers – Billing Analysis

Category	Goal	Ex-Ante	Ex-Post	Percent of Goal
2009				
Participants	800	801	801	100%
Energy (MWh)	696	697	522	75%
Summer Demand (kW)	127	127	(24)	-19%
Winter Demand (kW)	402	402	192	48%
2010				
Participants	1,200	1,200	1,200	100%
Energy (MWh)	1,044	1,044	782	75%
Summer Demand (kW)	190	190	(36)	-19%
Winter Demand (kW)	603	603	288	48%
Total				
Participants	2,000	2,001	2,001	100%
Energy (MWh)	1,740	1,741	1,304	75%
Summer Demand (kW)	316	317	(60)	-19%
Winter Demand (kW)	1,005	1,005	480	48%

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects. Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included for recovery purposes, unless new labor was utilized incrementally and specifically for DSM program implementation.

The expenditure goal for 2009 in the Collaborative Report was $304,000 for 800 participants. The total program costs as filed were $302,864 of which $258,977 were listed as incentives for 997 participants. However, these costs do not include the unrecoverable administrative costs from KPC staff and AEPSC staff. An estimated $7,500 was included under administration to account for unrecoverable costs, bringing the total to $310,364 in actual costs related to the program. The expenditure goal for 2010 in the Collaborative Report was $480,000 for 1,200 participants. The total filed program costs were $418,693, of which $358,022 were incentives for 1,198 participants. To account for unrecoverable admin costs and the costs from the 2011 evaluation, another $7,500 was included for 2010 and $20,000 was added in 2011 to account for admin and evaluation costs respectively.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analysis attempted to account for all costs related to program implementation and evaluation. Therefore an estimate of the value of KPC and AEP Service Corporation (AEPSC) staff time utilized to implement and evaluate the program was added to the reported costs. The below table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	Total
2009	$7,500	$43,887	$258,977	$-	$310,364
2010	$7,500	$60,671	$358,022	$-	$426,193
2011	$-	$-	$-	$20,000	$20,000

Goals were reported as total amounts respective to the winter peak only, however, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter. Results were lower than expected, and disconcerting. It is expected that prospective benefit cost ratios for some programs will be overestimated, sometimes wildly, due to the sunny disposition and uncertain nature of market potential studies, however previous results were higher due to using engineering estimates instead of a billing analysis to determine energy savings. Because of the lower numbers, 20 control groups were run and compared to ensure uncertainty in the model was reduced as much as possible. In addition, all customers that had usage levels outside of the 95% confidence level were discarded as potential outliers.

Program goals were to have a Program Administrator Cost (PACT) ratio of 3.37, a Total Resource Cost (TRC) ratio of 3.37, and a Ratepayer Impact Measure (RIM) ratio of 1.43. Due to no costs being borne by the participants, the Participant Cost (PCT) ratio of is not applicable. The results of the billing analysis show that the program was only cost effective for the TRC test at winter peak.

2009 and 2010 Summer Peak Cost Effectiveness Analysis

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	0.62	$ (274,063)	$ 450,187	$ 724,250
Total Resource Cost (TRC)	0.80	$ (114,192)	$ 450,187	$ 564,379
Ratepayer Impact Measure (RIM)	0.32	$ (970,509)	$ 450,187	$ 1,420,696
Participant Cost (PCT)	N/A	$ 1,274,458	$ 1,274,458	$ -

2009 and 2010 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	0.90	$ (74,873)	$ 649,377	$ 724,250
Total Resource Cost (TRC)	1.15	$ 84,998	$ 649,377	$ 564,379
Ratepayer Impact Measure (RIM)	0.46	$ (771,319)	$ 649,377	$ 1,420,696
Participant Cost (PCT)	N/A	$ 1,274,458	$ 1,274,458	$ -

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, there will be any changes to the cost effectiveness of the program in future years. Any number of a multitude of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the MEF program, results from the current evaluation were used as the starting point for the cost-benefit analysis. The results were expected to be higher due to an increase in the cost of avoided energy in future years. Due to KPC being a winter peaking utility, only the winter peak cost benefit analysis was run. Results for the program are presented for both the billing analysis and the engineering estimates. The results of the billing analysis show that the program will not be cost effective for any of the applicable tests in 2012-2014.

2012-2014 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.07	$ 82,316	$ 1,319,448	$ 1,237,132
Total Resource Cost (TRC)	1.37	$ 355,102	$ 1,319,448	$ 964,346
Ratepayer Impact Measure (RIM)	0.55	$ (1,058,986)	$ 1,319,448	$ 2,378,434
Participant Cost (PCT)	N/A	$ 2,052,359	$ 2,052,359	$ -

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the MEF program.

1) It is our recommendation that this program should be continued for one to two years and an additional impact analysis and customer selection evaluation be completed.
2) Demographic data from Acxiom or an equivalent vendor is recommended for purchase representing all KPC customers in the AEP CIS so that accurate control groups can be drawn for the proposed impact analysis. Current costs for the approximately 143,000 KPC residential customers are estimated at $12,000.
3) KPC should re-examine their participant selection methods. Too many customers in newer and well-sealed homes are being weatherized, spending funds that could be used on less efficient and older homes and gaining greater energy and demand savings.
4) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
5) On-going program management and oversight should continue to be handled by KPC staff, including tracking of customer participation and estimated ex-ante savings.
6) KPC staff labor time spent on the Program should be captured so that the true total cost of delivering the program can be known.
7) KPC should randomly survey a handful of participants to determine if the Honeywell crews are providing objective audit advice. Each participant should be surveyed twice, once for post-audit/pre-installation, and again post-installation to determine if the savings expected from the audit's recommendations are corroborated.
8) KPC staff should continue to perform on-site installation audits for a small sample of participants.
9) Honeywell and KPC staff should continue with scheduled program reviews and monthly conference calls to continue improving their working relationship.
10) KPC should consider adding another employee to help with in-the-field audits, ride-along trips and other general work required with the MEF and other programs.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

I. California Public Utilities Commission. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

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X. The SAS Institute. The EXPAND Procedure. *http://support.sas.com/documentation/cdl/en/etsug/60372/HTML/default/viewer.htm#expand_toc.htm*

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XII. Kentucky Power DSM Collaborative Report. January 1, 2008 to December 31, 2008.

XIII. Kentucky Power DSM Collaborative Report. January 1, 2009 to December 31, 2009.

XIV. Kentucky Power DSM Collaborative Report. January 1, 2010 to December 31, 2010.

Appendix – Impact Analysis and Methods

Impact Methodology

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in both the initial expected impact from an average installation and also the long-term savings from the specific installations.

Billing Analysis

Impact evaluation consists of two stages, interim impact evaluation and full impact evaluation. Engineering estimates are used to develop measure savings without post-consumption data. Implementation data is utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. The full impact evaluation consists of a billing analysis. This analysis utilizes relevant weather data and billing data with the statistical regression models to determine the savings impact of the program. A comparison of customers' bills before and after the implementation of the program is used to determine changes in usage and demand that can be attributed to the program. In order to isolate the effects of the program from unassociated changes in consumption, a Participant Group and a distinct but similar Control Group is compared. The Control Group will not contain program participants, but its customers will be similar in consumption to the program participants. After defining these research groups, billing data is weather-normalized to eliminate any effects due to weather differences before and after program implementation. Finally, regression models will be used to analyze the normalized data and provide savings values.

The first step of the billing analysis is to create a valid participant list from which to analyze. Each customer is checked to ensure that data existed for at least one year pre and post measure installation. Participants were also required to have data for all of 2008 to develop a set of comparison metrics for drawing the control group. Any customers that did not have the requisite billing data, or were inactive at the time of analysis, were discarded from analysis.

For 2009, the implementation data provided showed that 997 customers participated. 305 customers were not found in the AEP Customers Information System (CIS) at all. In all, 692 customers were available for analysis. In 2010, after validation, 102 customers were not in the AEP CIS; leaving 1,096 customers available for analysis. In total there were 1,788 customers in the implementation data that were valid for analysis. From those, more customers were rejected if their average per month usage was below 1,000 kWh.

After the participant list was created, a set of energy statistics was developed to compare to the control group. For each customer, an annual kWh, summer peak month kWh, and winter peak month kWh (formulas below) were calculated using 2008 billing data. KPC summer and winter peaks were pulled from the AEP Load Research system peak data and applied to each customer bill that contained that date, and was used to create a summer and winter monthly energy value.

Formula for determining comparison statistics between participant and control group

$$kWh_{annual} = 365 \times \frac{\sum kWh\_per\_Bill}{\sum Days\_per\_Bill} \qquad kW_s = 31 \times \frac{kWh\_per\_Bill_s}{Days\_per\_Bill_s} \qquad kW_w = 31 \times \frac{kWh\_per\_Bill_w}{Days\_per\_Bill_w}$$

After participant group selection is complete, the KPC population is validated to provide a list of potential control group customers. The population is usually constrained by one or more of program class (residential, C&I, etc…), building characteristics (single-family, mobile home, etc…), fuel type (all electric, natural gas, etc…), and income level (HEAP, non-HEAP, all). Customers are removed from consideration if they are not continuously active from January 1, 2008 until current. After the control population has been validated, comparison statistics are calculated using the above formulas.

After the control population group has been established, and both the control population's and participant group's comparison statistics have been calculated, the control population's customers are compared to the participants to provide a baseline comparison. Each participant customer is matched to all control population customers, and the top 150 most accurate matches are kept for further analysis. Matching is determined by calculating an Absolute Relative Deviation (ARD) for the Annual kWh, summer kWh, and winter kWh comparison statistics. The customers with the lowest combined ARD are kept for further validation. Due to the variance of the participant usage in the MEF program, many participants had to be rejected from further analysis because a valid control group could not be established. For each of the 150 control customers, they are assigned the same installation date as the participant customer. Each of the 150 customers is then validated using the same pre/post rules as the participant customers. Each control customer must have at least one year of data pre and post the pseudo-installation of the measure. Following pre-post validation, the 95%

confidence level is determined and the customers falling outside of the range were eliminated as outliers.

Formula for comparing control population customer to participant

$$ARD = ARD_{kWha} + ARD_{kWhs} + ARD_{kWhw}$$

$$ARD_{kWha} = \frac{|kWha_{ctrl} - kWha_{part}|}{kWha_{ctrl}} \qquad ARD_{kWhs} = \frac{|kWhs_{ctrl} - kWhs_{part}|}{kWhs_{ctrl}} \qquad ARD_{kWhw} = \frac{|kWhw_{ctrl} - kWhw_{part}|}{kWhw_{ctrl}}$$

After the 150 customers have been compared to the participant, the top 20 are kept for further evaluation. Twenty control groups are used for comparison because of the variance of the population. The population variance is high because the AEP CIS does not contain enough demographic data on the customer to create a very accurate regression model. There are too many lurking variables in a billing analysis if enough data is not included, which can bias the results. Once the 20 control groups have been selected, each group is run, pairwise, with the participant group through the entire billing analysis process. Final results for each run of the analysis are compared to ensure that none of the control groups are extreme in either direction (load savings or load growth). Using an alpha of .05 for Type I error testing, and a beta of .10 for Type II, or power testing, checks are completed to ensure that the control group methodology is valid. Once the methodology is verified, the first control group, being the most accurate, is used for the regression portion and official savings calculations. If there are concerns about uncertainty, all 20 control groups will be run and the numbers will be aggregated as a replicated analysis. For the MEF program, all 20 control groups were run.

The regression analysis is conducted by constructing two models, a baseline and treatment weather normalized panel model. A panel analysis is a two-dimensional time-series and cross-sectional model used to evaluate changes in the effects of a treatment on a treatment group compared to a control group over time. Weather Normal, or Typical Meteorological Year, data is created by the U.S. National Renewable Energy Laboratory (NREL) to represent weather data for a typical year. The TMY2 dataset was used for all KPC billing analysis, and is derived from the 1961-1990 National Solar Radiation Data Base (NSRDB).

The baseline model is created using at least one year of billing data pre-installation to develop a weather normalized billing function (see formula below). The treatment model is created using at least one year of billing data post-installation. Each customer is assigned a weather station, average daily temperature, cooling degree day, and heating degree day summaries to each bill. Degree days are calculated by summing the number of hours per day by the degrees per hour above or below a temperature break point. For heating degree days, the breakpoint temperature is set at 65 degrees Fahrenheit. Cooling degree days are calculated using 70 degrees Fahrenheit as the breakpoint. Once the necessary data has been created, an autoregressive model is fit to the data for each customer to create the betas necessary to predict data. Each beta represents the multiplier coefficient for the incremental value of each model variable. To forecast or estimate new kWh, multiply the regression betas by the new data.

Weather normalized regression model

$$kWh=(\beta_{daily\_kwh}\times Days)+(\beta_{ADT}\times ADT)+(\beta_{CDD}\times CDD)+(\beta_{HDD}\times HDD)+(\beta_{CDD^2}\times CDD^2)+(\beta_{HDD^2}\times HDD^2)+\varepsilon$$

Once the baseline and treatment models have been determined, the model betas are multiplied by weather normal data to create baseline weather normalized bills for each customer. Once the bills have been forecasted, the data is aggregated to create annualized normal energy usage per customer. Each customer has an estimated baseline and treatment annualized kWh. The difference between the estimated baseline and treatment kWh is the energy savings due to the program. The annualized energy estimates are then summarized by participant group and control group, and multiple t-tests are completed to compare the savings of each group, and their pairwise difference.

Once the annualized savings numbers have been calculated, the forecasted bills are used to create monthly and daily load shapes for DSMore. The monthly load shape is created by temporally disaggregating the bills from a cycle month to a calendar month. Traditional load research techniques use linear interpolation method of determining an average energy usage per day per bill, then creating a stepped daily load shape. This method maintains transformation under integration, meaning one can move from cycle month to billing month without loss of accuracy; however the ability to detect peaks using this method is very limited. The second method, utilized in this evaluation, is to create a daily load shape using cubic splines. This method is also closed under integration, and is the preferred method for temporal disaggregation when using SAS (Statistical Analysis Software®). AEP Load Research has done studies comparing the accuracy of both methods in predicting daily load shapes of interval metered customers, and found that the cubic spline disaggregation is more accurate when using goodness-of-fit statistics. However, the primary reason for using cubic splines is the ability to put more load on the peak days of the month. Using the cubic spline method, the forecasted bills are disaggregated to a 365 day daily load shape for each customer. Using the daily load shape, the customers are aggregated using traditional load research methods, to determine a domain load shape. For the MEF program, there were no domains below the program level.

Next, the peak day history for KPC is used to create a typical peak day for both the summer and winter peak. This is done by averaging the day per year for each year to determine the average day-per-year. As an example, if the last five winter peaks occurred between January 11th and January 15th, it is expected that the average day-per-year peak day will be January 13th. After the typical peak date for the summer and winter peaks has been determined, the KPC Residential Load Research class load shape, as determined by AEP Load Research, is retrieved for each peak date. Using the Residential class load shape, the proportion of energy used at the peak hour, relative to the total energy for the day is determined as a load factor. To determine the summer and winter peaks, the daily energy from the cubic spline disaggregation is divided by the load factor and 24 (hours per day) to determine the average peak demand reduction for each season. The formula is below:

Peak demand reduction formulas

$$kWs = \frac{\frac{kWh_{peakdayS}}{24}}{LF_S} \qquad kWw = \frac{\frac{kWh_{peakdayW}}{24}}{LF_W}$$

Analysis Results

The below graphs contain the summary panel, profile plot, and agreement plot from SAS, created during the PROC TTEST procedure. Particular attention should be paid to the uncertainty of the parameter estimate for the mean. Because of the uncertainty involved in the model, any savings estimate within the Lower Confidence Level (LCL) and Upper Confidence Level (UCL) is within plus or minus two standard errors of the mean. What this means is that the findings of the billing analysis show that the neither of the previous evaluation savings estimates, nor the current engineering estimate, are statistically different from the *ex post* savings estimate to the 95% confidence level.

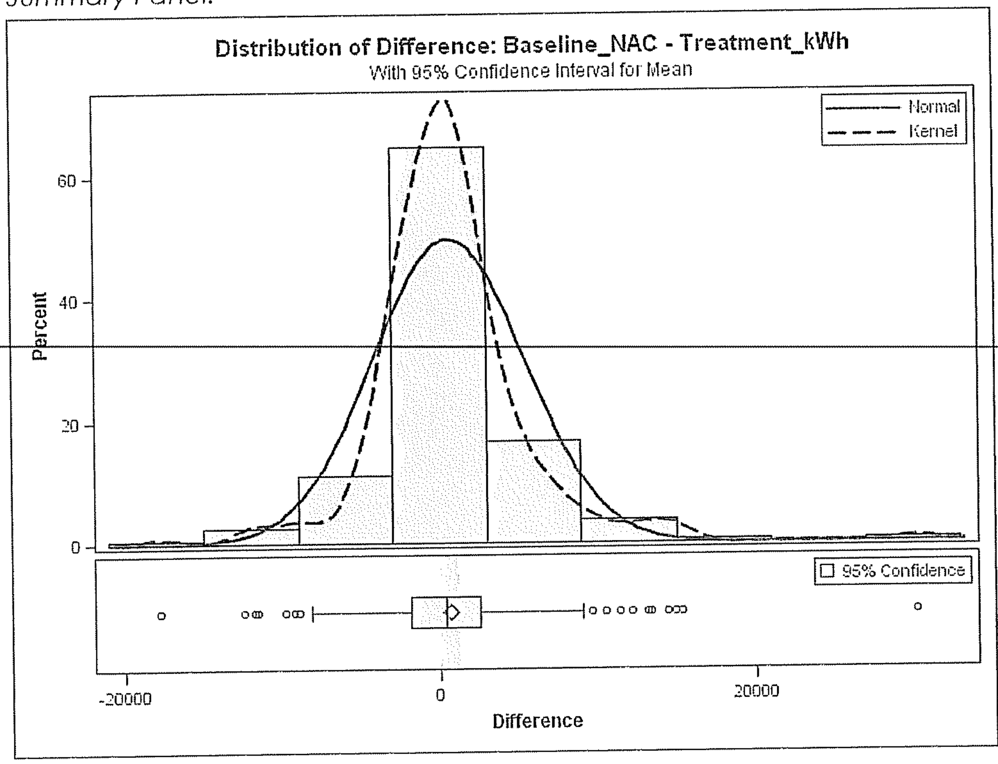
All twenty control groups were ran and aggregated. A cursory glance of the control group baseline and treatment comparisons show extreme variability. Had only one control group been run, the model could have found a load growth of 245 kWh or a high savings as 527 kWh. Running multiple iterations of the billing analysis allows us to take advantage of the Central Limit Theorem and create a better estimate of the per participant savings. Control group variation numbers are presented after the charts and graphics.

Summary Statistics: All Customers

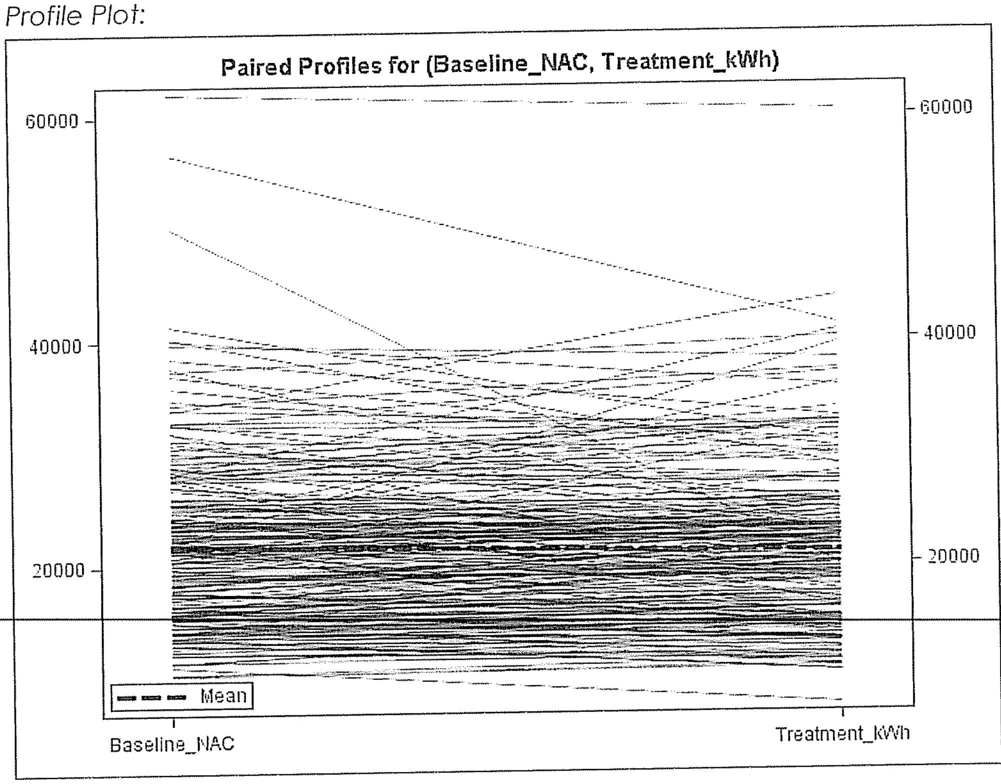
N	Mean	Std Dev	Std Err	95% CL Mean		Summer kW	Winter kW
235	**651.4**	4,818.8	314.3	32.1	1,270.7	**-0.030**	**0.240**

Analysis Graphs

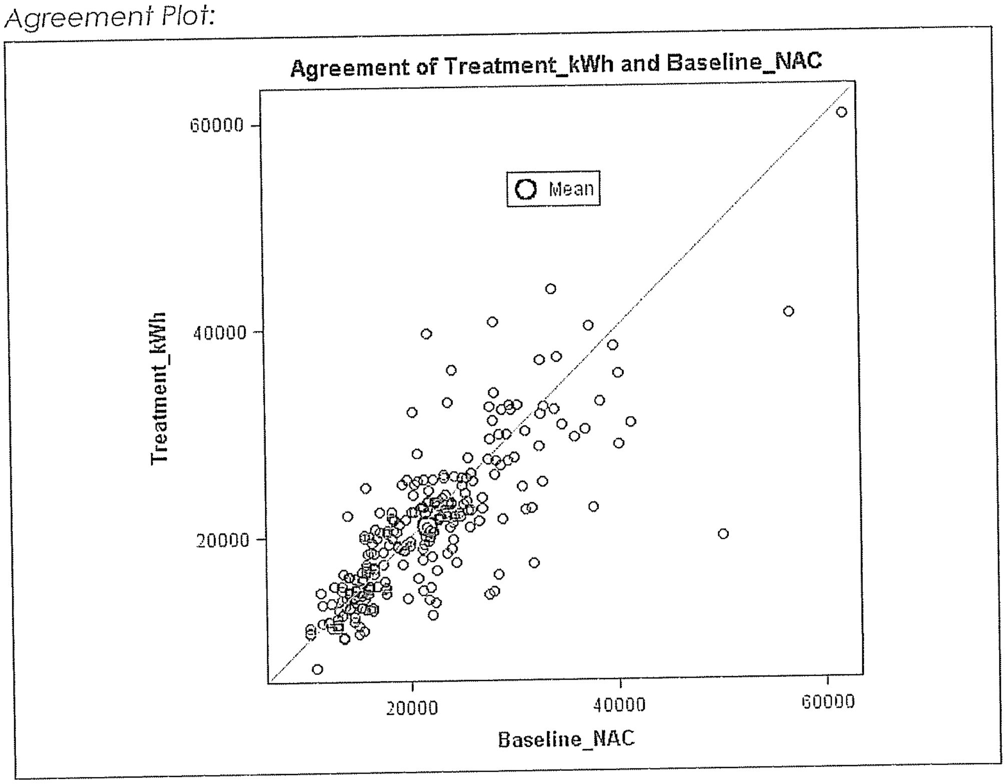
Summary Panel:



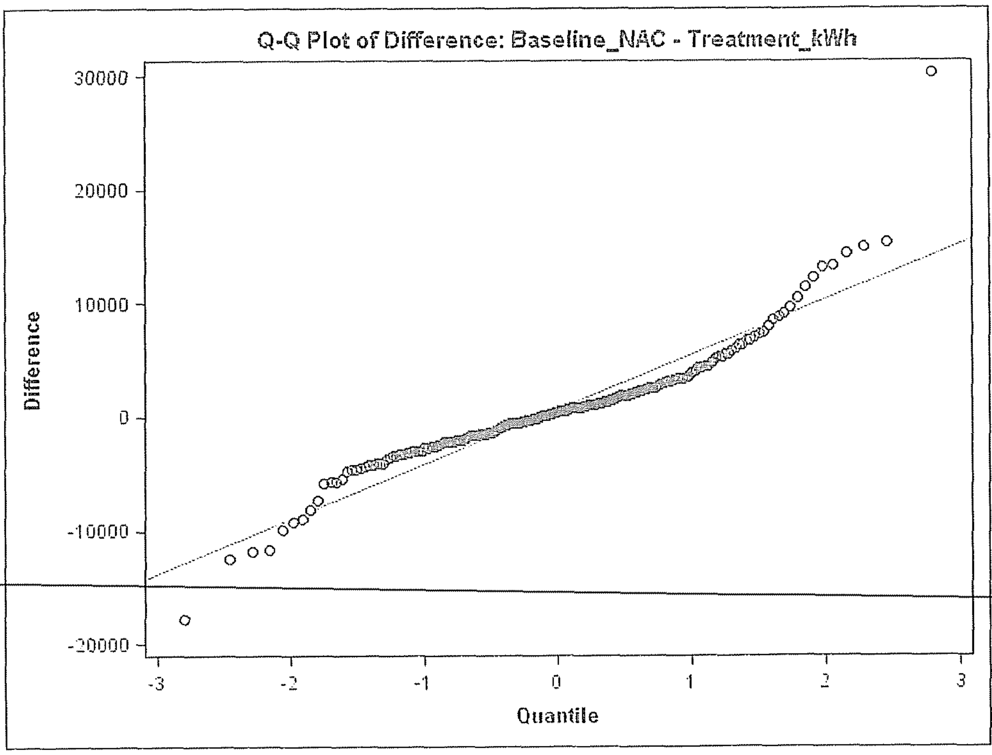
Profile Plot:



Agreement Plot:



Q-Q Plot:



Control Group Analysis

When performing a billing analysis to determine the impacts for program evaluation, the participant group needs to be matched to a set of control customers. For historical analyses, the literature suggests a single control group be matched to the participant list in order to provide a valid set of customers from which to compare. This is done to remove any activities that are related to free ridership: i.e. those activities that would have occurred without the program. However, this author feels that without a robust set of demographic data to make customers comparisons more accurate than AEP's current CIS contains, a billing analysis must treat the control group selection as a replication of quasi-experimental designs. Quasi-experimental design, or "before and after" design, is distinguished by the non-randomness of the control and participant selection groups. However, given the limited demographic data, we substitute the rigorous selection with an increase in replications. Classical statistics (sometimes called Frequentist statistics) is predicated on the notion of repeated trials to infinity, e.g. the relative frequency of a statistics as the trials near infinity. However, in practice, most statistics that is performed is done using a single repeated trial. In many cases, and disciplines, this is an accepted, even celebrated practice. However, in impact analysis of programs, the usage uncertainty and disparity of customer demographics at a premise (number televisions, HVAC usage, work schedule, occupants, etc....) demands that more than one replication be undertaken. Below is the list of control groups generated for this analysis and how each iteration would have compared to the per participant savings calculated in the billing analysis.

Control Group Comparison to Per Participant kWh

Analysis Group	Baseline Mean	Treatment Mean	Ratio	Per Participant kWh if Chosen	Loss/Gain From Mean
Control_01	22,181	21,676	97.73%	855	204
Control_02	21,505	20,833	96.88%	665	13
Control_03	21,684	20,845	96.13%	497	(154)
Control_04	21,274	20,871	98.11%	941	290
Control_05	20,595	20,363	98.87%	1,114	462
Control_06	20,973	20,368	97.11%	718	66
Control_07	21,494	20,971	97.57%	820	169
Control_08	21,896	21,456	97.99%	914	263
Control_09	21,442	21,668	101.05%	1,603	952
Control_10	21,349	20,121	94.25%	74	(578)
Control_11	21,682	20,526	94.67%	169	(483)
Control_12	21,256	20,147	94.78%	194	(458)
Control_13	21,968	20,831	94.82%	203	(448)
Control_14	21,214	20,841	98.24%	971	320
Control_15	21,292	20,512	96.34%	543	(108)
Control_16	20,968	20,282	96.73%	632	(20)
Control_17	22,092	21,362	96.69%	624	(28)
Control_18	20,830	19,996	96.00%	467	(184)
Control_19	21,880	20,928	95.65%	388	(263)
Control_20	20,876	20,219	96.85%	659	7

Appendix - Engineering Estimates

Estimation Methodology

To calculate annualized energy savings, an average per-measure savings must be determined based on the heating and cooling savings from the increased efficiency of the heat pump. Heating savings are determined by the inverse difference of the Heating Seasonal Performance Factors (HSPF) between the baseline heat pump and the increased efficiency heat pump. Cooling savings are determined by the inverse difference of the Seasonal Energy Efficiency Rating (SEER) between the baseline and upgraded heat pumps. Each savings value is scaled based on the size of the heat pump by tonnage or British Thermal Unit Hours (BtuH) to determine the per-participant, per-year usage. The per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. This number is compared to the billing analysis values to see if the survey free ridership and spillover questions are comparable to the analytically determined values.

Technology Description

ENERGY STAR CFL Bulbs

Description

A low wattage ENERGY STAR qualified compact fluorescent screw-in bulb (CFL) is purchased through a retail outlet in place of an incandescent screw-in bulb. The incremental cost of the CFL compared to the incandescent light bulb is offset via either rebate coupons or via upstream markdowns. Assumptions are based on a time of sale purchase, not as a retrofit or direct install installation. This characterization assumes that the CFL is installed in a residential location. Where the implementation strategy does not allow for the installation location to be known and absent verifiable evaluation data to support an appropriate residential versus commercial split, it is recommended to use this residential characterization for all purchases to be appropriately conservative in savings assumptions.

Algorithms

$$kWh = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times \left(H \times 365\right) \times \left(1 + IF\right)$$

$$kW = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times CF \times (1 + IF)$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
W_{base}	Wattage of bulb being removed
$W_{replace}$	Wattage of bulb being installed
H	Average Daily hours-of-use
IF	Interactive Factor
CF	Coincidence Factor

Assumptions:

The expected measure life is 8 years.

Air Sealing

Description

This measure characterization is for the improvement of a building's air-barrier, which together with its insulation defines the thermal boundary of the conditioned space. Air-leakage in buildings represents from 5% to 40% of the space conditioning costs but is also very difficult to control. The measure assumes that a trained auditor, contractor or utility staff member is on location, and will measure and record the existing air leakage rate and post air-sealing leakage using a blower door, and the efficiency of the heating and cooling system used in the home.

Algorithms

$$kWh = \frac{\left(\frac{(CFM50_{Exist} - CFM50_{New})}{Nfactor} \times 60 \times CDH \times DUA \times 0.018\right)}{1000 \times \eta Cool}$$

$$kW = \frac{\Delta kWh}{FLH_{cool}} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
$CFM50_{exist}$	Existing cubic feet per minute at 50 Pascal pressure differential as measured by the blower door before air sealing
$CFM50_{new}$	New cubic feet per minute at 50 Pascal pressure differential as measured by the blower door after air sealing
Nfactor	Conversion factor to convert 50 Pascal air flows to natural airflow
60	Constant to convert cubic feet per minute to cubic feet per hour
CDH	Cooling Degree Hours
DUA	Discretionary Use Adjustment to account for the fact that people do not always operate their air conditioning system when the outside temperature is greater than 75°F
0.018	The volumetric heat capacity of air
ηCool	Efficiency of Air Conditioning equipment
FLH_{cool}	Full load cooling hours
CF	Coincidence Factor

Assumptions

The expected measure life is 15 years.

Water Heater Wrap

Description

This measure relates to a Tank Wrap or insulation "blanket" that is wrapped around the outside of a hot water tank to reduce stand-by losses. This measure applies only for homes that have an electric water heater that is not already well insulated. Generally this can be determined based upon the appearance of the tank.

Algorithms

$$kWh = kWh_{base} \times \frac{(EF_{new} - EF_{base})}{EF_{new}}$$

$$kW = \frac{\Delta kWh}{8,760}$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
kWh_{base}	Average kWh consumption of electric domestic hot water tank.
EF_{new}	Assumed efficiency of electric tank with tank wrap installed.
EF_{base}	Assumed efficiency of electric tank without tank wrap installed.
8,760	Number of hours in a year.

Assumptions

The expected measure life is 5 years.

Pipe Wrap

Description

This measure describes adding insulation to un-insulated domestic hot water pipes. The measure assumes the pipe wrap is installed to the first length of both the hot and cold pipe up to the first elbow.

Algorithms

$$kWh = \frac{\left(\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) \times L \times C \times \Delta T \times 8,760\right)}{\eta DHW \times 3,413}$$

$$kW = \frac{\Delta kWh}{8,760}$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
ISR	In Service Rate or fraction of units that get installed

R_{exist}	Pipe heat loss coefficient of non-insulated pipe (existing)
R_{new}	Pipe heat loss coefficient of insulated pipe (new)
L	Length of pipe from water heating source covered by pipe wrap (ft.)
C	Circumference of pipe (ft.)
ΔT	Average temperature difference between supplied water and outside air temperature (°F)
ηDHW	Recovery efficiency of electric hot water heater
3,413	Conversion from Btu to kWh
8,760	Number of hours in a year

Assumptions

The expected measure life is 15 years.

Low Flow Showerhead

~~Description~~

This measure relates to the installation of a low flow showerhead in a home. This is a retrofit direct install measure or a new installation. Both electric and fossil fuel savings are provided, although only savings corresponding to the hot water heating fuel should be claimed.

Algorithms

$$kWh = ISR \times (GPM_{base} - GPM_{low}) \times \frac{kWh}{GPM_{reduced}}$$

$$kW = \frac{\Delta kWh}{Hours} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
ISR	In Service Rate or fraction of units that get installed.
GPM_{base}	Gallons per minute of baseline faucet.
GPM_{low}	Gallons per minute of low flow faucet.
$kWh/GPM_{reduced}$	Assumed kWh savings per GPM reduction.
$r_{install}$	Rate of install.
$r_{persist}$	Rate of persistence.
Hours	Average number of hours per year spent using faucet.
CF	Coincidence Factor.

Assumptions

The expected measure life is 15 years.

Programmable Thermostat

Description

Programmable Thermostats can save energy through the advanced scheduling of time-of-day and/or day-of-week setbacks to control heating and cooling set-points. Typical usage reduces the heating set-point during times of the day when occupants are usually not at home (work hours); keeping the home at a cooler temperature in the winter reduces heat losses relative to a higher temperature.

Algorithms

kWh = 1% Energy Savings for each degree of set-back over an 8-hour period.

kW = Winter/Summer Hours * kWh * CF

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
CF	Coincidence Factor.

Assumptions

The expected measure life is 15 years.

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility.
2. Customer's account must have been active prior to the measure being received until the date of the analysis (or the end of the measure's expected life).
3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Program Assumptions

Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Free Ridership	27%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%

Appendix – Exhibits

Exhibit 1 – Fact Sheet

AEP KENTUCKY POWER®

A unit of American Electric Power

Modified Energy Fitness Program

Fact Sheet

Program Overview

With the Kentucky Power Modified Energy Fitness Program, you can reduce your all-electric home's energy use while improving your comfort. The program helps you identify key areas within your home where you are losing valuable energy and can implement potential improvements.

Kentucky Power is partnering with Honeywell International, a nationally recognized energy management firm, to provide this service. A highly-trained Honeywell International home energy auditor is available to provide you energy-saving measures and recommendations on ways to make your home more energy efficient.

By participating in this program, you can receive:

- Air infiltration diagnostic test to find air leaks
- A complete energy audit with customized report
- Energy savings booklet
- Energy conservation measures installed (per program guidelines)
  - Domestic hot water pipe insulation
  - Water heater insulation wrap
  - Low flow showerhead
  - Weatherstripping / caulking / doorsweep
  - Duct sealing
  - High efficiency compact fluorescent light bulbs (CFLs)

Customer Eligibility

The Modified Energy Fitness Program is a weatherization program designed specifically for Kentucky Power's all-electric residential customers. To qualify for the program you must own a single family home that used an average of 1,000 kWh per month over the last 12 months.

Want to know where your home is wasting energy? Schedule your audit appointment through Kentucky Power's Modified Energy Fitness Program, and you'll get free energy-saving items and recommendations on ways to make your home more energy efficient.

How to Participate

Call 1-866-225-0686 to schedule your appointment. Remember, there is nothing to buy, and no follow-up sales call will result from your participation.

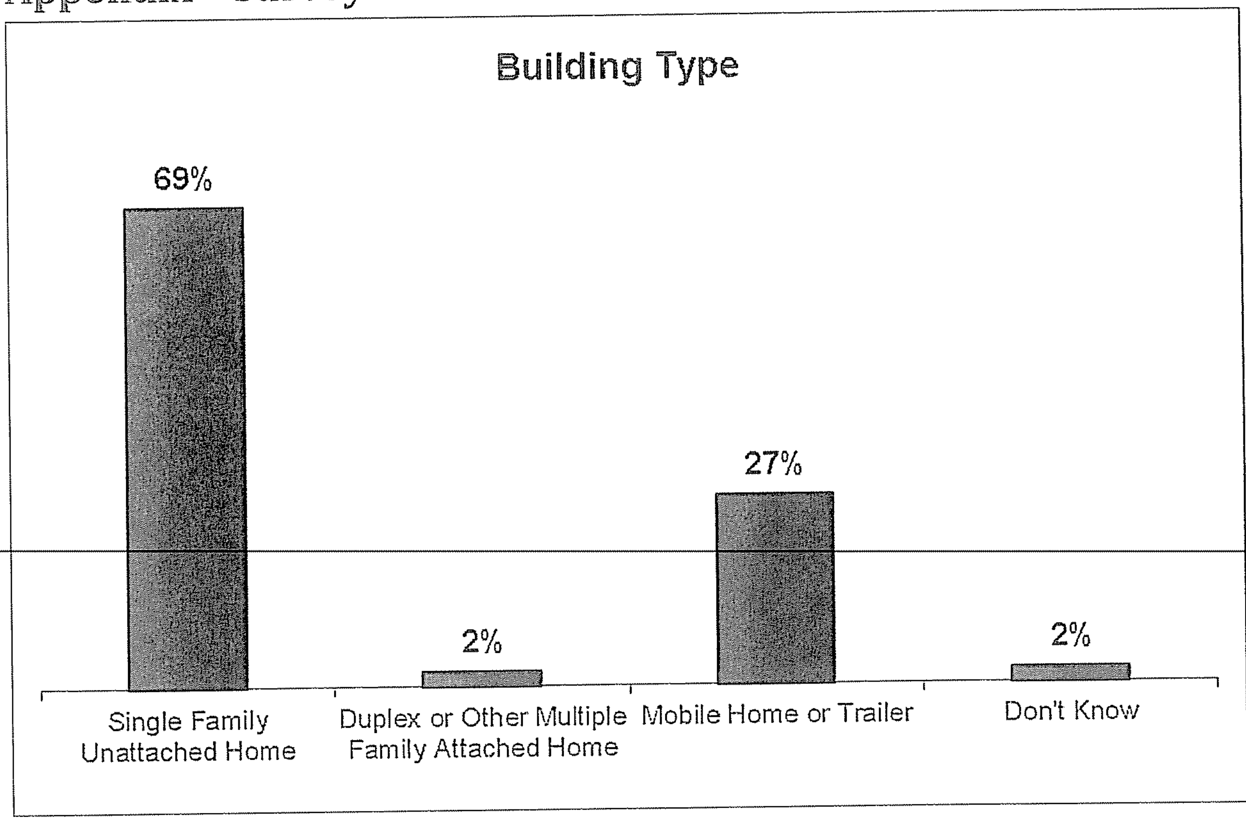
Other Opportunities

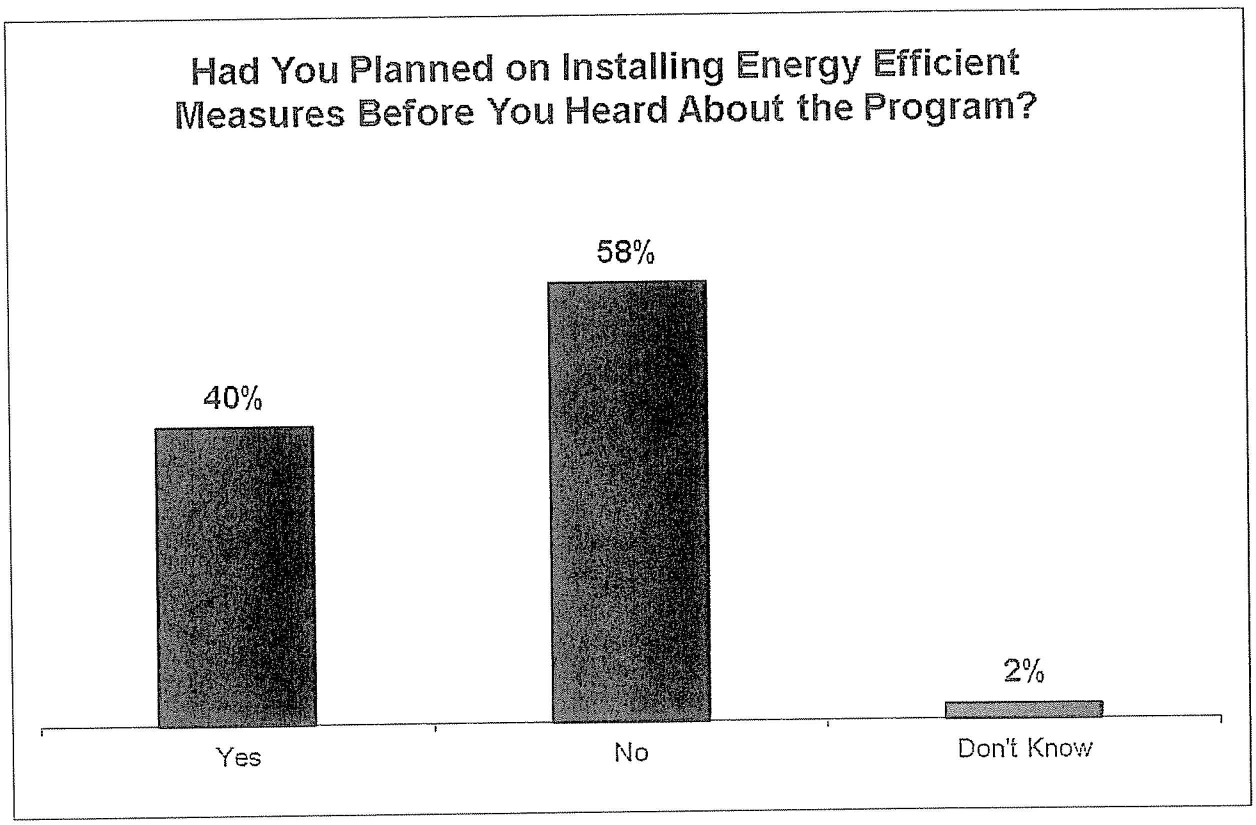
Kentucky Power offers a suite of SMART Programs, which are energy efficiency programs for homes, businesses and schools. For more information on this program or other SMART Programs, call **1-800-572-1113** or visit **KentuckyPower.com/save.**

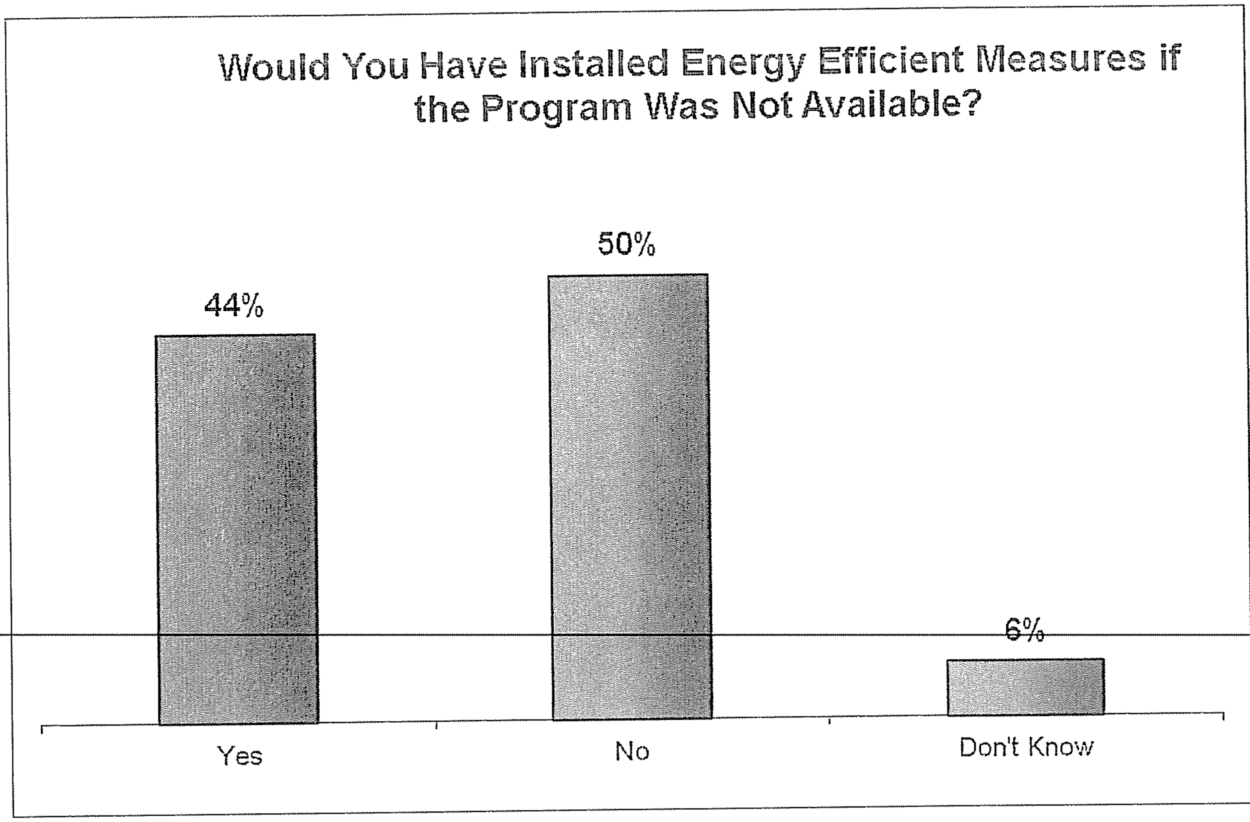
SMART Programs – Saving Money And Resources Together®

gridSMART®

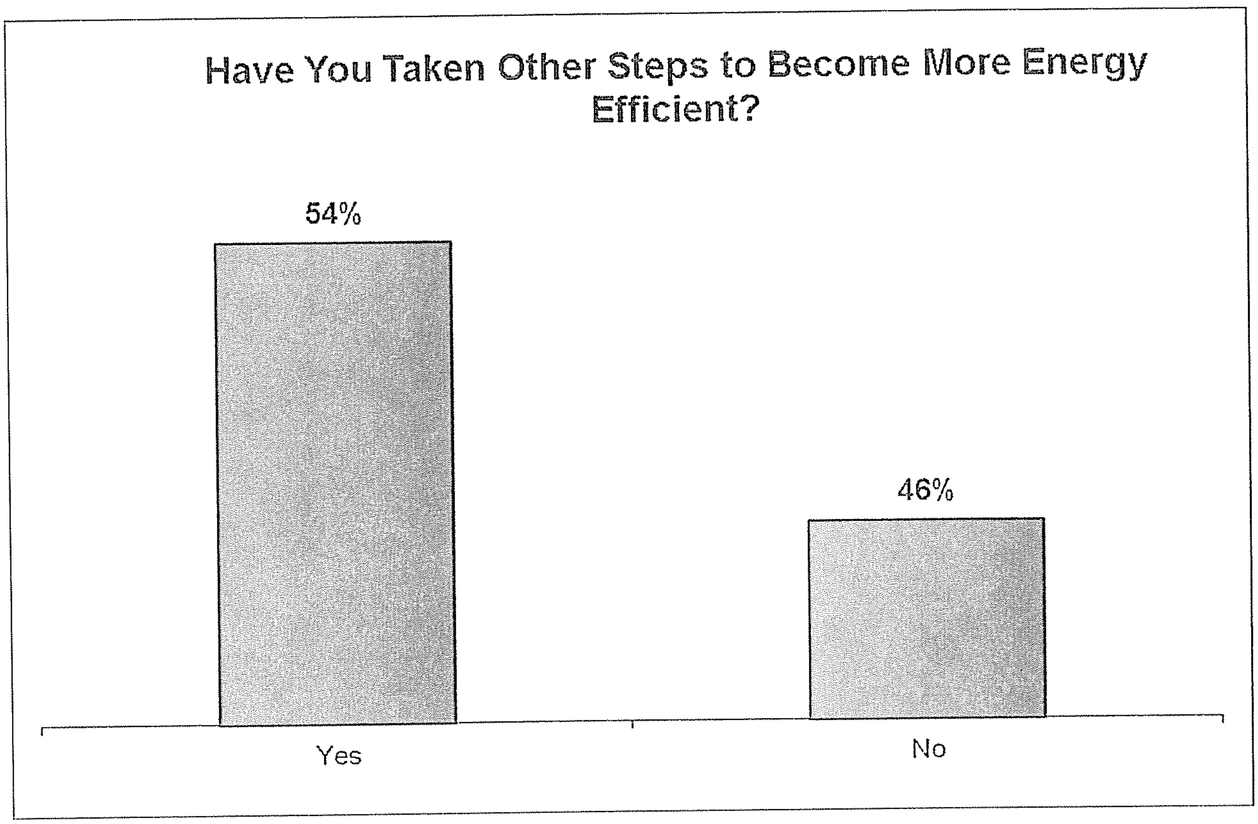
From Kentucky Power


Building Type
69%
2%
27%
2%
Single Family Unattached Home
Duplex or Other Multiple Family Attached Home
Mobile Home or Trailer
Don't Know

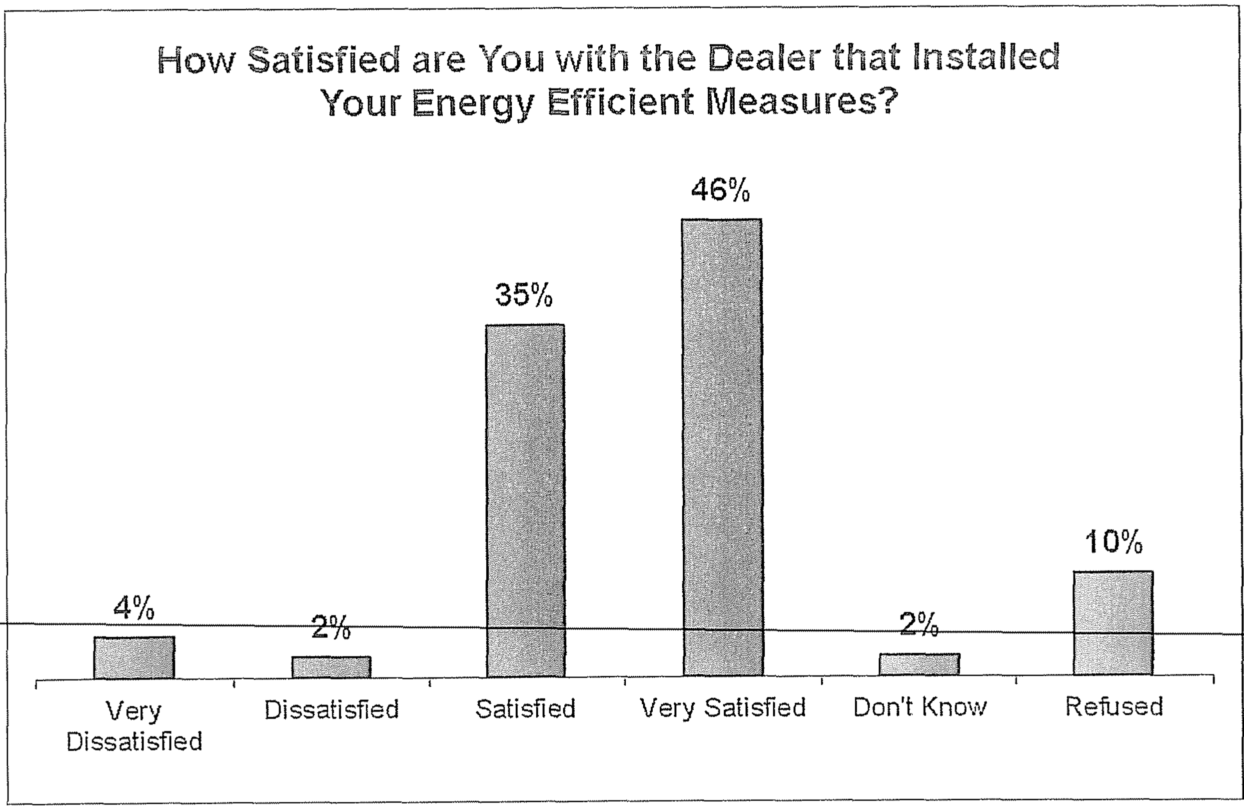

Had You Planned on Installing Energy Efficient Measures Before You Heard About the Program?
40%
58%
2%
Yes
No
Don't Know

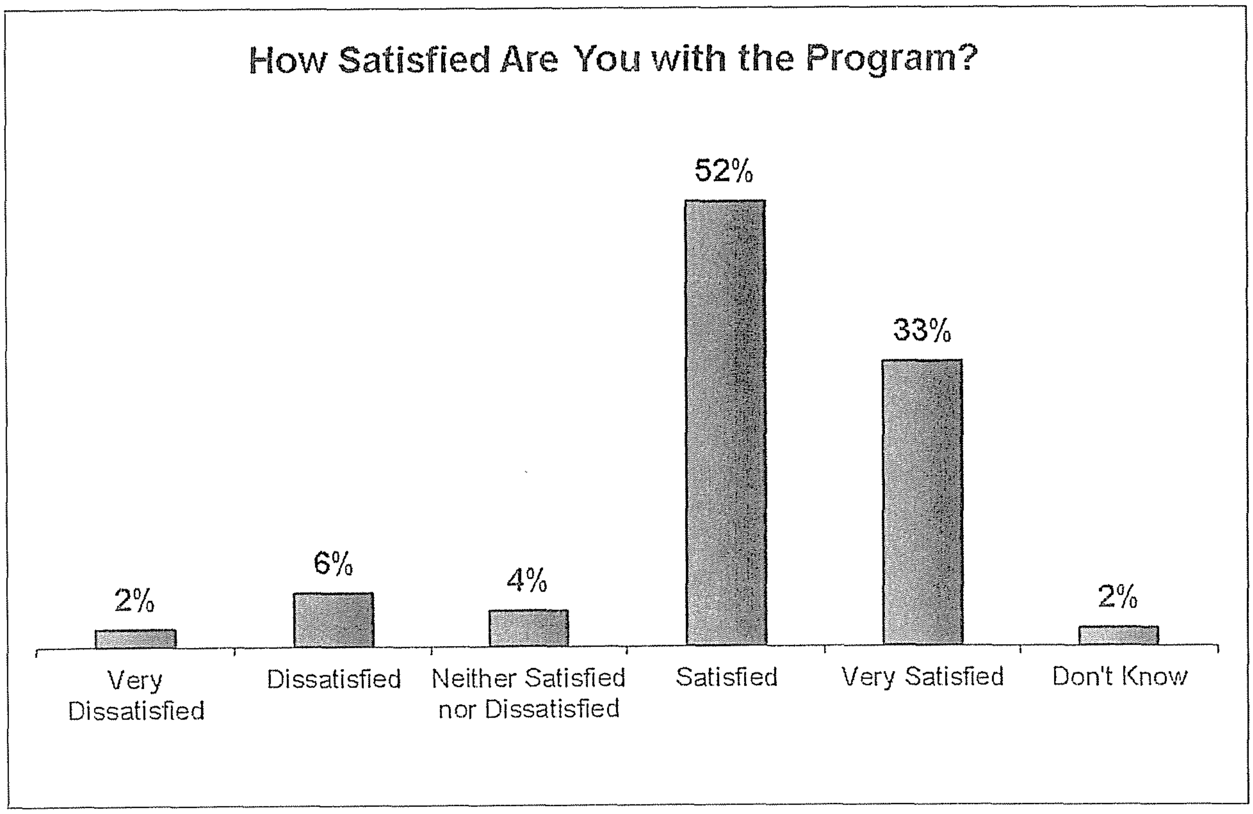


Would You Have Installed Energy Efficient Measures if the Program Was Not Available?
44%
50%
6%
Yes
No
Don't Know



Have You Taken Other Steps to Become More Energy Efficient?
54%
46%
Yes
No


How Satisfied are You with the Dealer that Installed Your Energy Efficient Measures?
4%
2%
35%
46%
2%
10%
Very Dissatisfied
Dissatisfied
Satisfied
Very Satisfied
Don't Know
Refused


How Satisfied Are You with the Program?
2%
6%
4%
52%
33%
2%
Very Dissatisfied
Dissatisfied
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied
Don't Know

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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AEP®

Evaluation Report

Kentucky Power Company

High Efficiency Heat Pump

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team
American Electric Power Service Corporation
1 Riverside Plaza, 13th Floor
Columbus, OH 43215

Table of Contents

Executive Summary

The Kentucky Power Company (KPC) High Efficiency Heat Pump (HEHP) program is designed to reduce residential electric energy consumption by upgrading less efficient electric heating and cooling systems with high-efficiency heat pumps. Advanced technology has increased the efficiency of heat pump systems, resulting in higher energy savings and a greater demand reduction. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. For 2009 and 2010, the HEHP program replaced 1,069 HVAC systems with heat pumps, providing 1,693 MWh of net annualized energy savings and 607 kW of winter peak demand reductions. The process evaluation concluded that the promotion and delivery processes continue to be effective.

Based on the results of the evaluation, the HEHP program was determined to be cost-effective for three of the cost-benefit tests used in the California Standard Practice Manual and KPC should continue to utilize the program through the remainder of the current program life (2011). The prospective analysis of the program for 2012-2014 predicts the program will be cost-effective and should be continued.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio	Winter Peak Ratio
Program Administrator Cost (PACT)	1.31	2.27
Total Resource Cost (TRC)	1.01	1.74
Ratepayer Impact Measure (RIM)	0.37	0.65
Participant Cost (PCT)	2.21	2.21

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	2.72
Total Resource Cost (TRC)	2.03
Ratepayer Impact Measure (RIM)	0.74
Participant Cost (PCT)	2.24

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Kentucky High Efficiency Heat Pump program was developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on February 24, 2009 (Case No. 2008-00349) to help meet Kentucky Power's goals.

The High Efficiency Heat Pump program is designed to reduce residential electric energy consumption by upgrading less efficient electric heating and cooling systems with high-efficiency heat pumps. Advanced technology has increased the efficiency of heat pump systems, resulting in higher energy savings and a greater demand reduction. This program is appropriate, as it helps lower electric bills for all residential customers and allows Kentucky Power Company to utilize its existing generating capacity more efficiently, thereby deferring the need for new generation as well as conserving our country's valuable natural resources. A significant gain in efficiency can be obtained by upgrading these HVAC systems with high efficiency heat pumps, which exceed USDOE minimum efficiency standards (13 SEER and 7.7 HSPF).

Kentucky Power Company promoted the program through HVAC contractors and paid incentives to both the contractor and the customers who purchased a high-efficiency heat pump to replace their existing electric resistance heat system or electric heat pump unit.

The major goals of the High Efficiency Heat Pump program are to:

1) Reduce energy consumption of electrically heated homes
2) Assist and encourage residential customers to improve heating, ventilation, and air conditioning (HVAC) efficiency by installing high efficiency heat pumps
3) Increase customer satisfaction and services
4) Reduce Kentucky Power's long-range peak demand.

Process and Market Evaluation

Summary

The Program first became active in 2009 and immediately met participant goals. The 2011 survey of participants indicated that slightly less than one-half of the participants replacing a heat pump and about one third of the participants replacing a forced-air furnace would likely have purchased an equivalent high efficiency heat pump without the program. Thus it can be inferred that the program influenced the decision making of most customers making heating system replacement decisions in 2009 and 2010. The promotion method employed was effective, but improvements in promotion could be considered. The delivery mechanism continues to be effective, as goals were reached and customer satisfaction levels were high.

Promotional Effectiveness

KPC promoted the program through an established network of participating HVAC contractors and with a bill insert (Exhibit 1 in Appendix). In 2010, KPC staff reviewed a database of all HVAC contractors in and near the KPC service territory, pursued recruitment of additional contractors, and successfully expanded the base of participating contractors. KPC staff estimated that 80% of HVAC contractors in KPC service territory are now participating in the program. Participants normally became aware of the program only after they contacted a participating HVAC contractor and inquired about heating system replacement. Some participants may have also heard about the program from neighbors and friends. A customer incentive of $400, as approved by the Kentucky Demand Side Management Collaborative, was provided to offset a significant portion of the incremental cost of the high-efficiency upgrade. Dealers received a $50 incentive for each installation to offset the cost of their time and effort. This promotional method is likely effective in reaching customers who need to replace their heating system, but direct program promotion to all customers could accelerate some heating system replacement decisions and provide a better understanding of the program for customers considering HVAC replacements.

Delivery Mechanism

To qualify for the program, each HVAC contractor was required to be licensed and certified within the state of Kentucky. When contacted by a KPC customer, the HVAC contractor explained the program to the customer, described the incentive offered for installing a new high efficiency heat pump, and provided the customer with the KPC provided marketing material. Once selected for the project, the contractor handled all facets of the installation and provided the Company with customer installation reports from which incentive payments were made to the customers and the contractor. KPC staff entered the information into an Excel spreadsheet for participant tracking, worked with the contractors to resolve any missing or questionable information, and processed the rebates. No on-site inspections were performed to verify the provided heat pump information and quality of contractor installation.

Data Tracking

A large number of problems were found when examining the data tracking efforts of KPC staff. Many pieces of data were missing that are required to produce engineering estimates for Air Source Heat Pumps. Specifically, each customer must have the baseline and replacement Heating Seasonal Performance Factor (HSPF), Seasonal Energy Efficiency Rating (SEER), Energy Efficiency Rating (EER), size in tonnage or British thermal unit hours (BtuH) for every customer. The implementation data for this program was missing the EER of the new heat pumps. Without EER, accurate demand estimates cannot be made. However, as a whole, data collection and tracking was very well done.

Free Riders and Spillover

A free rider is a participant who installed a high-efficiency heat pump system, but would have installed the same system had they not participated in the Program. Spillover refers to additional energy efficiency measures adopted by participants as a result of the program. Free ridership was determined by dividing the total survey responses by the positive responses to the questions "Had you planned on installing a heat pump before you heard about the program?" and "Would you have installed a heat pump if the program was not available?" From the survey responses, 46% of participants replacing an existing heat pump and 33% of participants replacing a central forced air furnace with a high efficiency heat pump indicated they would have purchased the same high-efficiency heat pump without the program and thus were classified as likely free riders in this program. No information on possible spillover effects was captured in the survey.

Market Potential

The 2010 Residential Customer Survey showed that approximately 45,000 KPC households reside in single family homes which they own and for which electricity is used for heating. Over 25,000 of those currently heat with a heat pump and over 6,000 with a central forced air furnace. About 2,400 of the forced air HVAC systems in those homes are more than fifteen years old, and over 2,500 of the heat pumps are of that age. The 2011 participant survey indicated that more than 50% of the participants would have purchased a high-efficiency heat pump without the program, indicating that the choice of a high-efficiency heat pump is becoming somewhat common. Even though the choice is becoming more common, there is clearly still a continuing need for encouraging high-efficient heat pump installations as replacements for both central furnace and heat pump systems. Setting a goal of influencing at least 200 purchases in each of the next two years is reasonable.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was high.

In the Resistance Survey 92% of the survey respondents indicated they were very satisfied (42%) or satisfied (50%) with the program. In the Replacement Survey 89% of the survey respondents indicated they were very satisfied (51%) or satisfied (38%) with the program. Two respondents were very dissatisfied, one was dissatisfied, and six expressed a neutral opinion. From the comments received the source of the dissatisfied response was based upon the recent KPC rate increase and not the HEHP program itself. One of the very dissatisfied respondents thought the new heat pump used more electricity than his previous system and that the air was not warm. The other gave no reason for his/her dissatisfaction.

Impact Evaluation

The HEHP evaluation consisted of a billing analysis coupled with engineering estimates of the implementation data collected by KPC. The billing analysis was used to determine net savings by participant. The engineering estimates were used to develop gross measure savings by participant. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. To effectively capture the change in usage patterns, an evaluation needs both pre- and post-installation billing data. The per-participant billing analysis savings are compared to the per-participant engineering estimates to determine an estimated Net-to-Gross ratio. In theory, the billing analysis results should capture the free ridership and spillover behaviors of participant group. Those results are then compared to the survey results to see if the free ridership and spillover questions asked corroborate the analysis. Further details of the billing analysis and engineering estimates can be found in the appendixes.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. Once a valid set of customers was determined, the next step was to perform a billing analysis and create engineering estimates using the algorithm for Air Source Heat Pumps (Appendix – Engineering Estimates) to determine an average per-participant energy, summer peak, and winter peak savings value. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings are in the below table.

2009 and 2010 Average Net Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
Resistance Per Participant Savings	1,342	-0.140	0.520
Replacement Per Participant Savings	1,698	-0.020	0.590

Resistance Results

For 2009, KPC had goals of replacing 75 Resistance Heat customers with higher efficiency heat pumps and saving KPC customers 313 MWh and 218 kW in winter peak demand. The program was able to replace 91 heat pumps, and produce net annualized total program savings of 122 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized winter peak demand reductions were 47 kW. KPC met 121% of their participant target, 39% of their energy target, and 22% of their winter demand target. Summer demand savings were not expected in Resistance Heat customers, as the heat pump does not replace the air conditioner or any other cooling appliances. However, it would be a mistake to assume that the new heat pump does not use any load.

For customers without a separate cooling appliance, the heat pump provides a way for them to cool their residence. Because of this, load growth occurs. The 2009 Resistance Heat customer installation results showed a net summer demand increase of 13 kW.

For 2010, KPC had goals of replacing 100 Resistance Heat customers with higher efficiency heat pumps and saving KPC customers 418 MWh and 290 kW in winter peak demand. The program was able to replace 252 heat pumps, and produce net annualized total program savings of 338 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized winter peak demand reductions were 131 kW. KPC met 252% of their participant target, 81% of their energy target, and 45% of their winter demand target. Again, summer demand savings were actually summer demand growth with a net summer demand increase of 35 kW.

Impact Evaluation Results by Year for Resistance Customers

Category	Goal	Ex-Ante	Ex-Post	Percent of Goal
2009				
Participants	75	91	91	121%
Energy (MWh)	313	380	122	39%
Summer Demand (kW)	-	-	(13)	
Winter Demand (kW)	218	264	47	22%
2010				
Participants	100	252	252	252%
Energy (MWh)	418	1,052	338	81%
Summer Demand (kW)	-	-	(35)	
Winter Demand (kW)	290	731	131	45%
Total				
Participants	175	343	343	196%
Energy (MWh)	731	1,432	460	63%
Summer Demand (kW)	-	-	(48)	
Winter Demand (kW)	508	995	178	35%

Replacement Results

For 2009, KPC had goals of replacing 200 older heat pumps with higher efficiency heat pumps and saving KPC customers 172 MWh, 47 kW in summer peak demand, and 89 kW in winter peak demand. The program was able to replace 217 heat pumps, and produce net annualized total program savings of 368 MWh and 128 kW in winter peak demand savings. KPC met 109% of their participation target, 215% of their energy target, and 144% of their winter peak demand target. The analysis found that load growth occurred during the summer peak season. The negative summer demand savings is most likely attributable to snap back. In instances where customers are living below their level of comfort, a potential for energy savings will not actually result in energy savings but will instead produce an increase in energy usage so that the customer can live closer to their desired comfort level. As an example, if a customer would prefer a residence cooled to 74 degrees in the summer, but can only afford 76 degrees, when presented with monetary savings from a reduced bill will move their thermostat to 74 degrees, rather than retain their lower bills.

KPC had goals of replacing 250 older heat pumps with higher efficiency heat pumps in 2010, which would save KPC customers 215 MWh, 59 kW in summer peak demand, and 111 kW in winter peak demand. The program was able to replace 509 heat pumps, and produce net annualized total program savings of 864 MWh and 300 kW in winter peak demand savings. KPC met 204% of their participation target, 403% of their energy target, and 271% of their winter peak demand target. The analysis found that load growth occurred during the summer peak season in the amount of 10 kW.

Impact Evaluation Results by Year for Replacement Customers

Category	Goal	*Ex-Ante*	*Ex-Post*	Percent of Goal
2009				
Participants	200	217	217	109%
Energy (MWh)	172	186	368	215%
Summer Demand (kW)	47	51	(4)	-9%
Winter Demand (kW)	89	96	128	144%
2010				
Participants	250	509	509	204%
Energy (MWh)	215	437	864	403%
Summer Demand (kW)	59	120	(10)	-17%
Winter Demand (kW)	111	226	300	271%
Total				
Participants	450	726	726	161%
Energy (MWh)	386	623	1,233	319%
Summer Demand (kW)	106	171	(15)	-14%
Winter Demand (kW)	200	322	428	214%

Total Results

For the first two years of the HEHP program, KPC was able to replace 343 Resistance heat systems, producing net annualized program savings of 460 MWh of energy savings and 178 kW in winter peak reductions. There was also a growth of 48 kW on the summer peak. KPC also replaced 726 heat pumps, producing net annualized program savings of 1,233 MWh and 428 kW in winter peak reductions. Summer peak demand growth was 15 kW. As a whole, KPC was able to install 1,069 heat pumps and produce savings of 1,693 MWh and 607 kW in winter peak demand reductions. Total summer peak demand growth was 63 kW. KPC met 171% of their participant target, 152% of their energy target, and 86% of their winter demand target. Participation, annual energy savings, and winter peak demand numbers were at or above the expected goals; however the summer demand savings were nonexistent. It is possible the control groups used for the impact evaluation were biased due to lurking variables, specifically the HVAC system of each control customer. The AEP CIS system does not contain any information on the physical characteristics of a premise. Due to this, only residential all-electric customers were used for control choices, as it was the best data available.

Below are the impact evaluation results for the customers that were replacing a heat pump.

The total savings for all participants in the High Efficiency Heat Pump program are listed below. As a whole, participation, energy savings, and winter demand savings were near or above target.

Impact Evaluation Results by Year for All Customers

Category	Goal	*Ex-Ante*	*Ex-Post*	Percent of Goal
2009				
Participants	275	308	308	112%
Energy (MWh)	485	566	491	101%
Summer Demand (kW)	47	51	(17)	-36%
Winter Demand (kW)	306	360	175	57%
2010				
Participants	350	761	761	217%
Energy (MWh)	632	1,489	1,202	190%
Summer Demand (kW)	59	120	(45)	-77%
Winter Demand (kW)	401	957	431	108%
Total				
Participants	625	1,069	1,069	171%
Energy (MWh)	1,117	2,055	1,693	152%
Summer Demand (kW)	106	171	(63)	-59%
Winter Demand (kW)	707	1,317	607	86%

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects. Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included for recovery purposes, unless new labor was utilized incrementally and specifically for DSM program implementation.

In 2009, the total program costs as filed with the Kentucky DSM Collaborative were $138,450 of which $123,150 were listed as incentives. However, these costs do not include the unrecoverable administrative costs from KPC staff and AEPSC staff. An estimated $32,909 was included under administration to account for unrecoverable costs, bringing the total to $171,359 in actual costs related to the program. No expenditure goals for 2009 were found in the Collaborative Report. The 2010 total filed program costs were $378,425, of which $276,950 were listed as incentives. To account for unrecoverable admin costs and the costs from the 2011 evaluation, another $38,225 was added to 2010 and $15,000 was added to 2011 to account for admin and evaluation costs respectively. Expenditure goals in the Collaborative Report for 2010 activities were listed as $157,500. The increase in expenditures was due to much larger participation that expected.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analysis attempted to account for all costs related to program implementation and evaluation. Therefore an estimate of the value of KPC and AEP Service Corporation (AEPSC) staff time utilized to implement and evaluate the program was added to the reported costs. The below table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	Total
2009	$32,909	$15,300	$123,150	$-	$171,359
2010	$38,225	$63,250	$276,950	$-	$378,425
2011	$-	$-	$-	$15,000	$15,000

Goals were reported as total amounts respective to the winter peak only, however, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter. Benefit costs tests were performed by Resistance Heat, Replacement, and Total participation. Results were lower than expected, though unremarkable. It is expected that prospective benefit cost ratios for a new program will be overestimated, sometimes wildly, due to the sunny disposition and uncertain nature of market potential studies.

Goals for Resistance Heat participants were a Program Administrator Cost (PACT) ratio of 11.63, a Total Resource Cost (TRC) ratio of 14.53, a Ratepayer Impact Measure (RIM) ratio of 0.91, and a Participant Cost (PCT) ratio of 15.44. Results for benefit cost ratios for Resistance Heat participants at summer peak was 0.91 for the PACT, 0.65 for the TRC, 0.29 for the RIM, and 1.79 for the PCT. Results for benefit cost ratios for Resistance Heat participants at winter peak was 1.91 for the PACT, 1.37 for the TRC, 0.62 for the RIM, and 1.79 for the PCT. All results were much lower than expected, though unsurprising.

2009 and 2010 Summer Peak Cost Effectiveness Analysis – Resistance Only

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	0.91	$ (15,699)	$ 158,026	$ 173,725
Total Resource Cost (TRC)	0.65	$ (83,937)	$ 158,026	$ 241,963
Ratepayer Impact Measure (RIM)	0.29	$ (378,228)	$ 158,026	$ 536,254
Participant Cost (PCT)	1.79	$ 201,299	$ 456,226	$ 254,927

2009 and 2010 Winter Peak Cost Effectiveness Analysis – Resistance Only

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.91	$ 158,098	$ 331,823	$ 173,725
Total Resource Cost (TRC)	1.37	$ 89,860	$ 331,823	$ 241,963
Ratepayer Impact Measure (RIM)	0.62	$ (204,431)	$ 331,823	$ 536,254
Participant Cost (PCT)	1.79	$ 201,299	$ 456,226	$ 254,927

Goals for Replacement participants were a Program Administrator Cost (PACT) ratio of 2.00, a Total Resource Cost (TRC) ratio of 1.91, a Ratepayer Impact Measure (RIM) ratio of 0.53, and a Participant Cost (PCT) ratio of 2.06. Results for benefit cost ratios for Replacement participants at summer peak was 1.50 for the PACT, 1.19 for the TRC, 0.41 for the RIM, and 2.40 for the PCT. Results for benefit cost ratios for Resistance Heat participants at winter peak was 2.44 for the PACT, 1.94 for the TRC, 0.66 for the RIM, and 2.40 for the PCT. All results were higher than expected due to the higher than expected annualized energy savings.

2009 and 2010 Summer Peak Cost Effectiveness Analysis – Replacement Only

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.50	$ 181,555	$ 544,298	$ 362,743
Total Resource Cost (TRC)	1.19	$ 88,716	$ 544,298	$ 455,582
Ratepayer Impact Measure (RIM)	0.41	$ (798,592)	$ 544,298	$ 1,342,890
Participant Cost (PCT)	2.40	$ 760,973	$ 1,303,171	$ 542,198

2009 and 2010 Winter Peak Cost Effectiveness Analysis – Replacement Only

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	2.44	$ 521,466	$ 884,208	$ 362,743
Total Resource Cost (TRC)	1.94	$ 428,627	$ 884,208	$ 455,582
Ratepayer Impact Measure (RIM)	0.66	$ (458,681)	$ 884,208	$ 1,342,890
Participant Cost (PCT)	2.40	$ 760,973	$ 1,303,171	$ 542,198

Total program benefit cost results were cost-effective from Participant, Program Administrator, and Total Resource perspectives. Program design did not produce total program ratios, so nothing existed to which to compare. If the uncertainty from the lack of population comparison data is accounted for, all three ratios above (PCT, PACT, and TRC) are considered greater than one, and cost beneficial, regardless of peak season.

2009 and 2010 Summer Peak Cost Effectiveness Analysis

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.31	$ 165,856	$ 702,324	$ 536,468
Total Resource Cost (TRC)	1.01	$ 4,779	$ 702,324	$ 697,545
Ratepayer Impact Measure (RIM)	0.37	$ (1,176,820)	$ 702,324	$ 1,879,144
Participant Cost (PCT)	2.21	$ 962,272	$ 1,759,397	$ 797,126

2009 and 2010 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	2.27	$ 679,564	$ 1,216,032	$ 536,468
Total Resource Cost (TRC)	1.74	$ 518,487	$ 1,216,032	$ 697,545
Ratepayer Impact Measure (RIM)	0.65	$ (663,113)	$ 1,216,032	$ 1,879,144
Participant Cost (PCT)	2.21	$ 962,272	$ 1,759,397	$ 797,126

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, there will be any changes to the cost effectiveness of the program in future years. Any number of a multitude of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the HEHP program, results from the current evaluation were used as the starting point for the cost-benefit analysis. A higher free ridership value was included in the prospective analysis, from 31% to 40%. However, the lower annualized energy savings due to increased free ridership is offset by an increase in the cost of avoided energy in future years.

Due to KPC being a winter peaking utility, only the winter peak cost benefit analysis was run. The results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective and should be continued.

2012-2014 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	2.72	$ 1,886,577	$ 2,984,494	$ 1,097,917
Total Resource Cost (TRC)	2.03	$ 1,515,754	$ 2,984,494	$ 1,468,740
Ratepayer Impact Measure (RIM)	0.74	$ (1,050,510)	$ 2,984,494	$ 4,035,004
Participant Cost (PCT)	2.24	$ 2,065,979	$ 3,732,212	$ 1,666,233

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the HEHP program.

1) Results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective. It is our recommendation that this program be continued.
2) Inclusion of EER for every heat pump installed, and if possible, the EER of the replacement heat pump should be collected.
3) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
4) On-going program management should be handled by KPC staff, including tracking of customer participation and estimating ex-ante savings.
5) KPC staff labor time spent on the Program should be captured so that the true total cost of delivering the program can be known.
6) KPC should request AEP add fields to the AEP CIS to capture HVAC information on their customers. This would provide a more accurate way of comparing the participant group to the population for billing analyses.
7) Program participants should be surveyed shortly after the rebate is processed.
8) KPC staff should perform on-site installation audits for a small sample of participants. This may necessitate adding another employee.
9) KPC should gather information from the dealers about customers that were interested in the program but declined to participate. Using that information, KPC should then sample the customer list and perform a non-participant survey to find any reasons for non-participation.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

I. California Public Utilities Commission. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

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X. DeBoor, Carl (1981), A Practical Guide to Splines, New York: Springer-Verlag.

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XII. Kentucky Power DSM Collaborative Report. January 1, 2009 to December 31, 2009.

XIII. Kentucky Power DSM Collaborative Report. January 1, 2010 to December 31, 2010.

Appendix – Impact Methods and Assumptions

Impact Methodology

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in both the initial expected impact from an ~~average installation and also the long-term savings from the specific installations.~~

Billing Analysis

Impact evaluation consists of two stages, interim impact evaluation and full impact evaluation. Engineering estimates are used to develop measure savings without post-consumption data. Implementation data is utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. The full impact evaluation consists of a billing analysis. This analysis utilizes relevant weather data and billing data with the statistical regression models to determine the savings impact of the program. A comparison of customers' bills before and after the implementation of the program is used to determine changes in usage and demand that can be attributed to the program. In order to isolate the effects of the program from unassociated changes in consumption, a Participant Group and a distinct but similar Control Group is compared. The Control Group will not contain program participants, but its customers will be similar in consumption to the program participants. After defining these research groups, billing data is weather-normalized to eliminate any effects due to weather differences before and after program implementation. Finally, regression models will be used to analyze the normalized data and provide savings values.

The first step of the billing analysis is to create a valid participant list from which to analyze. Each customer is checked to ensure that data existed for at least one year pre and post measure installation. Participants were also required to have data for all of 2008 to develop a set of comparison metrics for drawing the control group. Any customers that did not have the requisite billing data, or were inactive at the time of analysis, were discarded from analysis.

For 2009, the implementation data provided showed that 91 resistance heat and 217 replacement customers participated. One customer was not active in the AEP Customer Information System (CIS) at the time of installation, and 32 were not found in the CIS at all. In all, 60 Resistance and 234 Replacement customers were available for analysis. In 2010, after validation, 38 customers were not in the AEP CIS; leaving 226 Resistance and 430 Replacement customers available for analysis. In total there were 286 Resistance and 664 Replacement customers in the implementation data that were valid for analysis.

After the participant list was created, a set of energy statistics was developed to compare to the control group. For each customer, an annual kWh, summer peak month kWh, and winter peak month kWh (formulas below) were calculated using 2008 billing data. KPC summer and winter peaks were pulled from the AEP Load Research system peak data and applied to each customer bill that contained that date, and was used to create a summer and winter monthly energy value.

Formula for determining comparison statistics between participant and control group

$$kWh_{annual} = 365 \times \frac{\sum kWh\_per\_Bill}{\sum Days\_per\_Bill} \qquad kW_s = 31 \times \frac{kWh\_per\_Bill_s}{Days\_per\_Bill_s} \qquad kW_w = 31 \times \frac{kWh\_per\_Bill_w}{Days\_per\_Bill_w}$$

After participant group selection is complete, the KPC population is validated to provide a list of potential control group customers. The population is usually constrained by one or more of program class (residential, C&I, etc...), building characteristics (single-family, mobile home, etc...), fuel type (all electric, natural gas, etc...), and income level (HEAP, non-HEAP, all). Customers are removed from consideration if they are not continuously active from January 1, 2008 until current. After the control population has been validated, comparison statistics are calculated using the above formulas.

After the control population group has been established, and both the control population's and participant group's comparison statistics have been calculated, the control population's customers are compared to the participants to provide a baseline comparison. Each participant customer is matched to all control population customers, and the top 50 most accurate matches are kept for further analysis. Matching is determined by calculating an Absolute Relative Deviation (ARD) for the Annual kWh, summer kWh, and winter kWh comparison statistics. The customers with the lowest combined ARD are kept for further validation. For each of the 50 control customers, they are assigned the same installation date as the participant customer. Each of the 50 customers is then validated using the same pre/post rules as the participant customers. Each control customer must have at least one year of data pre and post the pseudo-installation of the measure.

Formula for comparing control population customer to participant

$$ARD = ARD_{kWha} + ARD_{kWhs} + ARD_{kWhw}$$

$$ARD_{kWha} = \frac{|kWha_{ctrl} - kWha_{part}|}{kWha_{ctrl}} \qquad ARD_{kWhs} = \frac{|kWhs_{ctrl} - kWhs_{part}|}{kWhs_{ctrl}} \qquad ARD_{kWhw} = \frac{|kWhw_{ctrl} - kWhw_{part}|}{kWhw_{ctrl}}$$

After the 40 customers have been compared to the participant, the top 20 are kept for further evaluation. Twenty control groups are used for comparison because of the variance of the population. The population variance is high because the AEP CIS does not contain enough demographic data on the customer to create a very accurate regression model. There are too many lurking variables in a billing analysis if enough data is not included, which can bias the results. Once the 20 control groups have been selected, each group is run, pairwise, with the participant group through the entire billing analysis process. Final results for each run of the analysis are compared to ensure that none of the control groups are extreme in either direction (load savings or load growth). Using an alpha of .05 for Type I error testing, and a beta of .10 for Type II, or power testing, checks are completed to ensure that the control group methodology is valid. Once the methodology is verified, the first control group, being the most accurate, is used for the regression portion and official savings calculations. If there are concerns about uncertainty, all 20 control groups will be run and the numbers will be aggregated as a replicated analysis.

The regression analysis is conducted by constructing two models, a baseline and treatment weather normalized panel model. A panel analysis is a two-dimensional time-series and cross-sectional model used to evaluate changes in the effects of a treatment on a treatment group compared to a control group over time. Weather Normal, or Typical Meteorological Year, data is created by the U.S. National Renewable Energy Laboratory (NREL) to represent weather data for a typical year. The TMY2 dataset was used for all KPC billing analysis, and is derived from the 1961-1990 National Solar Radiation Data Base (NSRDB).

The baseline model is created using at least one year of billing data pre-installation to develop a weather normalized billing function (see formula below). The treatment model is created using at least one year of billing data post-installation. Each customer is assigned a weather station, average daily temperature, cooling degree day, and heating degree day summaries to each bill. Degree days are calculated by summing the number of hours per day by the degrees per hour above or below a temperature break point. For heating degree days, the breakpoint temperature is set at 65 degrees Fahrenheit. Cooling degree days are calculated using 70 degrees Fahrenheit as the breakpoint. Once the necessary data has been created, an autoregressive model is fit to the data for each customer to create the betas necessary to predict data. Each beta represents the multiplier coefficient for the incremental value of each model variable. To forecast or estimate new kWh, multiply the regression betas by the new data.

Weather normalized regression model

$$kWh = \left(\beta_{daily\_kwh} \times Days\right) + \left(\beta_{ADT} \times ADT\right) + \left(\beta_{CDD} \times CDD\right) + \left(\beta_{HDD} \times HDD\right) + \left(\beta_{CDD^2} \times CDD^2\right) + \left(\beta_{HDD^2} \times HDD^2\right) +$$

Once the baseline and treatment models have been determined, the model betas are multiplied by weather normal data to create baseline weather normalized bills for each customer. Once the bills have been forecasted, the data is aggregated to create annualized normal energy usage per customer. Each customer has an estimated baseline and treatment annualized kWh. The difference between the estimated baseline and treatment kWh is the energy savings due to the program. The annualized energy estimates are then summarized by participant group and control group, and multiple t-tests are completed to compare the savings of each group, and their pairwise difference.

Once the annualized savings numbers have been calculated, the forecasted bills are used to create monthly and daily load shapes for DSMore. The monthly load shape is created by temporally disaggregating the bills from a cycle month to a calendar month. Traditional load research techniques use linear interpolation method of determining an average energy usage per day per bill, then creating a stepped daily load shape. This method maintains transformation under integration, meaning one can move from cycle month to billing month without loss of accuracy; however the ability to detect peaks using this method is very limited. The second method, utilized in this evaluation, is to create a daily load shape using cubic splines. This method is also closed under integration, and is the preferred method for temporal disaggregation when using SAS (Statistical Analysis Software®). AEP Load Research has done studies comparing the accuracy of both methods in predicting daily load shapes of interval metered customers, and found that the cubic spline disaggregation is more accurate when using goodness-of-fit statistics. However, the primary reason for using cubic splines is the ability to put more load on the peak days of the month. Using the cubic spline method, the forecasted bills are disaggregated to a 365 day daily load shape for each customer. Using the daily load shape, the customers are aggregated using traditional load research methods, to determine a domain load shape. For the HEHP program, there are two domains: Resistance and Replacement.

Next, the peak day history for KPC is used to create a typical peak day for both the summer and winter peak. This is done by averaging the day per year for each year to determine the average day-per-year. As an example, if the last five winter peaks occurred between January 11th and January 15th, it is expected that the average day-per-year peak day will be January 13th. After the typical peak date for the summer and winter peaks has been determined, the KPC Residential Load Research class load shape, as determined by AEP Load Research, is retrieved for each peak date. Using the Residential class load shape, the proportion of energy used at the peak hour, relative to the total energy for the day is determined as a load factor. To determine the summer and winter peaks, the daily energy from the cubic spline disaggregation is divided by the load factor and 24 (hours per day) to determine the average peak demand reduction for each season. The formula is below:

Peak demand reduction formulas

$$kWs = \frac{\dfrac{kWh_{peakdayS}}{24}}{LF_S} \qquad kWw = \frac{\dfrac{kWh_{peakdayW}}{24}}{LF_W}$$

Analysis Results

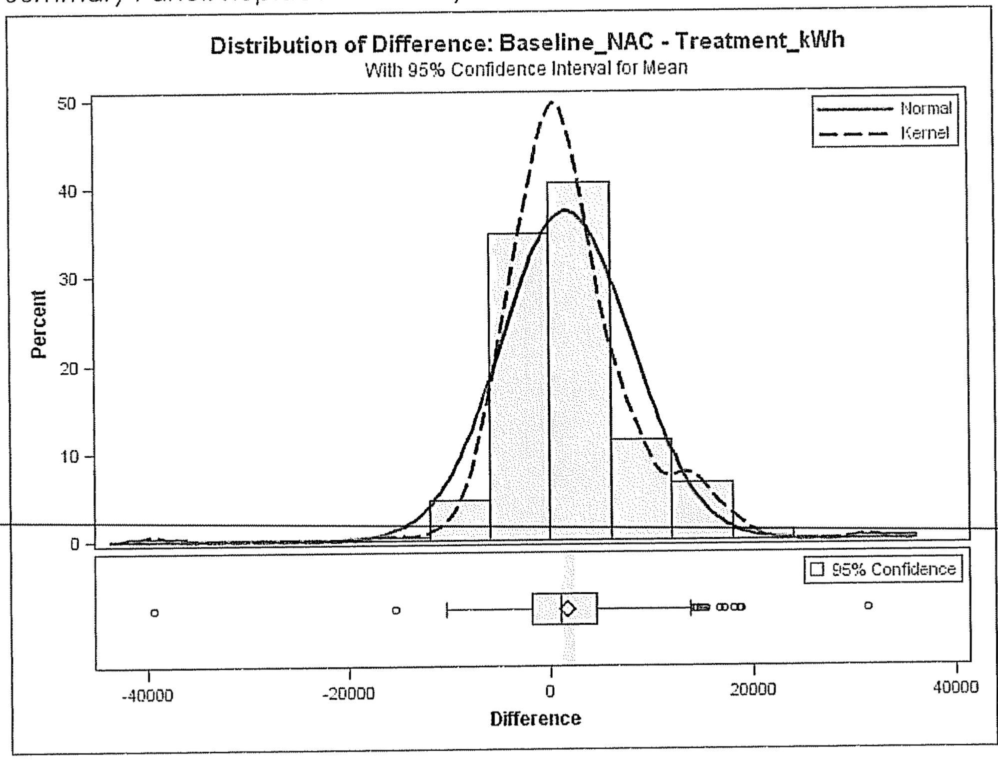
The below graphs contain the summary panel, profile plot, and agreement plot from SAS, created during the PROC TTEST procedure. Particular attention should be paid to the uncertainty of the parameter estimate for the mean. Because of the uncertainty involved in the model, any savings estimate within the Lower Confidence Level (LCL) and Upper Confidence Level (UCL) is within plus or minus two standard errors of the mean. What this means is that the findings of the billing analysis show that the *ex-ante* savings estimate of 4,177 kWh per participant is different from the *ex post* savings estimate to the 95% confidence level. This is not unexpected for a new program using only market potential studies or engineering estimates to determine per-participant savings.

Summary Statistics: By Sub Group

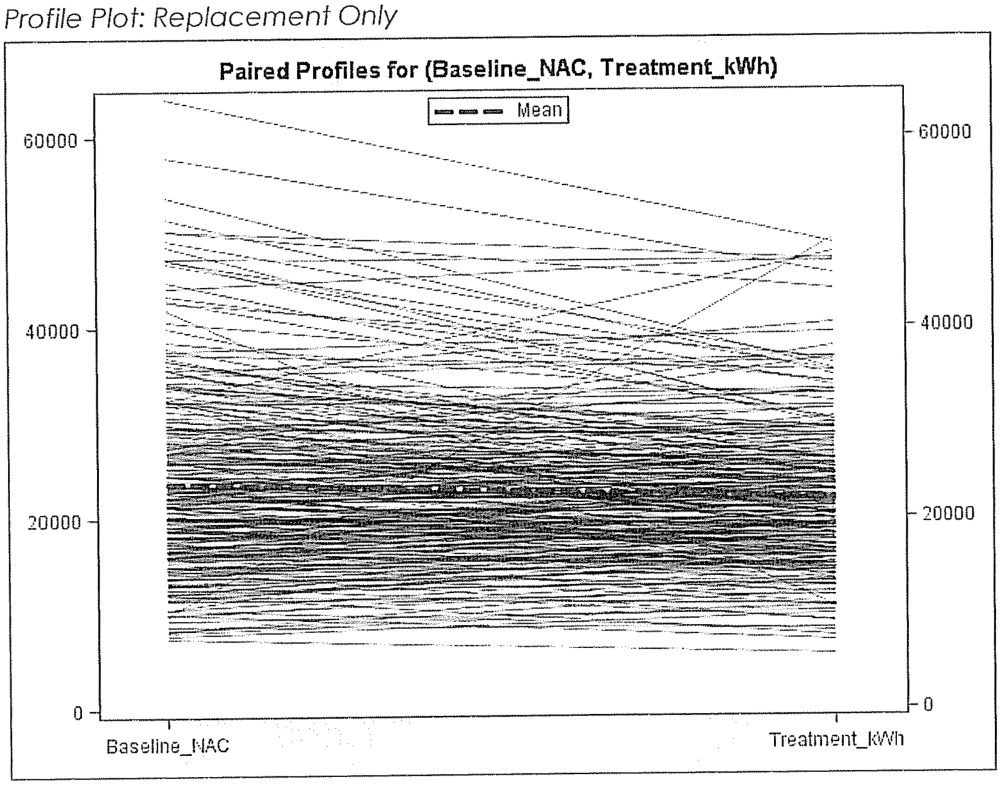
Sub Group	N	Mean	Std Dev	Std Err	95% CL Mean		Summer kW	Winter kW
Replacement	281	**1,697.8**	6,411.2	382.5	944.9	2,450.7	**-0.020**	**0.590**
Resistance	90	**1,341.5**	7,699.2	811.6	-271.0	2,954.1	**-0.140**	**0.520**

Analysis Graphs

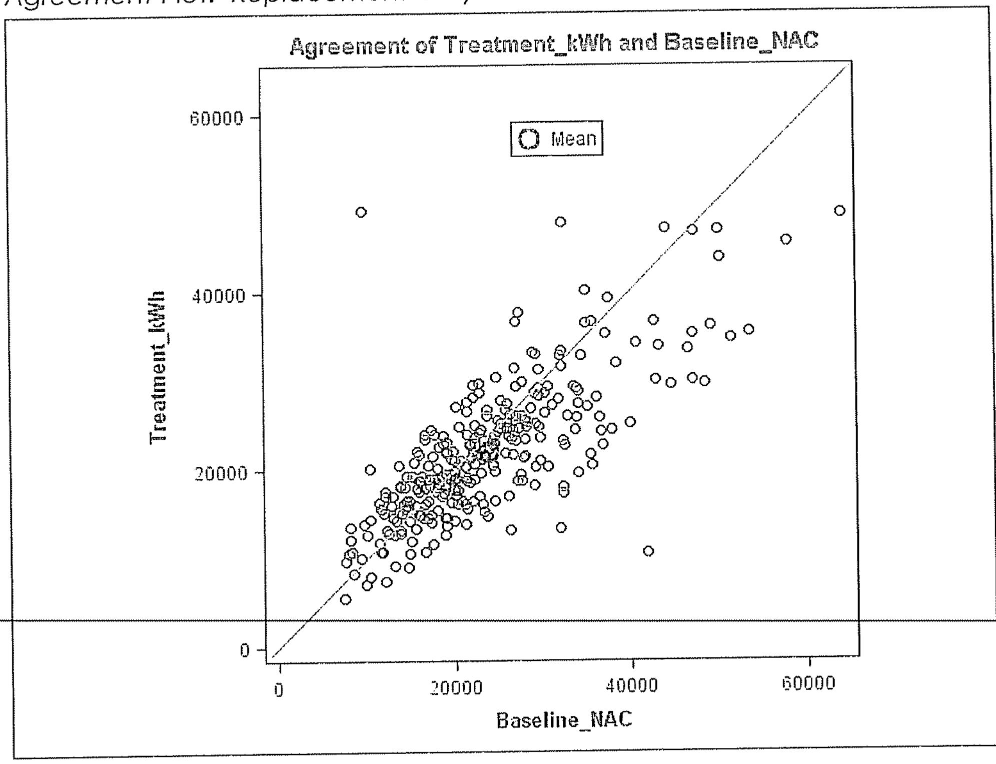
Summary Panel: Replacement Only



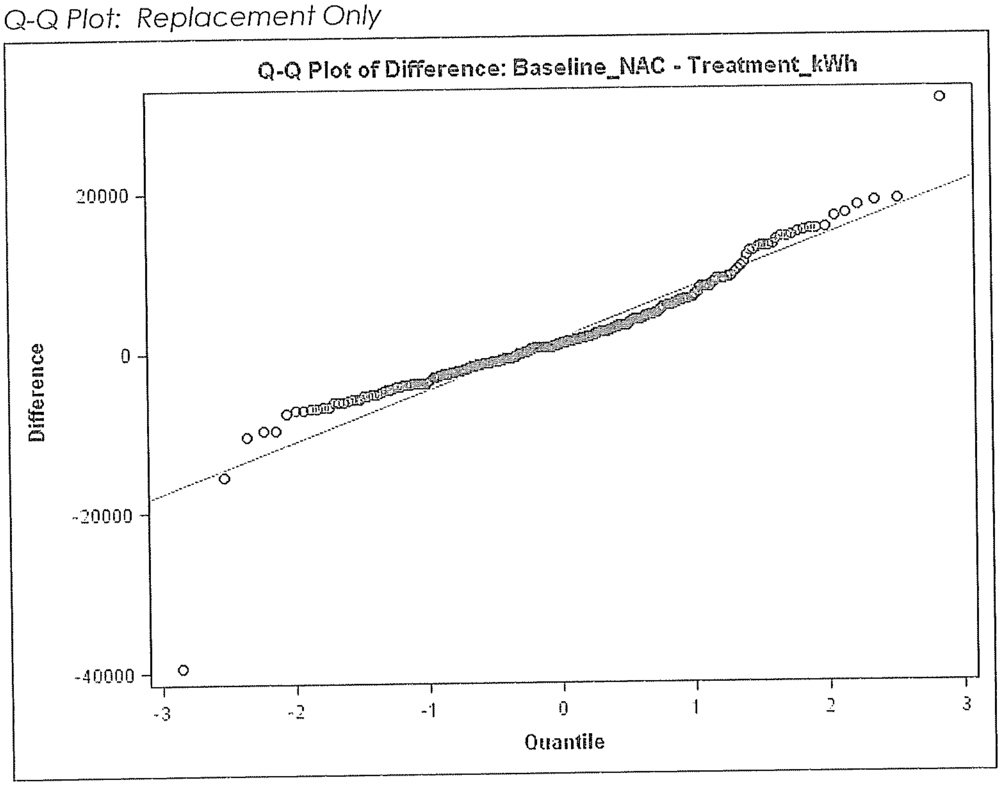
Profile Plot: Replacement Only



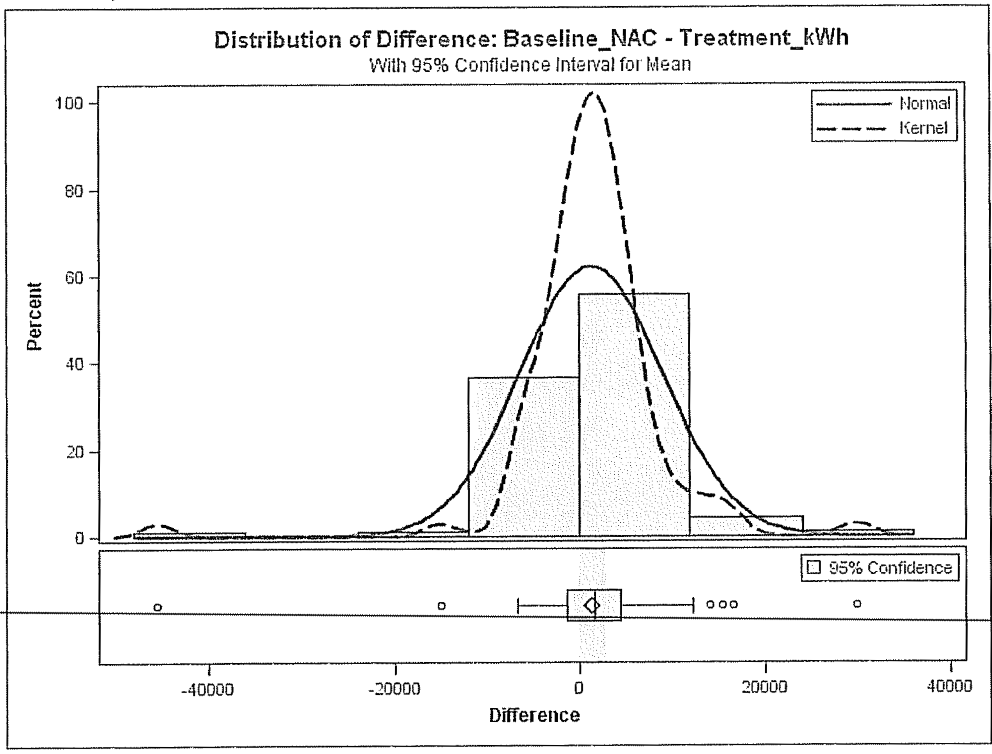
Agreement Plot: Replacement Only



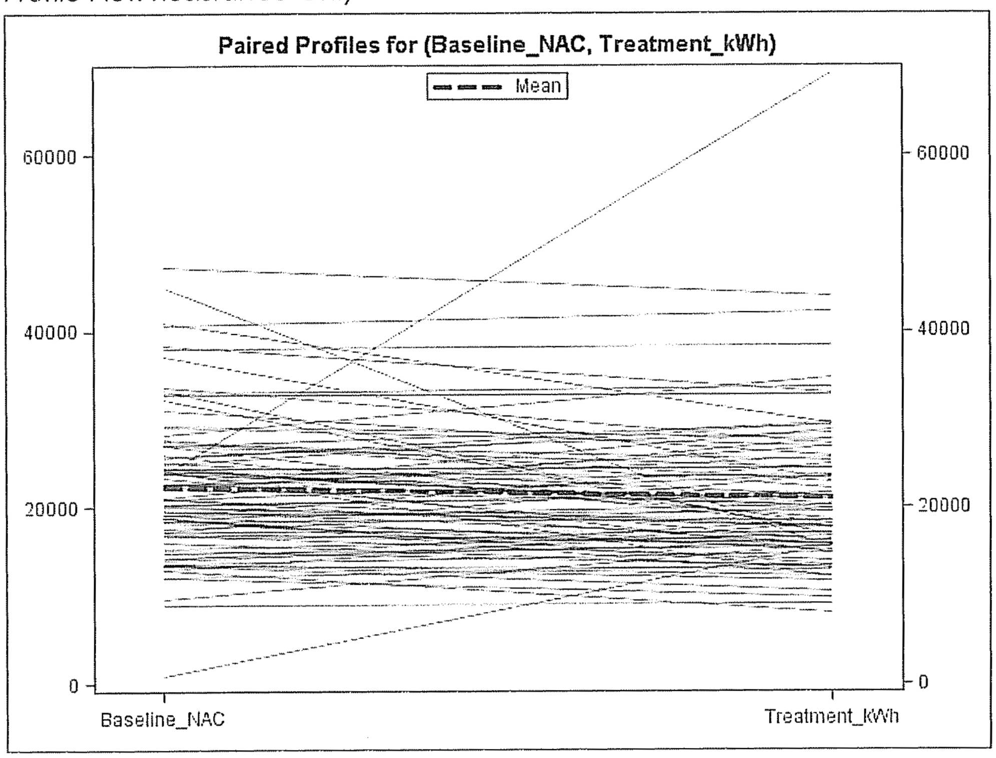
Q-Q Plot: Replacement Only



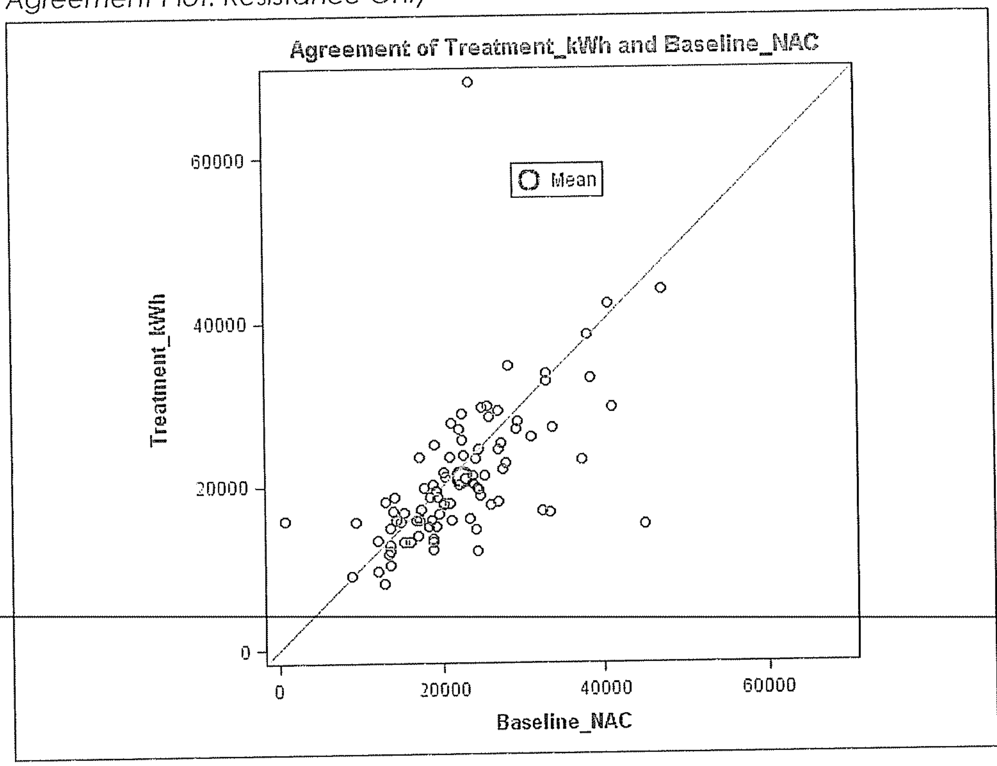
Summary Panel: Resistance Only



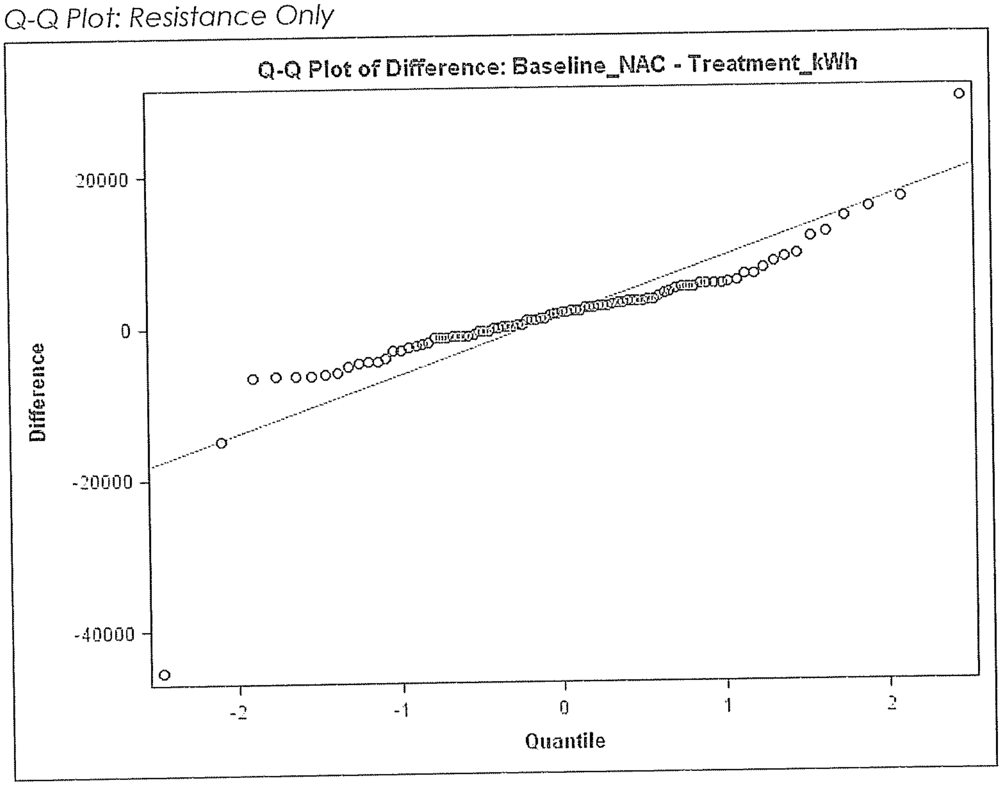
Profile Plot: Resistance Only



Agreement Plot: Resistance Only



Q-Q Plot: Resistance Only



Control Group Analysis

When performing a billing analysis to determine the impacts for program evaluation, the participant group needs to be matched to a set of control customers. For historical analyses, the literature suggests a single control group be matched to the participant list in order to provide a valid set of customers from which to compare. This is done to remove any activities that are related to free ridership: i.e. those activities that would have occurred without the program. However, this author feels that without a robust set of demographic data to make customers comparisons more accurate than AEP's current CIS contains, a billing analysis must treat the control group selection as a replication of quasi-experimental designs. Quasi-experimental design, or "before and after" design, is distinguished by the non-randomness of the control and participant selection groups. However, given the limited demographic data, we substitute the rigorous selection with an increase in replications. Classical statistics (sometimes called Frequentist statistics) is predicated on the notion of repeated trials to infinity, e.g. the relative frequency of a statistics as the trials near infinity. However, in practice, most statistics that is performed is done using a single trial without replication. In many cases, and disciplines, this is an accepted, even celebrated practice. However, in impact analysis of programs, the usage uncertainty and disparity of customer demographics at a premise (number televisions, HVAC usage, work schedule, occupants, etc….) demands that more than one replication be undertaken. Below is the list of control groups generated for this analysis and how each iteration would have compared to the per participant savings calculated in the billing analysis.

Control Group Comparison to Per Participant kWh – Replacement Only

Analysis Group	Baseline Mean	Treatment Mean	Ratio	Per Participant kWh if Chosen	Loss/Gain From Mean
Control_01	23,864	22,775	95.4%	1,405	(293)
Control_02	23,779	23,233	97.7%	1,963	265
Control_03	25,020	23,156	92.5%	694	(1,004)
Control_04	25,936	23,995	92.5%	685	(1,012)
Control_05	24,262	23,448	96.6%	1,703	5
Control_06	24,795	23,736	95.7%	1,477	(221)
Control_07	23,891	23,292	97.5%	1,910	213
Control_08	23,948	23,741	99.1%	2,315	617
Control_09	25,172	24,135	95.9%	1,514	(183)
Control_10	24,554	23,590	96.1%	1,562	(136)
Control_11	24,043	23,008	95.7%	1,468	(230)
Control_12	24,242	23,746	98.0%	2,025	327
Control_13	23,698	23,115	97.5%	1,923	225
Control_14	23,618	23,456	99.3%	2,359	662
Control_15	24,832	24,158	97.3%	1,860	162
Control_16	23,785	23,249	97.7%	1,974	276
Control_17	24,015	23,639	98.4%	2,143	445
Control_18	23,906	23,184	97.0%	1,785	87
Control_19	24,208	23,749	98.1%	2,061	363
Control_20	24,352	23,126	95.0%	1,289	(409)

Control Group Comparison to Per Participant kWh – Resistance Only

Analysis Group	Baseline Mean	Treatment Mean	Ratio	Per Participant kWh if Chosen	Loss/Gain From Mean
Control_01	23,924	23,235	97.1%	1,488	147
Control_02	22,605	22,284	98.6%	1,827	485
Control_03	23,022	23,712	103.0%	2,851	1,510
Control_04	23,653	23,107	97.7%	1,620	279
Control_05	23,582	22,377	94.9%	972	(370)
Control_06	24,572	22,746	92.6%	433	(908)
Control_07	24,170	24,383	100.9%	2,361	1,019
Control_08	24,071	24,022	99.8%	2,109	768
Control_09	23,012	21,447	93.2%	579	(763)
Control_10	23,062	22,980	99.6%	2,074	733
Control_11	24,156	24,091	99.7%	2,094	752
Control_12	22,899	21,880	95.5%	1,123	(218)
Control_13	24,217	21,774	89.9%	(183)	(1,525)
~~Control_14~~	~~23,053~~	~~22,836~~	~~99.1%~~	~~1,938~~	~~596~~
Control_15	23,623	22,116	93.6%	676	(665)
Control_16	23,672	22,593	95.4%	1,099	(243)
Control_17	23,560	22,606	96.0%	1,217	(124)
Control_18	23,547	21,708	92.2%	345	(997)
Control_19	22,796	21,517	94.4%	855	(487)
Control_20	24,197	23,420	96.8%	1,412	70

Appendix - Engineering Estimates

Estimation Methodology

To calculate annualized energy savings, an average per-measure savings must be determined based on the heating and cooling savings from the increased efficiency of the heat pump. Heating savings are determined by the inverse difference of the Heating Seasonal Performance Factors (HSPF) between the baseline heat pump and the increased efficiency heat pump. Cooling savings are determined by the inverse difference of the Seasonal Energy Efficiency Rating (SEER) between the baseline and upgraded heat pumps. Each savings value is scaled based on the size of the heat pump by tonnage or British Thermal Unit Hours (BtuH) to determine the per-participant, per-year usage. The per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. This number is compared to the billing analysis values to see if the survey free ridership and spillover questions are comparable to the analytically determined values.

Technology Description

A heat pump is a high efficiency year-round heating and cooling system operating entirely on electricity. The system is called a heat pump because it pumps or moves heat from one area to another. The basic components of a heat pump are a compressor; circulating fluid (refrigerant); and two heat exchangers, one outside and one inside. In winter, heat in extracted from cold outdoor air even when the temperature is well below freezing. The heat is absorbed by the refrigerant, and then is pumped through the compressor to the indoor coil (heat exchanger) where the refrigerant releases its heat to the indoor air. Since there is less heat available at low outdoor temperatures, the heat pump system includes a supplemental resistance heater that automatically provides additional heat when the outdoor air temperature is too low for the heat pump compressor to supply the home's total heating demand. In the summer, the heat is absorbed by the refrigerant in the indoor coil from the circulating indoor air. The heat-laden refrigerant from the indoor coil is pumped to the outdoor coil where the heat is transferred to the outdoor air. The heat pump system is the most efficient way to heat and cool electrically. The most significant energy savings are obtained during the heating season since it utilizes the "free" heat that already exists in the outdoor air. The heat pump energy efficiency is determined by the seasonal energy efficiency ratio (SEER) for summer and the heating seasonal performance factor (HSPF) for winter.

Algorithms

$$kWh = \left[\left(FLH_{cool} \times \frac{BtuH}{1000} \times \left(\frac{1}{SEER_{base}} - \frac{1}{SEER_{ee}}\right)\right) + \left(FLH_{heat} \times \frac{BtuH}{1000} \times \left(\frac{1}{HSPF_{base}} - \frac{1}{HSPF_{ee}}\right)\right)\right]$$

$$kW = \frac{\left(BtuH \times \left(\frac{1}{EER_{base}} - \frac{1}{EER_{ee}}\right)\right)}{1000} \times CF$$

Terms

Term	Description
kWh	Energy Savings
kW	Demand Savings
FLH_{cool}	Full Load Cooling Hours by closest weather related large city
FLH_{heat}	Full Load Heating Hours by closest weather related large city
BtuH	Size of equipment in British Thermal Unit Hours
$SEER_{base}$	SEER efficiency of baseline unit
$SEER_{ee}$	SEER efficiency of installed unit
$HSPF_{base}$	Heating Season Performance Factor for baseline unit
$HSPF_{ee}$	Heating Season Performance Factor for installed unit
EER_{base}	EER efficiency of baseline unit
EER_{ee}	EER efficiency of installed unit
CF	Coincidence Factor

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility.
2. Customer's account must have been active prior to the measure being received until the date of the analysis (or the end of the measure's expected life).
3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Assumptions

Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Resistance Free Ridership	38%
Replacement Free Ridership	29%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%
Measure's expected life in years	15
Fully Loaded Cooling Hours	1,150
Fully Loaded Heating Hours	1,975
Summer Coincidence Factor	0.7
Winter Coincidence Factor	0.5

Appendix – Exhibits

Exhibit 1 – Bill Insert

MAKE A DIFFERENCE BY GOING PAPERLESS

Kentucky Power customers are going green by switching to paperless billing. Help the environment by having your bill delivered via e-mail, saving paper and saving trees. Sign up for paperless billing at www.AEPPaperless.com.

Last year over 260,000 residential AEP customers received their bills electronically, making a significant impact on the environment.

Collectively, these AEP customers saved:

- 2,072 trees
- 89 tons of paper
- 500,000 pounds of greenhouse gases
- 200,000 pounds of solid waste
- 1.6 million gallons of wastewater

Sign up for paperless billing at: **www.AEPPaperless.com**

Environmental impact estimates were made using the Environmental Defense Fund Paper Calculator. For more information, visit www.papercalculator.org.

AEP KENTUCKY POWER®

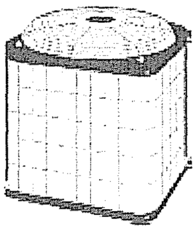
A unit of American Electric Power

KentuckyPower.com

CASH INCENTIVES FOR NEW, HIGH-EFFICIENCY HEAT PUMPS

Kentucky Power will pay residential customers $400 to replace an existing heating and cooling system with a new high-efficiency heat pump.

High-Efficiency Heat Pump Program



Homeowners can upgrade their electric resistance heating system with a new high-efficiency heat pump unit and receive $400 from Kentucky Power. Qualified heat pumps must meet the following requirements:

- A Seasonal Energy Efficiency Ratio (or SEER) rating equal to or greater than 13.
- A Heating Seasonal Performance Factor (or HSPF) equal to or greater than 7.7.

Already have an electric heat pump? We'll also offer you $400 to upgrade your unit. Qualified heat pumps must have:

- A SEER rating equal to or greater than 14.
- A HSPF equal to or greater than 8.2.

Mobile Home Heat Pump Program

Residential customers who live in a mobile home can also receive $400 for upgrading their electric resistance heating system with a new, high-efficiency heat pump unit. The heat pump must feature a SEER rating equal to or greater than 13 and an HSPF equal to or greater than 7.7.

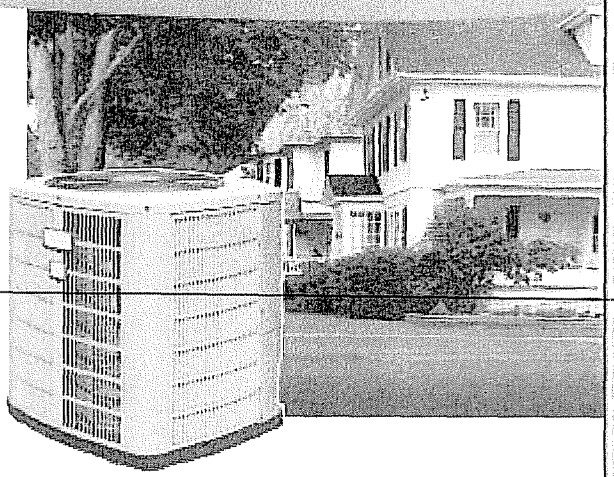
Though these products can be more expensive to purchase up front, the cost difference will be paid back over time through lower energy bills.

For more information, call our Customer Solution Center at 1-800-572-1113. You can also contact your local licensed HVAC dealer for details.

Exhibit 2 – Fact Sheet

AEP KENTUCKY POWER
A unit of American Electric Power

High Efficiency Heat Pump Program
Fact Sheet



Program Overview

Is your current heating and cooling system inefficient, more than 5-10 years old or in need of replacement? If so, Kentucky Power's High Efficiency Heat Pump Program can help you offset the cost of upgrading to a new, high efficiency heat pump system.

Simply put, a heat pump is an air conditioner that is able to reverse cycle to provide heating. It is an efficient and economical way to heat and cool your home using electricity. It's also a wise energy investment for home-owners that can help reduce your monthly electric bills without sacrificing comfort.

The High Efficiency Heat Pump Program provides a $400 incentive when you upgrade your electric resistance heating system with a new, high efficiency heat pump unit. The new heat pump must have a minimum rating of 13 SEER (Seasonal Energy Efficiency Ratio) and a 7.7 HSPF (Heating Seasonal Performance Factor) to qualify.

The $400 incentive is also available if you upgrade from an older, less efficient heat pump to a high efficiency heat pump unit. Heat pumps rated at a minimum 14 SEER and 8.2 HSPF qualify.

Customer Eligibility

All Kentucky Power residential customers who currently use an electric resistance heating system or heat pump are eligible to participate.

How to Participate

Call our Customer Solution Center at 1-800-572-1113 or contact a local, licensed HVAC dealer that participates in the Kentucky Power Demand Side Management SMART Programs. Kentucky Power recommends getting at least two price quotes and does not endorse any particular heating and cooling professional.

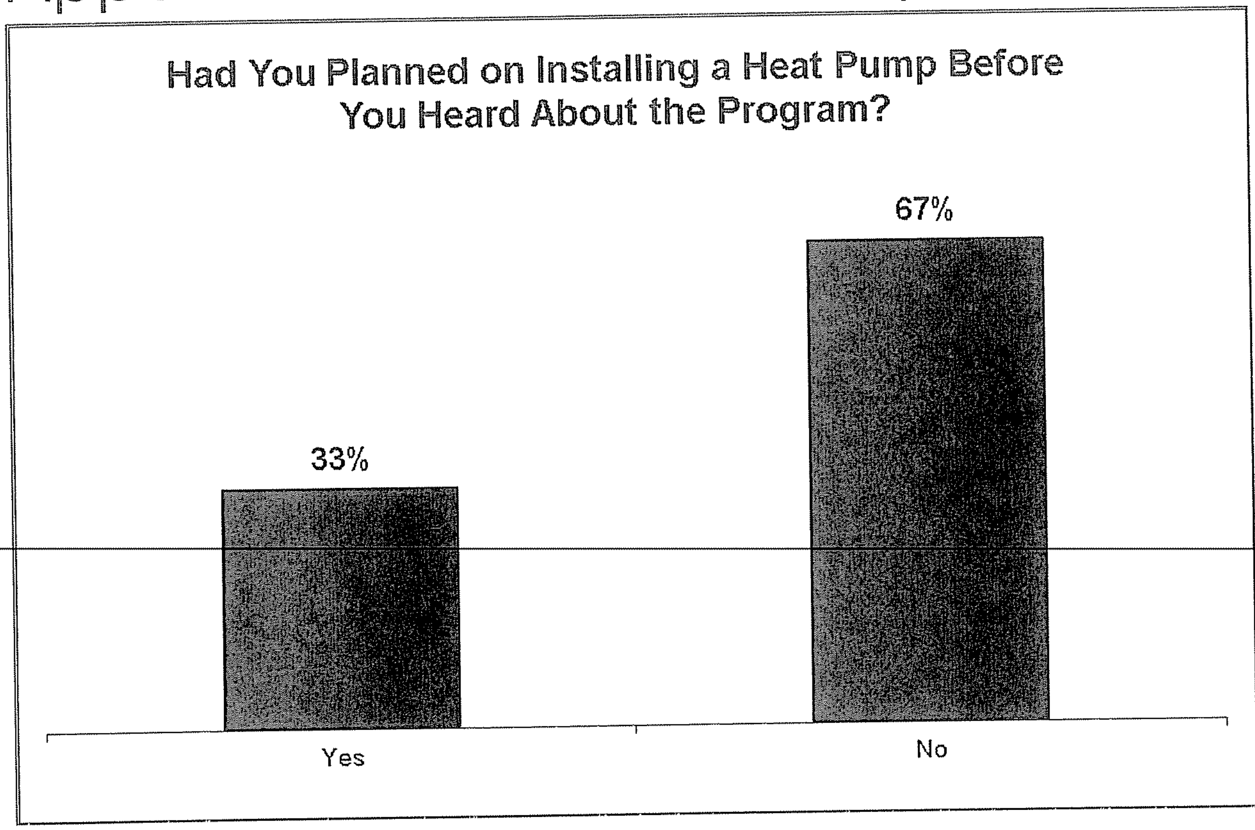
Other Opportunities

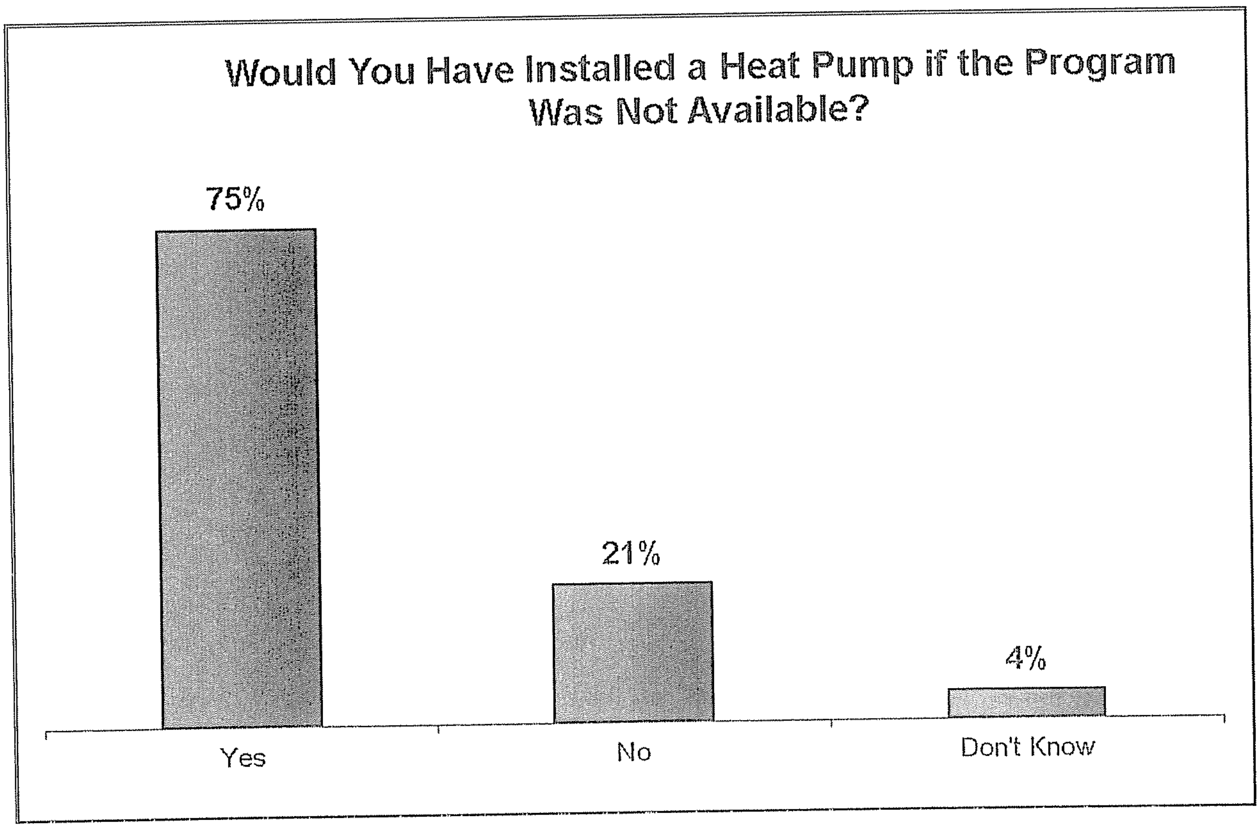
Kentucky Power offers a suite of SMART Programs, which are energy efficiency programs for homes, businesses and schools. For more information on this program or other SMART Programs, call **1-800-572-1113** or visit **KentuckyPower.com/save.**

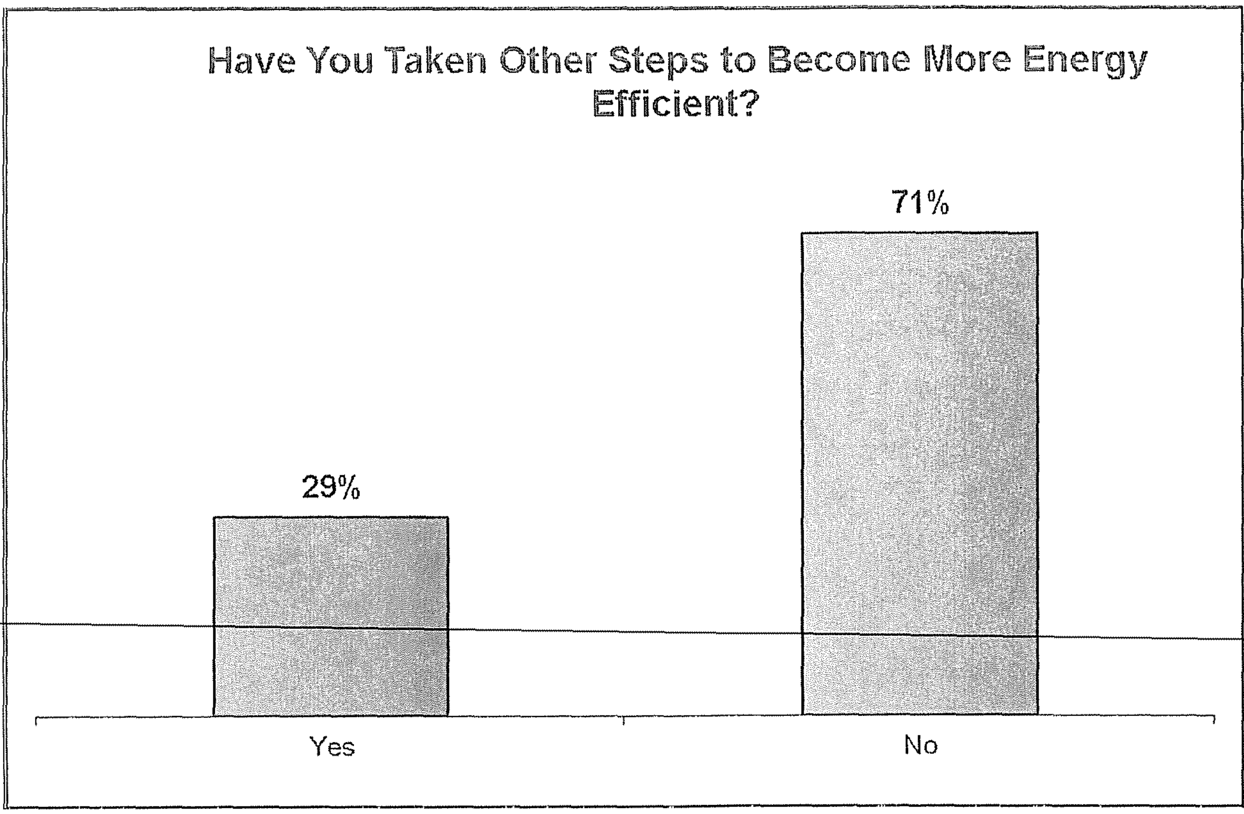
SMART Programs – Saving Money And Resources Together℠

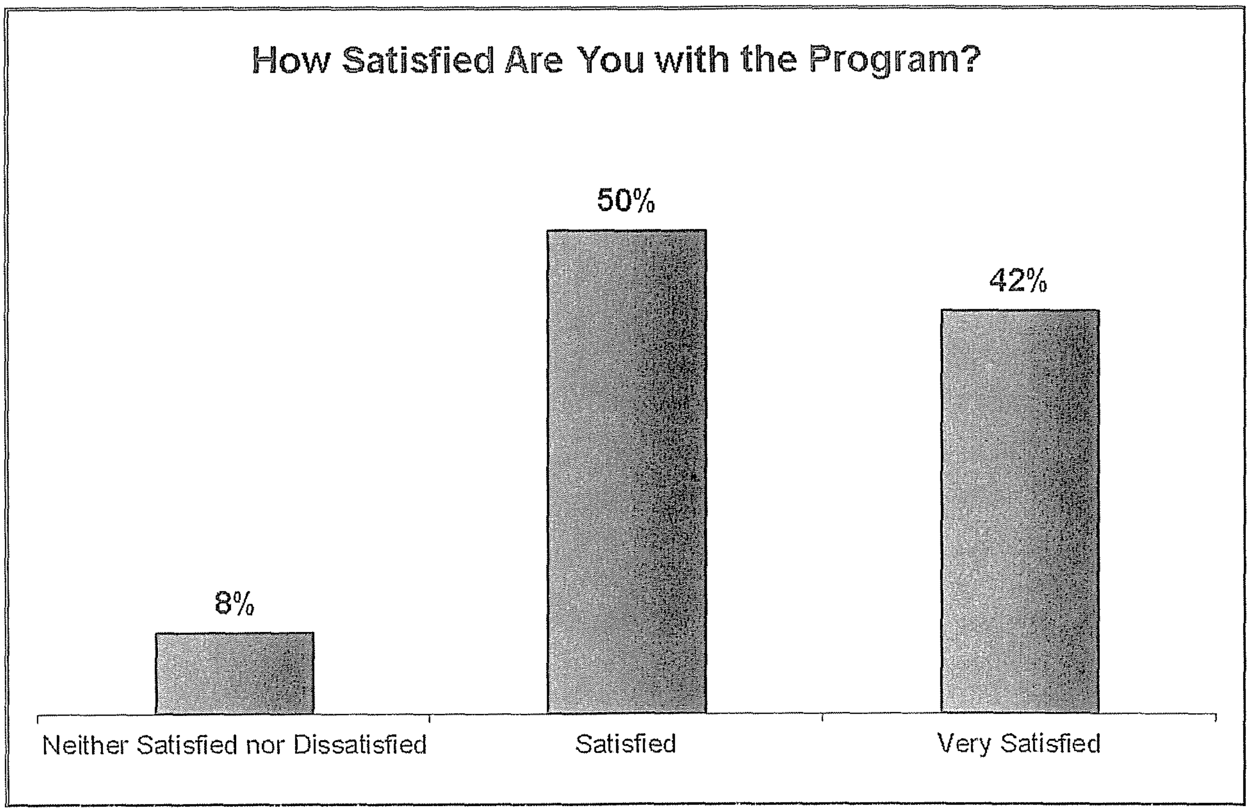
gridSMART®
From Kentucky Power

Appendix – Resistance Survey

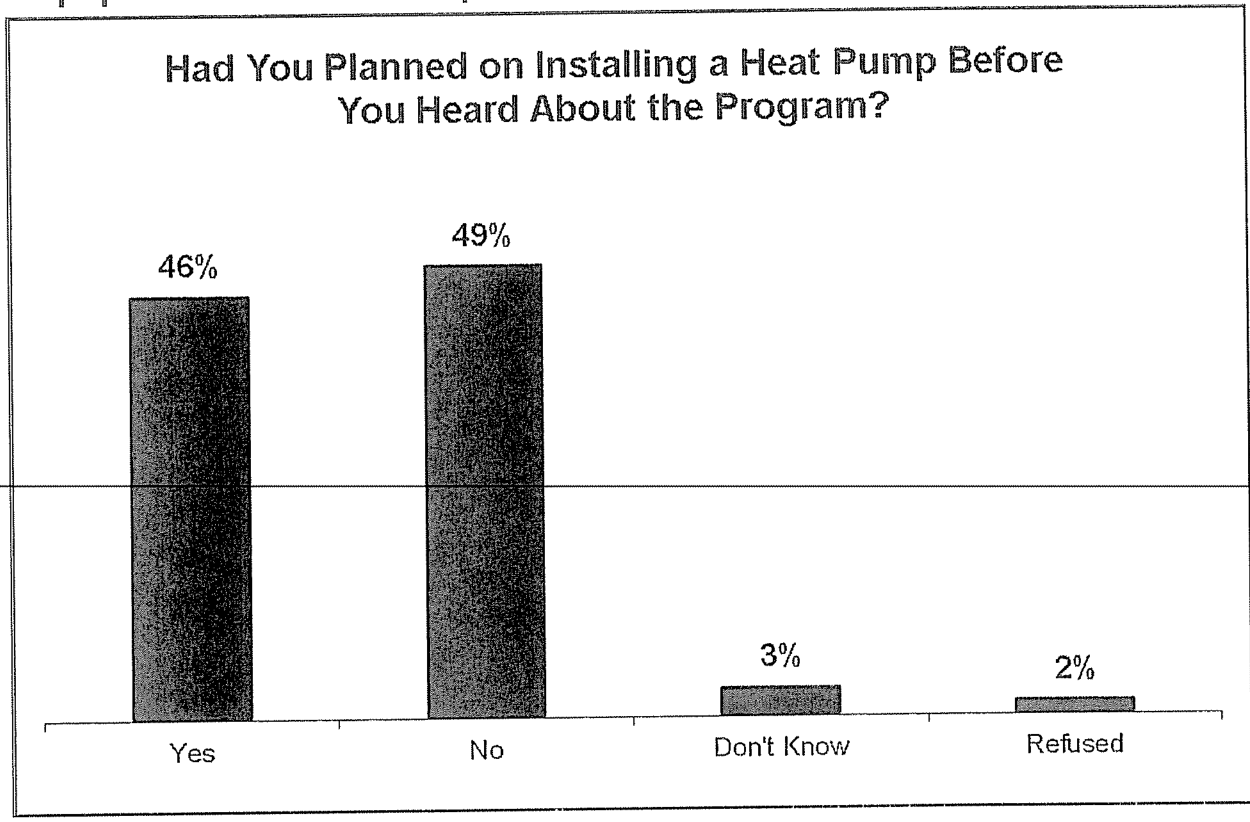


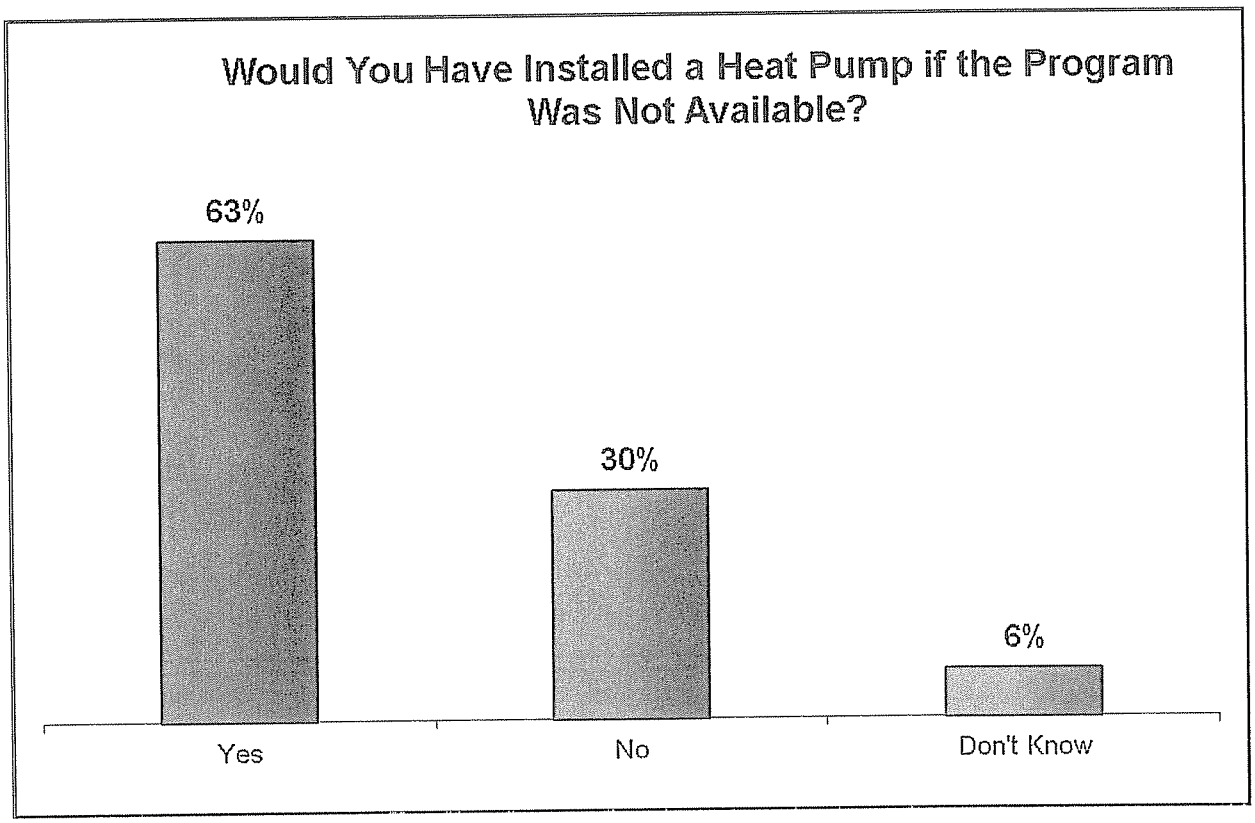


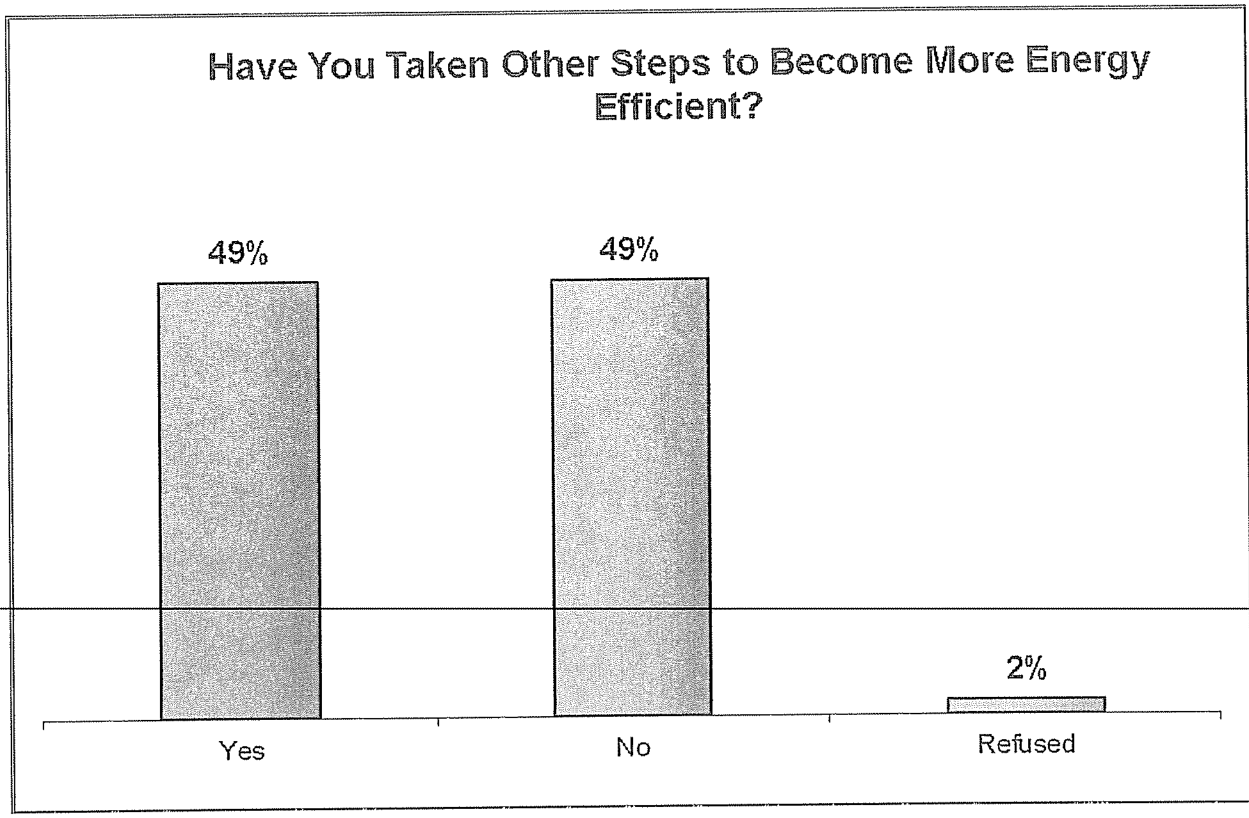

Have You Taken Other Steps to Become More Energy Efficient?
71%
29%
Yes
No

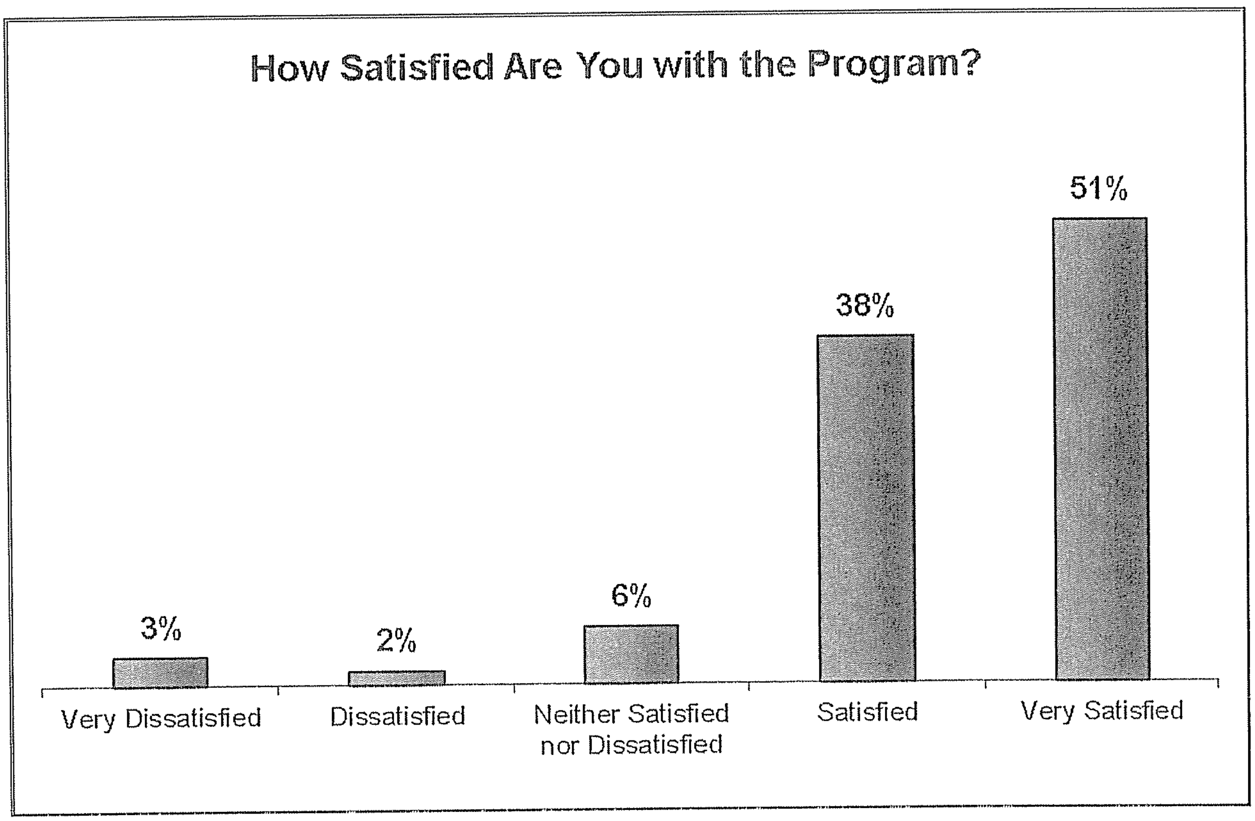

How Satisfied Are You with the Program?
50%
42%
8%
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied

Appendix – Replacement Survey






Have You Taken Other Steps to Become More Energy Efficient?
49%
49%
2%
Yes
No
Refused


How Satisfied Are You with the Program?
3%
2%
6%
38%
51%
Very Dissatisfied
Dissatisfied
Neither Satisfied nor Dissatisfied
Satisfied
Very Satisfied

Appendix – Heat Pump Dealers

A W R
77 Cow Hollow
Drift, KY 41619
(606) 377-9730

AAA Heating and Air Cond.
340 Amos Newsome Ln
Virgie, KY 41572
(606) 639-6860

Adams Heating & Cooling
P. O. Box 719
Delbarton, WV 25670
(304) 475-3878

Aire Serv
2106 1/2 13th Street
Ashland, KY 41101
(606) 324-1033

American Heating & Cooling
P. O. Box 4321
Pikeville, KY 41502
(606) 639-4307

Appalachian Htg & Cooling
P. O. Box 4141
Pikeville, KY 41502
(606) 422-5643

Appalachian Refrigeration
P. O. Box 400
Avawam, KY 41713
(606) 436-0682

Ar-tron Heating & Air Conditioning
2744 Roberts drive
Ashland, KY 41101
(606) 920-9700

Ashland Furnace
2700 Winchester Avenue
Ashland, KY 41101
(606) 325-3211

B & B Heating & Cooling
P. O. Box 308
Harold, KY 41635
(606) 478-9400

Big Sandy Heating & Cooling
P. O. Box 330
Hager Hill, KY 41222
(606) 297-4328

Blanton Heating & AC
135 Railroad Street
Dwale, KY 41621
(606) 874-0130

Bobby Howard & Sons
P. O. Box 38
Whitesburg, KY 41858
(606) 633-9580

Breathitt Plumbing & Heating
1261 Main Street
Jackson, KY 41339
(606) 666-4313

Breeding's Plumbing & Electric
P. O. Box 86
Isom, KY 41824
(606) 633-5961

Burchett's Heating & Air Conditioning
P. O. Box 665
Wittensville, KY 41274
(606) 297-6224

C & H Heating & Air Conditioning
P. O. Box 946
Flatwoods, KY 41139
(606) 833-1995

C.N.C. Services
895 Nebo Road
Catlettsburg, KY 41129
(606) 686-2298

Cadco Heating & Air Conditioning
2181 Winchester Avenue
Ashland, KY 41101
(606) 928-3041

Caldwell Heating & Air Conditioning
9630 Grandview Lake Road
Ashland, KY 41102
(606) 928-3618

Castle Heating & Cooling
5917 Bybee Road
Ashland, KY 41102
(606) 928-1148

Clay's Heating & Cooling
P. O. Box 1764
Prestonsburg, KY 41653
(606) 874-2256

Coleman Heating & Cooling
P. O. Box 580
Regina, KY 41559
(606) 754-5763

Cox Commercial
149 Clover lane
Greenup, KY 41144
(606) 473-1016

Crab Mechanical Services Inc
621 3rd Street
Portsmouth, OH 45662
(740) 355-5300

Cullop's Heating & Cooling
P. O. Box 2637
Williamson, WV 25661
(606) 237-4823

Delta Supply Heating & Cooling
455 Hambley Blvd.
Pikeville, KY 41501
(606) 432-0787

Dils & Company
2359 Town Mountain Road
Pikeville, KY 41501
(606) 437-4609

East Hills Heating & Cooling
P. O. Box 135
Ivel, KY 41642
(606) 226-4593

Elite Comfort HVAC Inc
8192 KY 1261
Campton, KY 41301
(606) 272-7141

Elliott Supply & Glass, Inc.
P. O. Box 3038
Pikeville, KY 41502
(606) 437-7368

Fannin's Plumbing Heating & Electric Company, Inc.
432 Main Street
Paintsville, KY 41240
(606) 789-3696

Fletcher Services
1572 Ratliff Creek Rd
Pikeville, KY 41501
(606) 433-1151

Frederick & May Lumber & Supply
P. O. Box 218
West Liberty, KY 41472
(606) 743-3136

G & W Heating & Cooling
273 Paul Road
Wurtland, KY 41144
(606) 922-8402

General Heating & Air Conditioning
P. O. Box 964
Flatwoods, KY 41139
(606) 836-8143

Grayson Mechanical HVAC
405 Robert & Mary Street
Grayson, KY 41143
(606) 474-4550

Griffith Plumbing & Heating
338 Broadway
Jackson, KY 41339
(606) 666-2316

Hatton Heating & Cooling
69 Beagle Road
Whitesburg, KY 41858
(606) 632-2790

HCE Systems Inc.
P. O. Box 879
Norton, VA 24273
(276) 679-5829

HELP Air Conditioning & Htg
731 E. Main St.
Grayson, KY 41143
(606) 475-0826

Howard's Heating & Air
P. O. Box 569
Baxter, KY 40806
(606) 573-2944

Huff's HVAC
P. O. Box 547
Cornettsville, KY 41731
(606) 476-2942

Imperial Heating & Cooling
P.O. Box 526
Ashland, KY 41105
(606) 324-0610

KB HVAC
145 Shady Creek
Greenup, KY 41144
(606) 923-7534

Kentucky Wide Htg & Clg
P.O. Box 384
Thelma, KY 41260
(606) 424-5684

Lafferty Heating & Cooling
P. O. Box 208
Dwale, KY 41621
(606) 874-9357

Mabry's Heating & Cooling
2423 Greenbriar Rd
Olive Hill, KY 41164
(606) 286-6007

Maggard's Heating & Cooling
140 County Line Branch
Garrett, KY 41630
(606) 358-2466

Marco Heating & Cooling
P. O. Box 585
Hyden, KY 41749
(606) 672-2431

Miller's Heating & Cooling
3752 Stone Coal Rd
Pikeville, KY 41501
(606) 432-9599

Mooney's Heating & Cooling
P. O. Box 1313
Inez, KY 41224
(606) 298-4784

Mulvaney & Son's Inc.
P. O. Box 368
Catlettsburg, KY 41129
(606) 739-4042

Patterson Repair Services, Inc.
4264 Marsh Hill Dr
Catlettsburg, KY 41129
(606) 571-1715

Pike's Heating & Cooling
490 Steerfork Road
Mallie, KY 41836
(606) 785-9430

Pratts Heating & Cooling
317 Upper Doty Branch
Happy, KY 41746
(606) 476-9690

Quality Air Conditioning & Heating
P. O. Box 751
Pound, VA 24279
(276) 796-5366

Randy Suttles General Construction
208 Miranda Lane
Grayson, KY 41143
(606) 474-9286

Ray Brown Inc.
726 National Ave.
Lexington, KY 40502
(859) 278-0281

Roosevelt's Heating & Cooling
26595 Highway 32
Martha, KY 41159
(606) 652-4972

Roy's Electric Repair
4802 Roberson Road
Ashland, KY 41101
(606) 833-8019

Scurlock Heating & Cooling
1005 Woodland Drive
Paintsville, KY 41240
(606) 788-9188

Service Incorporated
800 Old Flemingsburg Road
Morehead, KY 40351
(606) 784-4918

Shelton Heating & Air
560 Shelton Dr.
Eolia, KY 40826
(606) 632-9542

Slone's Heating & Refrigeration
P. O. Box 82
Regina, KY 41559
(606) 432-3912

Smith Heating, Cooling & Electric
P. O. Box 1594
Hazard, KY 41702
(606) 439-4874

Tennell Refrigeration
157 One Mile Branch
Hyden, KY 41749
(606) 672-5252

Thompson Heating & AC
6858 Mockingbird Trail
Catlettsburg, KY 41129
(606) 739-6880

Todds Refrigeration
456 Pine Frk
Shelbyanna, KY 41562
(606) 437-5320

Tony's Electrical HVAC
P. O. Box 228
Melvin, KY 41650
(606) 452-4394

Tri-County Heating & Air
P. O. Box 108
Salyersville, KY 41465
(606) 349-2308

Tri-County Heating & Air
P. O. Box 108
Salyersville, KY 41465
(606) 349-2283

Tri-State Heating & cooling
P. O. Box 65
Banner, KY 41603
(606) 874-5472

Webb's Heating & Cooling
P. O. Box 146
Lowmansville, KY 41232
(606) 673-3050

Williams Electric
P. O. Box 635
Salyersville, KY 41465
(606) 349-1234

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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dwtabata@aep.com

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Marketing Analyst
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614-716-1414 fax
pjhrnicek@aep.com

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Marketing Analyst
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614-716-1605 fax
bsberson@aep.com

AEP®

Evaluation Report

Kentucky Power Company

Community Outreach CFL

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team
American Electric Power Service Corporation
1 Riverside Plaza, 13th Floor
Columbus, OH 43215

Table of Contents

Executive Summary

The objective of the Kentucky Power Company's (KPC) Community Outreach Compact Fluorescent Lighting (CFL) Program (COCFL) is to promote the conservation and efficient use of electricity by encouraging the use of energy efficient ENERGY STAR® CFLs in place of incandescent light bulbs. Qualified customers in targeted communities receive a package of four ENERGY STAR® CFLs along with energy education materials. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. For 2009 and 2010, the COCFL program distributed 34,220 CFLs to 8,555 KPC customers, providing 2,119 MWh of net annualized energy savings, 448 kW of summer peak demand reductions, and 417 kW of winter peak demand reductions. The process evaluation concluded that the promotion and delivery processes were effective, that there was a sizable market for CFLs, and that the program provided excellent customer satisfaction.

Based on the results of the evaluation, the COCFL program was determined to be cost-effective under the three of the cost-benefit tests used in the California Standard Practice Manual and KPC should continue to utilize the program through the remainder of the current program life (2011). The prospective analysis of the program for 2012-2014 predicts the program will be cost-effective, and it is recommended that the program continue.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio	Winter Peak Ratio
Program Administrator Cost (PACT)	3.51	3.47
Total Resource Cost (TRC)	4.23	4.17
Ratepayer Impact Measure (RIM)	0.53	0.52
Participant Cost (PCT)	N/A	N/A

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	2.73
Total Resource Cost (TRC)	3.91
Ratepayer Impact Measure (RIM)	0.62
Participant Cost (PCT)	N/A

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Community Outreach Compact Fluorescent Lighting (CFL) program was developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on February 24, 2009 (Case No. 2008-00349) to help meet Kentucky Power's goals.

The major goals of the program are to:

1) Provide education to customers as to the proper application of high efficiency CFLs
2) Encourage the use of energy efficient lighting in their homes
3) Reduce customer usage of electric energy
4) Increase customer satisfaction and services
5) Reduce Kentucky Power's long-range peak demand.

The Community Outreach CFL Program was designed as both an education program and a program to increase the adoption of energy efficient lighting in residential homes. KPC worked in selected communities to provide education materials to KPC customers and a package of four (4) ENERGY STAR® qualified CFLs. This provided participating KPC customers with a better understanding of the purpose and benefits of installing energy efficient CFLs in their homes and increased their awareness of the capabilities and direct savings of CFLs.

The lower wattage of CFLs versus the higher wattage of incandescent bulbs to attain the same level of lumens reduces energy consumption, which in-turn lowers the customer's monthly electric bill, and provides both energy and demand savings to KPC. Additionally, the life of the high-efficiency CFLs exceeds that of the incandescent lamps by about a factor of ten, thus reducing equipment costs and adding another benefit of using this energy conservation measure in a customer's home. Although, today's higher purchase price could still be considered somewhat of a barrier which prevents customers from purchasing a CFL versus an incandescent bulb, this barrier is less overwhelming than in previous years, and can be overcome with additional education regarding the financial benefits of CFLs. Historically, CFLs were limited to specific home lighting applications, but improving CFL technology has created more applications for the use of CFLs.

Despite the increased availability and applicability of CFLs, there are still significant numbers of customers in their service territory that are not aware of the many benefits that CFLs provide. KPC believes that education related to the improved technology of energy efficient products, such as CFLs, can have a significant benefit if targeted to communities within its service territory. This Program provides an effective and direct avenue to reach customers via the direct distribution of energy efficiency CFLs in selected communities.

Process and Market Evaluation

Summary

KPC utilized community outreach activities to administer the Program to deliver educational materials and a four-pack of ENERGY STAR® qualified CFLs to each qualified customer. The Program promotion was effective, as evidenced by the achievement of goals within the scheduled number of events. The delivery mechanism was effective in that incremental delivery costs were minimal, only KPC customers received the program benefits and a face-to-face opportunity was provided for customers to ask questions of KPC staff. No significant barriers to participation were identified. The KPC staff had access to customer account information at the events, allowing potential participants to prove KPC customer status simply by providing name and address. The customers had significant incentive to participate, because they received a four-pack of ENERGY STAR® qualified CFLs, education materials, and potential savings with their electric bill as a result of decreased lighting usage. The survey showed that free ridership was unremarkable. KPC reached the customer participation goal in a cost-effective manner and received excellent customer satisfaction ratings.

Promotional Effectiveness

The 2009 promotional materials, primarily local radio and newspaper ads, were effective in that the response produced 3,744 participants, greater than the 2009 participant goal of 3,500, for a 107% sign-up result. In 2010, an additional promotional tool using targeted telephone messaging to inform customers of upcoming community events was added. Also, a large sign was added in 2010 to further attract potential participants to attend the event. The sign increased the effectiveness of the program, as more participants were reached at each event, permitting the increased goal of 4,800 participants to be achieved without adding significantly more events. In addition, Program management began cross-promoting other KPC Energy Efficiency Programs at the community event, potentially drawing additional participants and additional energy savings to those programs.

Delivery Mechanism

The program delivery was performed by KPC staff attending community events and physically handing out each four-pack of ENERGY STAR® qualified CFLs along with energy education materials to verified KPC customers. The efficiency of the delivery was improved upon in 2010 through an improvement in logistics for the physical delivery of the CFLs to the event location, resulting in multiple trips being condensed into a single trip per event. Adequate care was exercised to assure that only KPC customers received direct benefits from the program. Requiring a valid KPC account number was the preferred method of ensuring this, but in cases where the customer did not have that information they were able to provide name and address and KPC program management was able to perform on-site verification of customer status by referencing a customer list on a laptop.

Data Tracking

While at the community outreach events, KPC staff collected data on each customer, including the customer's name, account number, telephone number, CFLs provided to the customer and the county where the customer resides. KPC staff utilized a spreadsheet to record the information from the participants in the Program. There were a few shortcomings in the data tracking area as pertinent pieces of information were spread across multiple organizations and multiple formats. The implementation spreadsheet contained most of the necessary information needed to perform an impact analysis, but was missing important items such as the date the CFLs were distributed and bill account numbers in the format of the KPC customer information system. KPC staff also did not have a good way of tracking expenditures by type. When pulled from the AEPSC ledger, only two types of expenditures were found, and the descriptions used were lacking of detail. Cost descriptions for evaluation could not be verified in the general ledger, and so estimated costs from KPC staff had to be used. Finally, errors were found in the spreadsheet used to determine estimated energy savings. The average per-participant savings numbers used were actually one-fourth the amount they should have been due to the savings numbers being based on a single CFL, not the four-pack being handed out by KPC staff.

Survey

The participant follow-up survey was designed to collect, from a randomly selected sample of participants, the information necessary to perform the program impact evaluation and the process and market evaluations. The survey was conducted using a telemarketing process. For the sample selection, the original list of 3,744 participants was reduced to 2,589 due to missing or incorrect phone numbers and/or duplicate or now inactive customer account numbers. The information collected for the impact evaluation included the number of CFLs actually installed in the participant's home, the size (wattage) of the incandescent bulbs replaced, whether the installed CFLs were still in place, an estimate of how many hours and time of day they are normally operating and the locations in the home at which the CFLs were installed. The information collected for the process and market evaluations included whether the participants were already installing CFLs in their homes, whether they would have purchased CFLs in lieu of the Program, their satisfaction with the Program, and the use of the CFLs in their homes. Thoroughbred Research Group was hired to conduct a telemarketing survey for 255 Program participants to provide results at a 90% confidence level with +/- 5% error. The questionnaire and results of the telemarketing participant survey are included in the Appendix.

Product Awareness

The Participants' pre-program awareness of energy efficient CFLs was not high, with 47% of the participants surveyed having used CFLs in their home prior to the Program, and 53% of the participants surveyed having not previously used CFLs in their home.

Free Riders and Spillover

A free rider is a participant who utilized the provided CFLs, but would have purchased and installed equivalent CFLs had they not participated in the Program. Spillover refers to additional CFLs purchased by participants as a result of the program. From the survey responses, 27% of participants indicated they would have purchased and installed equivalent CFLs without the program and thus were classified as likely free riders in this program. The survey results also indicated that 22% of participants purchased additional CFLs since participating in the Program, providing a potential spillover effect and potentially providing additional energy savings. The authors of this report had some concerns with the survey wording; therefore, to stay conservative, the 27% free rider response was used for the impact analysis and the spillover effects were ignored.

Market Potential

Based on the responses to the 2010 Residential Appliance Saturation Survey, it was determined that 13% to 25% of rooms in KPC customer's homes utilize some CFLs as a source of lighting. The top three locations in the home where CFLs were the main source of lighting were the kitchen, living room and master bedroom, respectively. For all the locations in the home it can be said that three to six times more customers are still using incandescent bulbs for their main source of lighting. Therefore, there continues to be a significant market opportunity to promote energy efficient CFLs in the KPC service territory.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was very high, with 97% of the respondents being "very satisfied" (61%) or "satisfied" (36%) with receiving the energy efficient CFLs and also 97% of the respondents were "very satisfied" (68%) or "satisfied" (29%) with the Program overall. Only 1% of the respondents surveyed expressed dissatisfaction with the CFLs and the Program, stating reasons such as the CFLs had a shorter life than expected, the light output was inadequate, or that they received an insufficient quantity of CFLs. The survey results also indicated that 7% of the respondents removed their CFLs from their home, mainly due to lamp failure, while another 15% of the respondents never installed their CFLs because they did not believe they had an appropriate location to place them in their home.

Impact Evaluation

The evaluation began with an engineering estimate analysis of the implementation data collected by KPC. The engineering estimates were used to develop gross measure savings without post-consumption data or a billing analysis. A billing analysis was not performed because the magnitude of impacts in a CFL program falls within the normal bill variability. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. For Net-To-Gross calculations, survey results provided a basis for net savings estimates.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. For 2009, 3,744 customers received a four-pack of CFLs for a total of 14,976 bulbs distributed. However, after removing non-valid or missing account numbers, only 3,175 unique KPC customers could be identified. The bulk of the bulbs were distributed between May and December; however, only 55 valid customers received bulbs in November. In 2010, 19,244 bulbs were distributed to 4,811 customers. Again, after removing non-valid or missing account numbers, only 4,189 unique customers could be identified (16,756 bulbs). Also, for 2010, the bulbs were distributed from March to December with very low numbers in August (56 customers) and December (108 customers). In total there were 34,220 bulbs distributed to 8,555 customers, of which 29,456 bulbs and 7,364 customers were validated. The percentage of customers and bulbs distributed that would be considered valid is 86%.

Once a valid set of customers was determined, the next step was to use the engineering estimate algorithm for CFLs (Appendix – Impact Methods and Assumptions) to determine an average per-participant energy, summer peak, and winter peak savings value. To calculate annualized energy savings, an average per-CFL savings must be determined based on the wattage of the bulb being removed (base wattage) and the wattage of the bulb being installed (replacement wattage). The difference in wattage is the per-hour usage, and this number is multiplied by the total number of bulbs installed, the average hours per day, and the average days per year of use to determine the per-participant, per-year usage. Once the average per-participant annualized savings were determined, values were discounted to account for the persistence of the measure. This new per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings should be as follows

2009 and 2010 Average Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
Per-Participant Savings	248	0.052	0.049

For 2009, KPC had goals of providing 3,500 customers with CFLs and saving KPC customers 644 MWh, 322 kW in winter peak demand and 14 kW in summer peak demand savings. The program was able to provide 3,744 participants with CFLS, and produce net annualized total program savings of 927 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized summer peak demand reductions were 196 kW and the net annualized winter peak demand reductions were 183 kW. KPC met 107% of the participant target, 144% of the energy target, 1,402% of the summer demand target, and 57% of the winter demand target.

For 2010, KPC had goals of providing 4,800 customers with CFLs and saving KPC customers 883 MWh, 442 kW winter peak demand and 19 kW in summer peak demand savings. The program was able to provide 4,811 participants with CFLS, and produce net annualized total program savings of 1,191 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized summer peak demand reductions were 252 kW and the net annualized winter peak demand reductions were 235 kW. KPC met 100% of the participant target, 135% of the energy target, 1,313% of the summer demand target, and 53% of the winter demand target.

For the first two years of the COCFL program, KPC was able to distribute 34,220 bulbs to 8,555 customers, producing net annualized program savings of 2,119 MWh of energy savings, 448 kW in summer demand and 417 kW in winter demand peak reductions. As a whole, KPC was able to meet 103% of the participant target, 139% of the energy target, 1,351% of the summer demand target, and 55% of the winter demand target. While the total energy savings and summer demand savings were higher than expected, the winter peak demand savings was lower. This was due to the participant survey results showing the bulbs being on more than expected during summer peak demand hours, and less than expected during winter peak demand hours.

Impact Results

The four key statistics used in an impact evaluation – number of participants, energy savings, summer peak demand reduction, winter peak demand reduction – are shown below. Included in the table are the program goals, the *ex-ante* savings, and the *ex-post* savings. *Ex-ante* savings are forecasted savings as reported by the program staff during the program's implementation. *Ex-post* savings are estimated savings as determined by the impact evaluation and reported in the evaluation report.

Impact Evaluation Results by Year

Category	Goal	Ex-ante	Ex-post	Percent of Goal
2009				
Participants	3,500	3,744	3,744	107%
~~Bulbs~~	~~14,000~~	~~14,976~~	~~14,976~~	~~107%~~
Energy (MWh)	644	689	927	144%
Summer Demand (kW)	14	15	196	1,402%
Winter Demand (kW)	322	344	183	57%
2010				
Participants	4,800	4,811	4,811	100%
Bulbs	19,200	19,244	19,244	100%
Energy (MWh)	883	885	1,191	135%
Summer Demand (kW)	19	19	252	1,313%
Winter Demand (kW)	442	443	235	53%
Total				
Participants	8,300	8,555	8,555	103%
Bulbs	33,200	34,220	34,220	103%
Energy (MWh)	1,527	1,574	2,119	139%
Summer Demand (kW)	33	34	448	1,351%
Winter Demand (kW)	764	787	417	55%

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects. Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). In addition to the tests, costs of conserved energy will be calculated from the utility perspective. Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included, unless new labor was utilized incrementally and specifically for DSM program implementation.

For 2009, the total program costs as filed were $34,119, of which $27,457 were incentives. However, these costs do not include the unrecoverable administrative costs from KPC staff and AEPSC staff. An estimated $6,000 was included to account for unrecoverable costs, bringing the total to $40,119 in actual costs related to the program. In 2010, the total filed program costs were $57,134, of which $39,745 were incentives. To account for unrecoverable admin costs and the costs from the 2010 evaluation of 2009 activity, another $7,699 and $8,806 were added respectively. However, these costs could not be corroborated by AEP's ledger. Cost data pulled from the Enterprise Warehouse showed that there was $36,908 and $26,226 spent in 2009 on recoverable total costs and incentives; and there was $57,443 and $23,749 respectively in 2010. Though costs were slightly different, neither value would significantly alter the benefit-cost analysis results.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analysis attempted to account for all costs related to program implementation and evaluation. Therefore an estimate of the value of KPC and AEP Service Corporation (AEPSC) staff time utilized to implement and evaluate the program was added to the reported costs. The below table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	Total
2009	$6,000	$6,662	$27,457	$0	$40,119
2010	$7,699	$6,884	$39,745	$8,806	$63,134
2011	$0	$0	$0	$5,000	$5,000

Goals were reported as total amounts respective to the winter peak only. However, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter.

The results for the benefit/cost tests show that the program was cost-effective from Participant, Program Administrator, and Total Resource perspectives, although each ratio underperformed compared to projections in the program filing. The likely reason for this underperformance is due to changes in the calculations of energy savings during the later years of the CFL bulb life. The Energy Independence and Security Act of 2007 (EISA) sets efficiency requirements for lighting that will cause the phasing out of most incandescent bulbs. This will increase the efficiency of the baseline comparison to the CFL, which justifies a discount in the future potential savings.

2009 and 2010 Summer Peak Cost Effectiveness Analysis

Cost Benefit Test	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	3.51	$ 259,299	$ 362,492	$ 103,194
Total Resource Cost (TRC)	4.23	$ 276,697	$ 362,492	$ 85,795
Ratepayer Impact Measure (RIM)	0.53	$ (319,814)	$ 362,492	$ 682,306
Participant Cost (PCT)	N/A	$ 734,082	$ 734,082	$ -

2009 and 2010 Winter Peak Cost Effectiveness Analysis

Cost Benefit Test	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	3.47	$ 254,528	$ 357,722	$ 103,194
Total Resource Cost (TRC)	4.17	$ 271,926	$ 357,722	$ 85,795
Ratepayer Impact Measure (RIM)	0.52	$ (324,585)	$ 357,722	$ 682,306
Participant Cost (PCT)	N/A	$ 734,082	$ 734,082	$ -

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, there will be any changes to the cost effectiveness of the program in future years. Any number of a multitude of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the COCFL program, results from the current evaluation were used as the starting point for the cost-benefit analysis. Future savings values were discounted due to increasing the free ridership percent as a result of effects from the Energy Independence and Security Act of 2007. While the reduction in savings could be attributed to an increase in efficiency in the baseline technology, thus reducing the per-bulb savings, it is more likely that future participants will simply not have an opportunity to purchase incandescent bulbs, thus an increase in free ridership. Currently, CFLs are ubiquitous at most big-box retailers and home stores reducing the availability of incandescent bulbs. However, the lower annualized energy savings due to the lack of incandescent bulbs is offset by an increase in the cost of avoided energy in future years. The results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective.

2012-2014 Winter Peak Cost Effectiveness Analysis

Benefit Cost Test	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	2.73	$ 320,612	$ 505,480	$ 184,868
Total Resource Cost (TRC)	3.91	$ 376,066	$ 505,480	$ 129,414
Ratepayer Impact Measure (RIM)	0.62	$ (306,350)	$ 505,480	$ 811,830
Participant Cost (PCT)	N/A	$ 1,116,488	$ 1,116,488	$ -

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the COCFL program.

1) Results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective. *Therefore, it is our opinion that the COCFL program should* continue through 2014, with periodic evaluations to ensure the program is still cost effective.
2) Greater scrutiny should be applied to data collection and tracking. Every customer list should have at a minimum, the customer's utility bill account number in the same format as it is stored in the CIS, the install date of the measure (handout date), and number and wattage of the CFLs.
3) Marketing related data should be captured and tracked to provide marketing analysis. This should include information relating each campaign, the method of transmittal, and costs.
4) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
5) On-going program management should be handled by KPC staff, including tracking of customer participation and estimated *ex-ante* savings.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

I. California Public Utilities Commission. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

II. State of California Governor's Office of Planning and Research. California Standard Practice Manual: Economic Analysis of Demand Side Programs and Projects. July 2002.

III. PJM Forward Market Operations. Energy Efficiency Measurement & Verification. Revision 01. March 1, 2010.

IV. Vermont Energy Investment Corporation. State of Ohio Energy Efficiency Technical Reference Manual. *Ohio TRM – Draft 8-6-2010*. Public Utilities Commission of Ohio, 2010. PDF. 6 August 2010.

V. Ohio Electric Utilities. Draft Technical Reference Manual (TRM) for Ohio Senate Bill 221 Energy Efficiency and Conservation Program and 09-512-GE-UNC. September/October 2009.

VI. Morrison, Richard. Kentucky Power Company DSM Program Template. *Kentucky Power Company Program Template for DSM Programs Revised 052010 Expand Redline*. MS Excel Workbook. 20 May 2010.

VII. AEP Load Research Analysis Evaluation Report for the Community Outreach Compact Fluorescent Lighting Program in Kentucky Power Company Program Period: January 2009 – December 2009. August 2010.

VIII. Sonderegger, Robert C. A Baseline Model for Utilitiy Bill Analysis Using Both Weather and Non-Weather Related Variables. June 1998.

IX. Kentucky Power DSM Collaborative Report. January 1, 2008 to December 31, 2008.

X. Kentucky Power DSM Collaborative Report. January 1, 2009 to December 31, 2009.

XI. Kentucky Power DSM Collaborative Report. January 1, 2010 to December 31, 2010.

Appendix - Impact Methods and Assumptions

Impact Methods

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life, with savings discounted after the EISA Act of 2007 which reduces the availability for savings in future years due to lack of available alternatives. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated ~~measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in~~ both the initial expected impact from an average installation and also the long-term savings from the specific installations.

Technology Description

A low wattage ENERGY STAR qualified compact fluorescent screw-in bulb (CFL) is purchased through a retail outlet in place of an incandescent screw-in bulb. The incremental cost of the CFL compared to the incandescent light bulb is offset via either rebate coupons or via upstream markdowns. Assumptions are based on a time of sale purchase, not as a retrofit or direct install installation. This characterization assumes that the CFL is installed in a residential location. Where the implementation strategy does not allow for the installation location to be known and absent verifiable evaluation data to support an appropriate residential versus commercial split, it is recommended to use this residential characterization for all purchases to be appropriately conservative in savings assumptions.

Algorithms

$$kWh = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times \left(H \times 365\right) \times \left(1 + IF\right)$$

$$kW = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times CF \times (1 + IF)$$

Terms

Term	Description
kWh	Energy Savings.
kW	Demand Savings.

W_{base}	Wattage of bulb being removed.
$W_{replace}$	Wattage of bulb being installed.
H	Average Daily hours-of-use.
IF	Interactive Factor.
CF	Coincidence Factor.

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility.
2. Customer's account must have been active prior to the measure being received until the date of the analysis (or the end of the measure's expected life).
3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Assumptions

Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Free Ridership	27%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%
Installation Ratio	61.1%
Measure's expected life in years	6
Average Daily Hours of Use	4.5
Days per year of Use	351
Energy Waste Heat Factor	1.07
Demand Waste Heat Factor	1.21
Summer Coincidence Factor	0.29
Winter Coincidence Factor	0.27

EISA Discounts

Percentage Adjustments for Energy Star Lighting with Base Wattage					
Watts Low	Watts High	<= 2011	2012	2013	>= 2014
0	15	100%	100%	100%	63%
16	20	100%	100%	62%	62%
21	∞	100%	63%	63%	63%

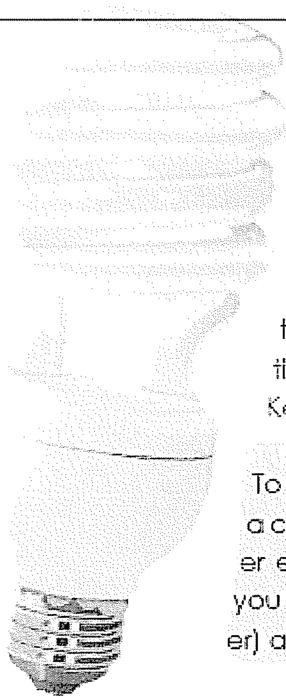
Wattage Adjustments for Energy Star Lighting without Base Wattage					
Watts Low	Watts High	<= 2011	2012	2013	>= 2014
0	15	3.25	3.25	3.25	2.05
16	20	3.25	3.25	2.00	2.00
21	∞	3.25	2.06	2.06	2.06

Appendix – Exhibits

Exhibit 1 – Sample Newspaper Advertisement

FREE CFLs

Kentucky Power will be distributing energy efficient, compact fluorescent light bulbs (CFLs) to customers **Wed., June 17, at our Hazard Service Building** (address below). The **FREE** CFLs will be available on a first-come, first-served basis while supplies last.



CFLs are a great choice to light your home. They can last up to 10 times longer than incandescent bulbs and typically use 1/4 - 1/3 less electricity. They also produce 80 percent less heat, yet provide more light. All this means they can save you money, particularly when they are **FREE** to Kentucky Power customers.

To get your **FREE CFL***, simply bring a copy of your AEP/Kentucky Power electricity bill (so we can verify you are a Kentucky Power customer) and receive your bulb.

This promotion is for AEP/Kentucky Power customers only.

CFL GIVEAWAY
9 a.m - 3 p.m.*
Wed., June 17, 2009
Kentucky Power Service Bldg.
1400 East Main Street
Hazard, KY

* While supplies last. Kentucky Power reserves the right to limit the number of CFLs provided to each customer.

Exhibit 2 – Some Facts About CFL

Some facts about CFL *Compact Fluorescent Lighting*

Compact fluorescent light bulbs (CFLs) are a great way to save energy and money in your home. Designed to directly replace incandescent bulbs, they offer the best features of fluorescent lighting – longer life, lower operating costs and less heat gain – with the ease and convenience of traditional lighting. Consider the following:

☐ CFLs can last up to 10 times longer than incandescent bulbs. This means you won't have to change light bulbs nearly as often. While you may pay more up front for a CFL bulb (and they get cheaper every day), you will only have to replace it every 5 - 13 years.

☐ CFLs typically use 1/4 to 1/3 less energy than traditional light bulbs. For example, a 28-watt compact fluorescent typically provides as much light as a 100-watt incandescent bulb. This means you will save money on your monthly electric bill.

LIGHT OUTPUT EQUIVALENCY

[illegible]	[illegible]	[illegible]
Watts	Lumens	Watts
40	450	9-13
60	800	13-15
75	1,100	18-25
100	1,600	23-30
150	2,600	30-52

courtesy: energystar.gov

☐ CFLs produce about 80 percent less heat, yet provide more light. Less heat makes them easier to work around and helps reduce summer air-conditioning costs.

☐ CFLs are environmentally friendly. According to Energy Star (a joint program of the United States Environmental Protection Agency and the Department of Energy) every compact fluorescent light can prevent more than 450 pounds of emissions from a power plant over its life.

☐ CFLs can save you money. While the initial cost of a compact fluorescent light bulb will be higher than a comparable incandescent bulb, savings will be realized due to the lower wattage of the bulb and the longer life. Want to know how much you can save? Visit our web site at kentuckypower.com and utilize our Online Energy Calculator function. There you will discover how much CFLs can save you on your electric bill. You will also learn about other steps you can take to conserve electricity and lower your energy costs.

COMPARE & SAVE

28-watt CFL bulb	Equivalent To	100-watt incandescent bulb
Purchase price = $3.22		Purchase price = $.99
Light output = 1600 lumens		Light output = 1690 lumens
Expected Life = 8000 hours		Expected Life = 750 hours
*Life Cycle Cost = $17.78		*Life Cycle Cost = $67.50

*For comparison purposes, based on 8,000 hours cycle
Energy costs based on $.07 per kwh.

AEP
KENTUCKY POWER

www.kentuckypower.com

(800) 572-1113

Exhibit 3 – Fact Sheet: Mercury in CFLs

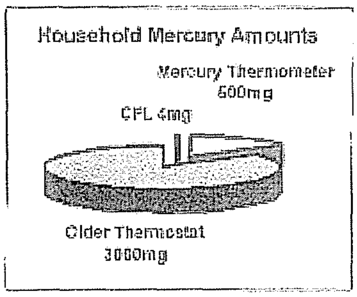
FACT SHEET: Mercury in Compact Fluorescent Lamps (CFLs)

The US Environmental Protection Agency has prepared this fact sheet to respond to questions/concerns about mercury in energy-efficient lighting that uses compact fluorescent technology.

What are the Health Risks of Mercury and How do CFLs Fit In?

Mercury is an essential ingredient for most energy-efficient lamps. The amount of mercury in a CFL's glass tubing is small, about 4mg. However, every product containing mercury should be handled with care. Exposure to mercury, a toxic metal, can affect our brain, spinal cord, kidneys and liver, causing symptoms such as trembling hands, memory loss, and difficulty moving.

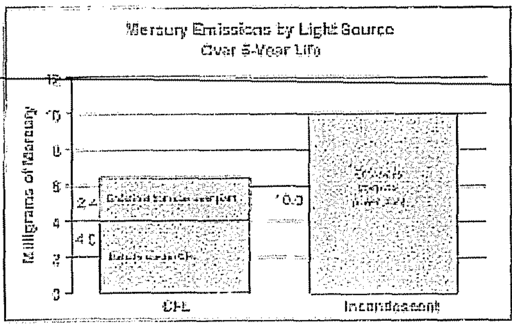
As energy-efficient lighting becomes more popular, it is important that we dispose of the products safely and responsibly. Mercury is released into our environment when products with mercury are broken, disposed of improperly, or incinerated. If you break a CFL, clear it up safely. And always dispose of it properly to keep CFLs working for the environment.



Mercury is an ingredient in several household products. Recycling programs exist for mercury in older non-digital thermostats and mercury thermometers, but residential CFL recycling programs are just now appearing.

CFLs Responsible for Less Mercury than Incandescent Light Bulbs

Ironically, CFLs present an opportunity to prevent mercury from entering our air, where it most affects our health. The highest source of mercury in our air comes from burning fossil fuels such as coal, the most common fuel used in the U.S. to produce electricity. A CFL uses 75% less energy than an incandescent light bulb and lasts at least 6 times longer. A power plant will emit 10mg of mercury to produce the electricity to run an incandescent bulb compared to only 2.4mg of mercury to run a CFL for the same time.



Source: US EPA, June 2002

Always Dispose of Your CFL Properly

While CFLs for your home are not legally considered hazardous waste according to federal solid waste rules, it is still best for the environment to dispose of your CFL properly upon burnout. Only large commercial users of tubular fluorescent lamps are required to recycle. If recycling is not an option in your area (see below on how to find out), place the CFL in a sealed plastic bag and dispose the same way you would batteries, oil-based paint and motor oil at your local Household Hazardous Waste (HHW) Collection Site. If your local HHW Collection Site cannot accept CFLs (check Earth911.org to find out) seal the CFL in a plastic bag and place with your regular trash.

Safe cleanup precautions: If a CFL breaks in your home, open nearby windows to disperse any vapor that may escape, carefully sweep up the fragments (do *not* use your hands) and wipe the area with a disposable paper towel to remove all glass fragments. Do *not* use a vacuum. *Place all fragments in a sealed plastic bag and follow* disposal instructions above.

Resources for Recycling or Proper Disposal of CFLs

NOTE: Residential recycling programs are not yet available in most regions.

1. Earth911.org (or call 1-800-CLEAN-UP for an automated hotline): Online, enter your zip code, press "GO," click "Household Hazardous Waste", then "fluorescent light bulb disposal." The site will identify your nearest *residential mercury recycling facility or mail disposal method. If you find no specific information on* CFL disposal, go back and click on the link for "Mercury Containing Items."

2. Call your local government if the Web site and Hotline number above does not have your local information. Look on the Internet or in the phone book for your local or municipal government entity responsible for waste collection or household hazardous waste.

Appendix – Survey Results

Kentucky Power

CFL Distribution Program Study Community Outreach CFL Segment Report

THOROUGHBRED™ RESEARCH GROUP

Thoroughbred Research Group
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Research Methodology

Project Background

Kentucky Power implemented a program to distribute packages of compact fluorescent lights (CFLs) to residents of their service area by making complimentary four-packs of CFLs available at various community events. In an effort to estimate the effectiveness of the program and to better understand consumer behavior related to the distribution, Kentucky Power and AEP contracted with Thoroughbred Research Group to conduct a survey among residential customers who received one or more of the four-pack CFLs for use in their homes.

Specific objectives of the research included:

- Document the extent to which the 4-pack CFLs are currently in use in homes
- Determine the types of bulbs the CFLs replaced and the wattage of bulbs replaced (if replacing incandescent bulbs)
- Measure the amount of time the CFLs are in use
- Identify where in the home the CFLs have been installed
- Determine general levels of satisfaction with the CFL distribution program

Research Methodology

This study consisted of a telephone survey of 255 Kentucky Power customers who had received one or more of the CFL packs at a community event. Kentucky Power supplied Thoroughbred Research with a list of participating customer names and telephone numbers.

Interviews were gathered between May 17 and May 22, 2010. The questionnaire for this study was developed by the staff of AEP and Kentucky Power. Surveys averaged approximately seven minutes to complete.

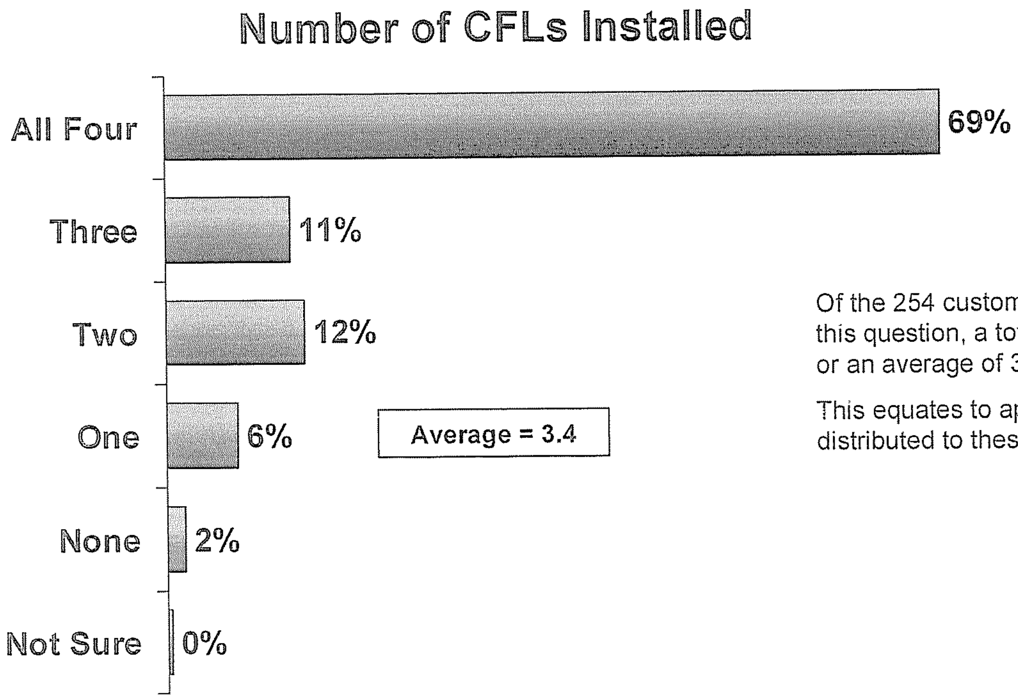
Representing a population of 2,589 unique customer households, this sample of 255 interviews produces results accurate to within no more than plus or minus 4.9 percentage points at 90% confidence.

Key Findings

1. Among the 255 respondents in this study, we asked each respondent to detail the experience with the most recent 4-pack of CFLs they received from Kentucky Power (in the event they received more than one package). With descriptions on a total of 1,020 CFLs (255 x 4), we found that:
   - 793 of the CFLs are currently still in use in the home (78%)
   - 69 were installed but are no longer in use (7%)
   - 158 were never installed (15%)
2. More than three out of four participants reported having used the CFLs to replace one or more incandescent bulbs. About 61% of the total CFLs distributed replaced an incandescent bulb, with an average wattage of 70 watts.
3. On average, the CFLs distributed through this program that are still in use are operating 4.5 hours per day.
4. Two-thirds of the CFLs still in use are placed in three areas of the home – the living room (27%), the kitchen (22) and a bedroom (18%).
5. About half the program participants (47%) said they had already installed CFLs in their home prior to receiving this pack from Kentucky Power. These customers reported having had an average of 6.2 prior CFLs per household.
6. About one in four (27%) said they did not have any CFLs prior to receiving them from Kentucky Power, but had planned to do so; and 22% said they did not have any prior, but had since purchased additional CFLs.
7. Satisfaction is very high among program participants in terms of both the CFLs they received (97%) as well as the promotion as a whole (97%).

Number of CFLs Installed

Nearly seven out of ten customers reported having installed all of the CFLs they received from Kentucky Power. Only 2% reported they had not yet installed any of the CFLs.



Of the 254 customers who provided an answer to this question, a total of 862 CFLs were installed, or an average of 3.4 per customer.

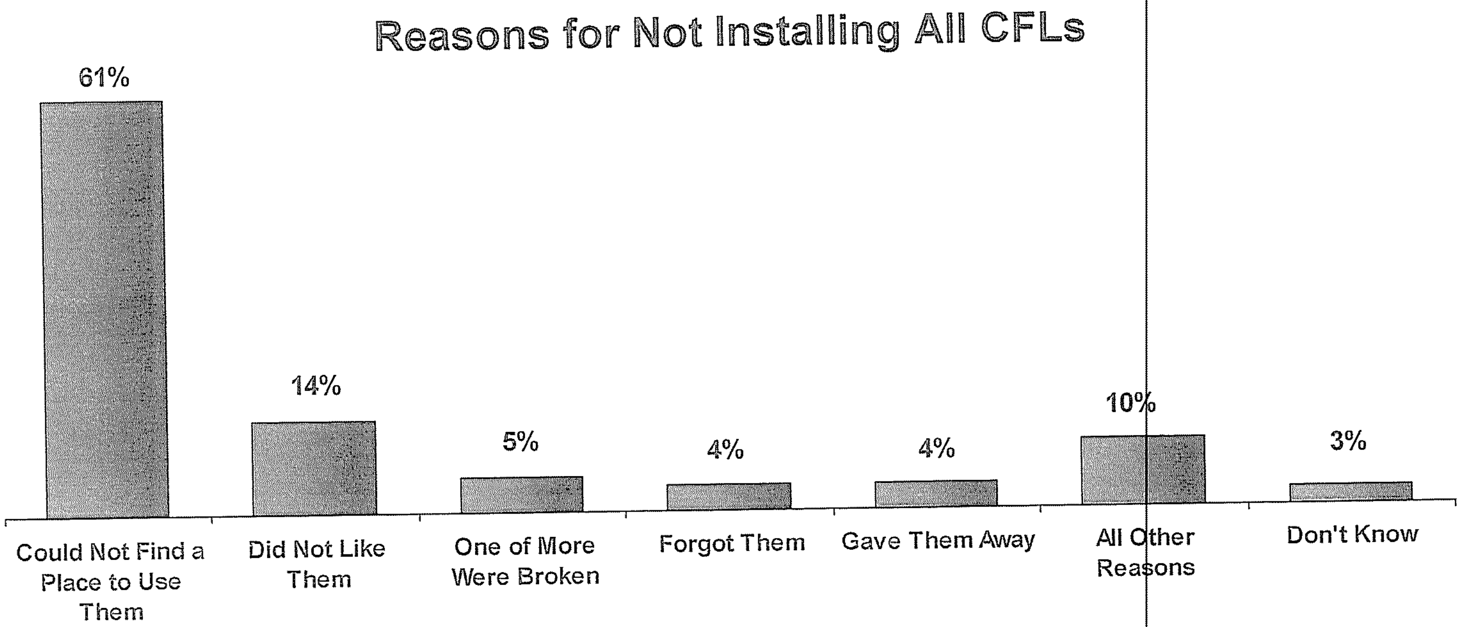
This equates to approximately 85% of the CFLs distributed to these customers.

Base: All Respondents (n=255)

Reasons for Not Installing All CFLs

The 79 respondents (about 31% of the total sample) who did not install all four of the CFLs they received were asked why they had not used all four bulbs.

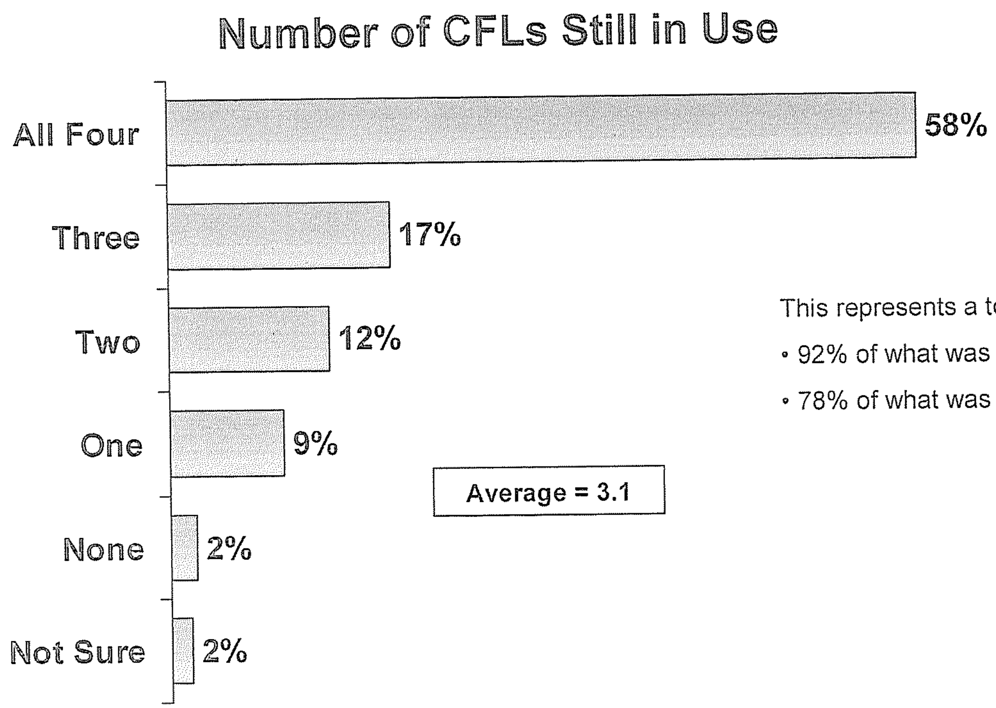
The dominant reason was not being able to find a place in the home to use all of the bulbs (mentioned by 61%). Another 14% of this group said they did not like the CFLs, while 5% reported that one or more of the CFLs they received were broken.



Base: Those who did not install all four CFLs (n=79)

Number of CFLs Still in Use

Among those who originally installed at least one of the CFLS they received, well over half (58%) say all four CFLs are still in use in their homes. Only 2% reported none of the bulbs they had originally installed are still in use.



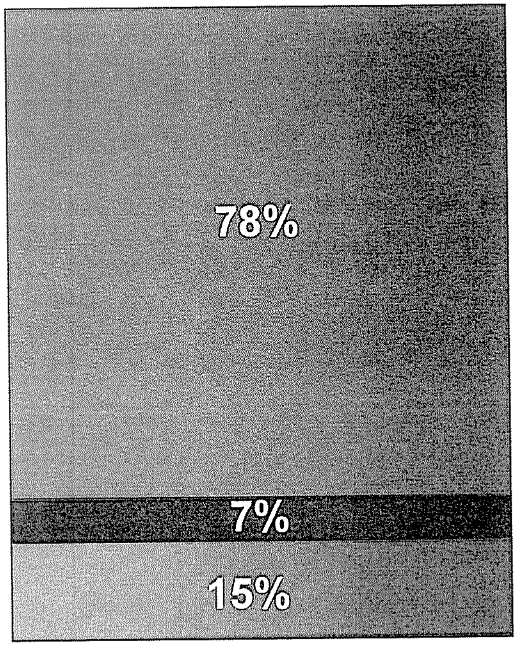
Base: Those who installed one or more CFLs (n=250)

This represents a total of 793 CFLs still being in use, or

- 92% of what was originally installed, and
- 78% of what was originally distributed

Net Distribution, Installation and Use

1,020 CFL Bulbs Distributed



The results of this survey indicate that 78% of the CFLs Kentucky Power distributed through community events are currently being used in customers' homes.

Still in Use = 793

Installed, No Longer in Use/Not Sure if In Use = 69

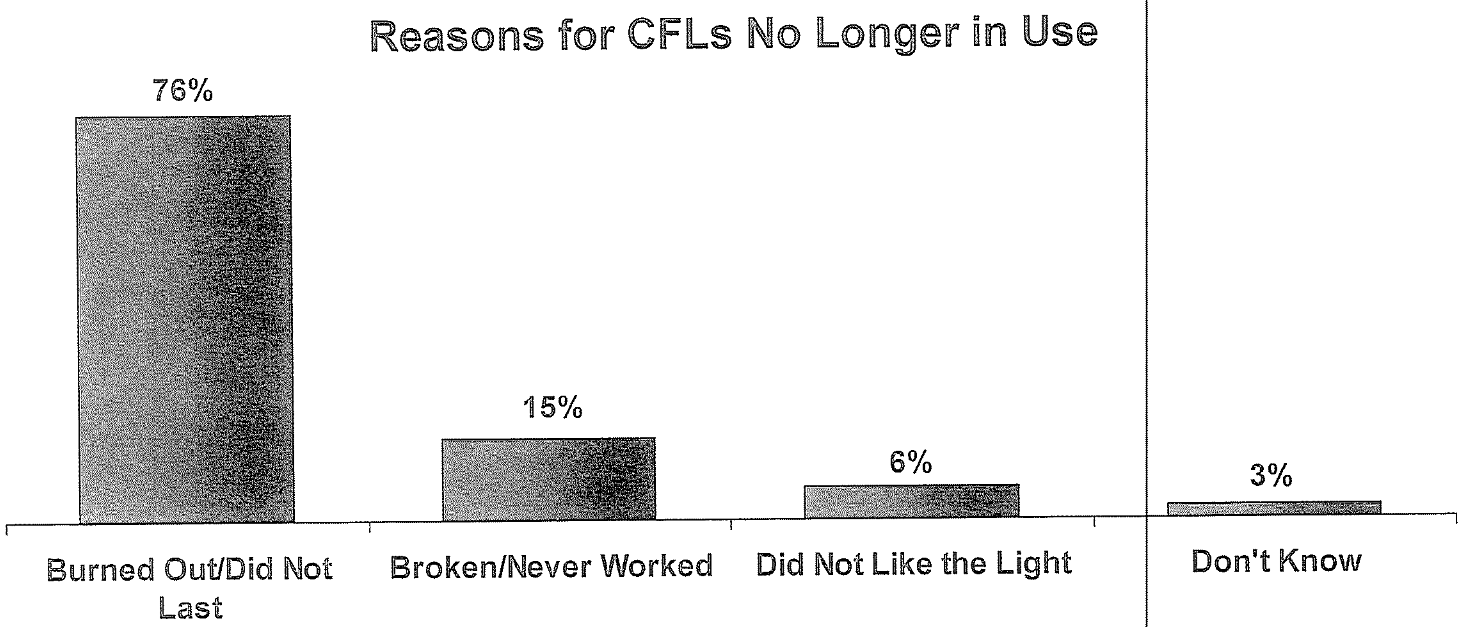
Never Installed/Not Sure if Installed = 158

Base: All respondents (n=255)

Reasons for CFLs No Longer in Use

The 33 respondents who reported that one or more of the CFLs they originally installed are no longer in use in their home, the primary reason is that the bulbs had burned out and no longer work (mentioned by 76% of this group).

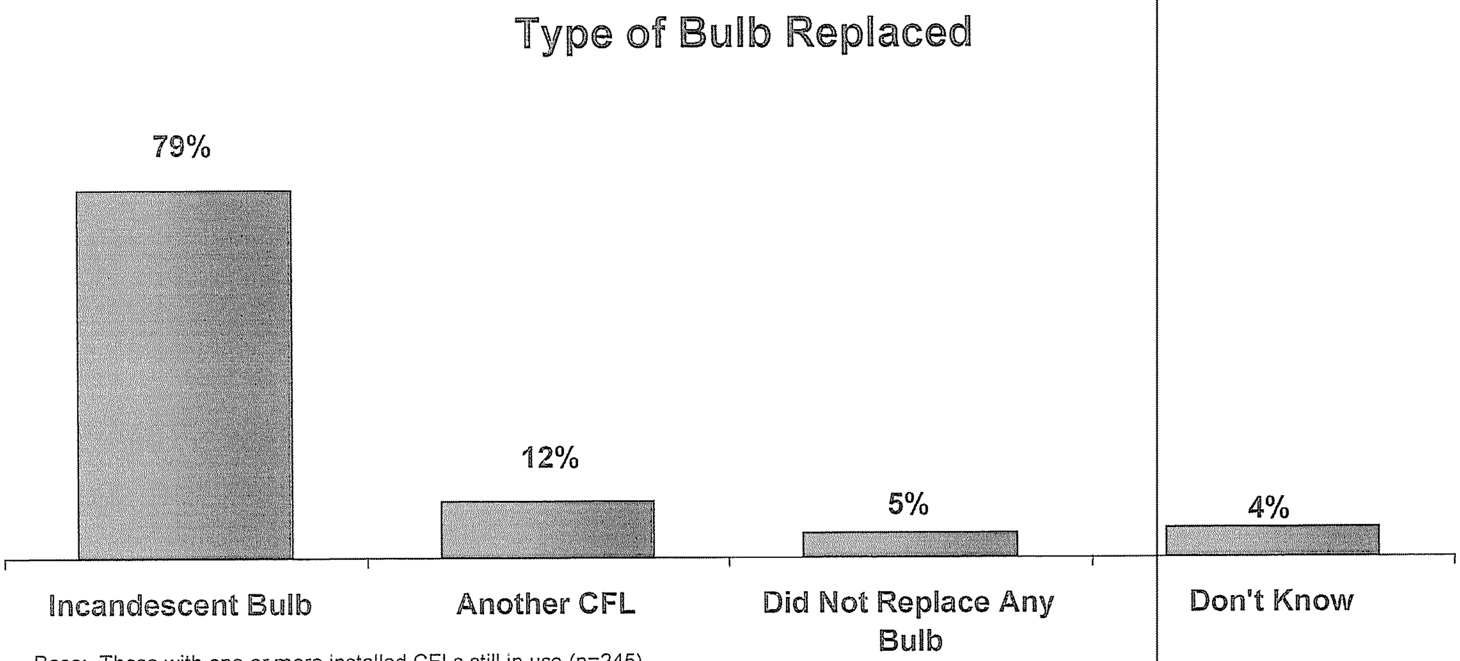
Another 15% said the bulbs were broken or never worked at all. Only 6% say they did not like the light the CFLs produced.



Base: Those who installed one or more CFLs no longer in use (n=33)

Type of Bulb Replaced

More than three out of four reported they used the CFLs they received from Kentucky Power to replace an incandescent light bulb in their home. Twelve percent replaced another CFL in the home, and 5% said the bulbs they received did not replace any previous bulbs in the home.



Base: Those with one or more installed CFLs still in use (n=245)

Wattage of Incandescent Bulbs Replaced

Those who used the CFLs they received from Kentucky Power to replace one or more incandescent bulbs in their homes (189 of the 255 survey participants) were asked to detail the wattage of each bulb replaced. In total, these respondents gave responses for 623 light bulbs.

Excluding "don't know" responses, 54% of the CFLs replaced a 60-watt incandescent bulb, 21% replaced a 100-watt bulb and 19% replaced a 75-watt bulb.

Wattage of Incandescent Bulbs Replaced

	Number	Percent of All Responses	Percent of Known Wattage
15 Watt	1	< 0.5%	< 0.5%
40 Watt	28	4%	5%
50 Watt	2	< 0.5%	< 0.5%
60 Watt	327	52%	54%
70 Watt	2	< 0.5%	< 0.5%
75 Watt	118	19%	19%
100 Watt	128	21%	21%
110 Watt	1	< 0.5%	< 0.5%
3-way Bulb (60-75-100)	2	< 0.5%	< 0.5%
Don't Know	14	2%	
Total	623	100%	100%

Base: Those who replaced one or more incandescent bulbs with a CFL (n=189)

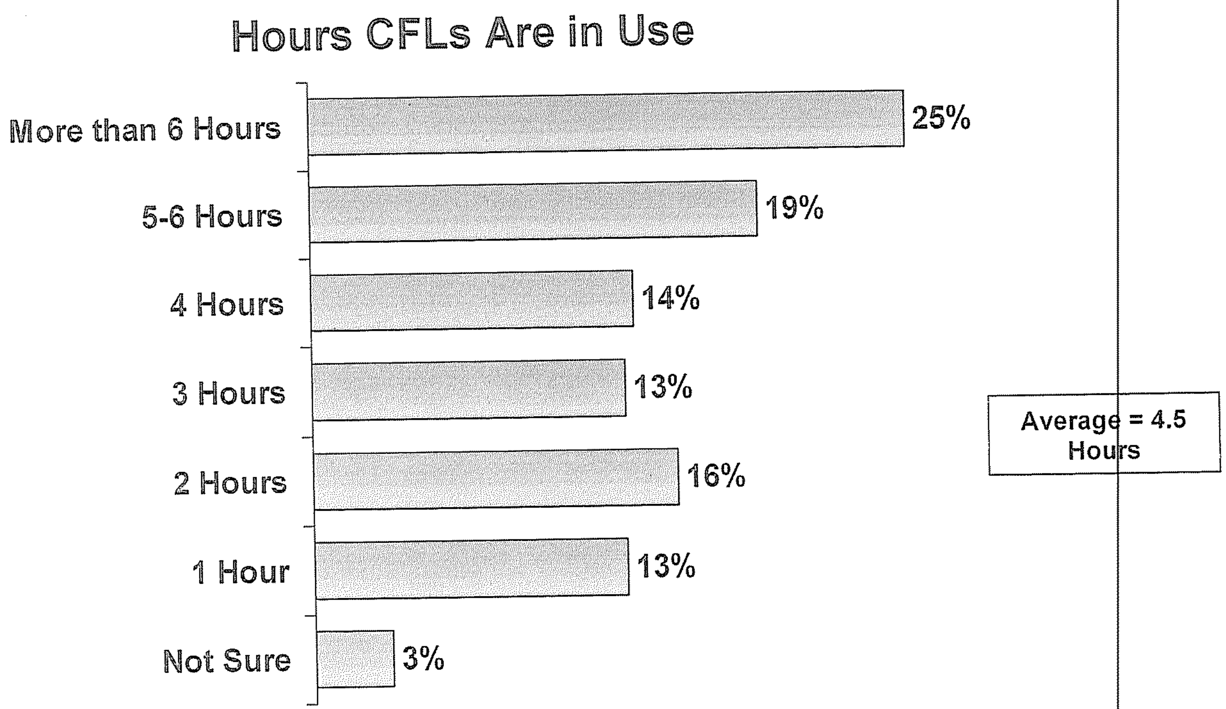
In total, these 623 CFLs replaced a 70-watt incandescent bulb on average.

The 623 bulbs detailed in the table at the left represent 61% of the total CFLs distributed, and 79% of the total CFLs still in use.

Hours in Use

Respondents with one or more of the CFLs still in use in their home were also asked to how long each bulb is typically used each day in the home.

When aggregating the responses for all 793 CFLs described in this survey, the average daily use was 4.5 hours per CFL still in use.

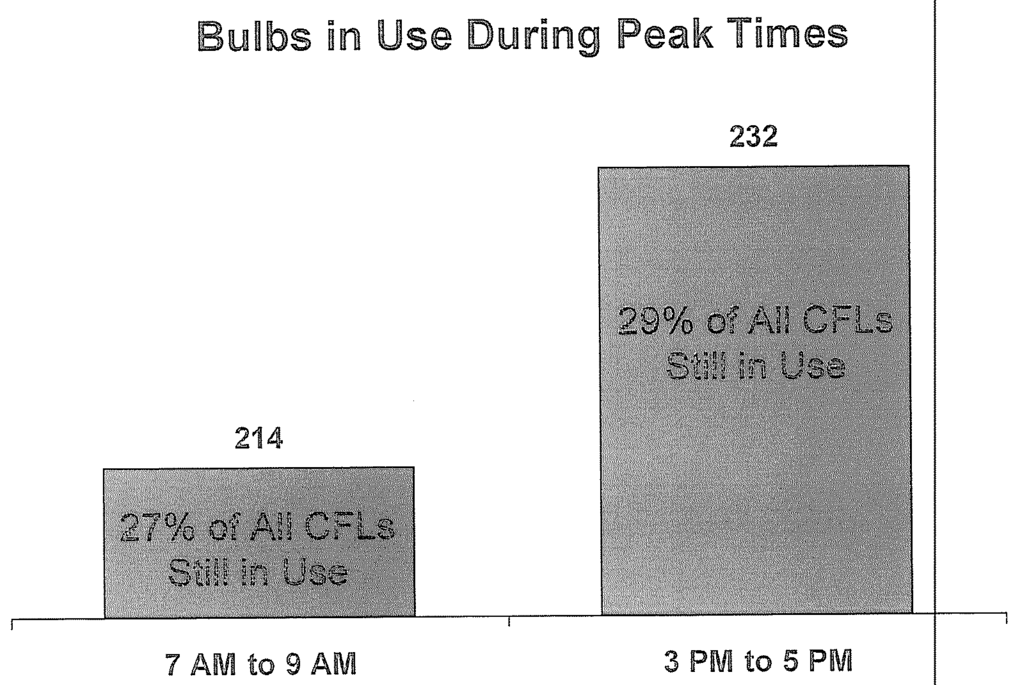


Base: Those with one or more CFLs still in use (n=245)

Peak Hour Use

Of the 793 CFLs described in this study, 214 bulbs (or 27%) were reported to be in use during the morning peak period of 7:00 AM through 9:00 PM

Respondents reported 232 bulbs (or 29%) in use for the afternoon peak time period of 3:00 PM through 5:00 PM.



Base: Those with one or more CFLs still in use (n=245)

Placement of CFLs in Home

Of the 793 CFLs still in use, about two-thirds are used in three areas of the home – the living room (27%), the kitchen (22%) and a bedroom (18%).

Where in Home CFLs are Used

	Number	Percent of All Responses	Percent of Known Placements
Living Room	212	27%	27%
Kitchen	175	22%	22%
Bedroom	139	18%	18%
Bathroom	90	11%	11%
Family/TV Room	51	6%	7%
Outside	31	4%	4%
Entry Hall	25	3%	3%
Dining Room	21	3%	3%
Laundry Room	12	2%	2%
Home Office	11	1%	1%
Garage/Basement	10	1%	1%
Utility Room	3	<0.5%	<0.5%
Other	4	1%	1%
Don' Know/No Answer	9	1%	
Total	793	100%	100%

67%

Base: Those with one or more CFLs still in use (n=245)

Experience with Other CFLs in the Home

Nearly half (47%) reported having had CFLs installed in their home prior to receiving the four-pack from Kentucky Power. Of this group, the average number of previously installed CFLs in the home was 6.2 bulbs.

Other CFLs in the Home

Other CFLs in Home Prior to Receiving 4-Pack from Kentucky Power	47%
Average Number of Previously Installed CFLs	6.2
No CFLs Prior to Receiving 4-Pack from Kentucky Power	53%
• But were planning on getting CFLs	27%
• Have purchased additional CFLS since	22%

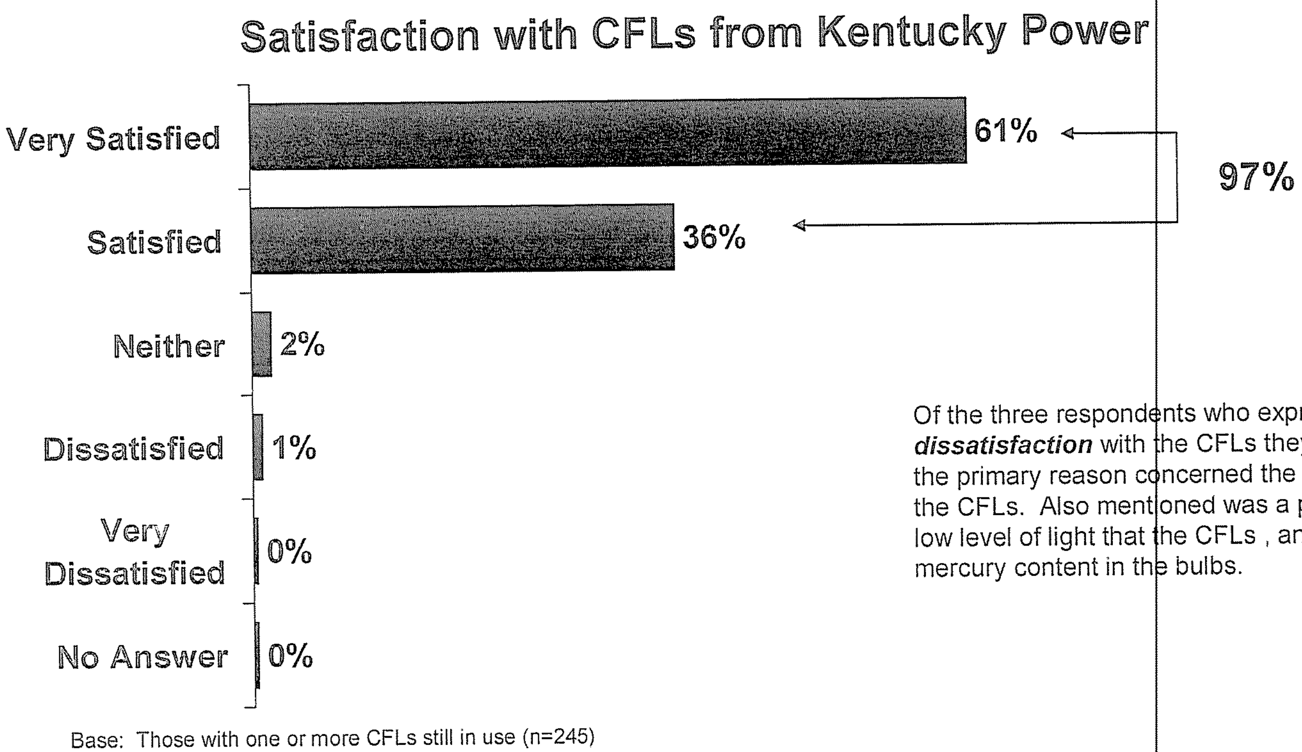
Base: Those with one or more CFLs still in use (n=245)

The remaining 53% reported they did not have any CFLs in their home prior to receiving some from Kentucky Power.

A total of 27% said they were planning on buying some, and 22% said they have since bought additional CFLs for their home.

Satisfaction with CFLs Received

Satisfaction with the CFL distribution program among participants is very high. Ninety-seven percent expressed being satisfied with the CFLs they received from Kentucky Power, with 61% indicating they are "very satisfied".



Of the three respondents who expressed ***dissatisfaction*** with the CFLs they received, the primary reason concerned the short life of the CFLs. Also mentioned was a perceived low level of light that the CFLs , and the mercury content in the bulbs.

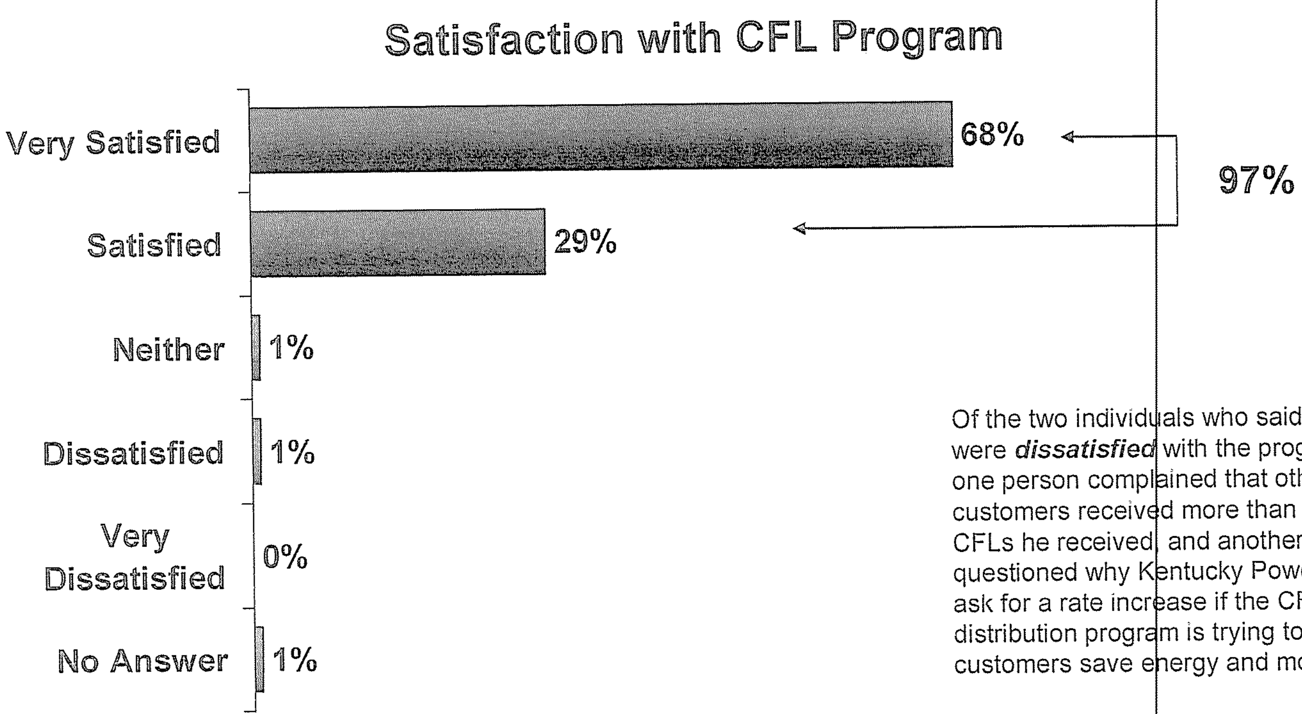
Verbatim Comments:

"Why were you dissatisfied with the CLFs you received from Kentucky Power?"

- "The longevity. The price of them. The energy efficiency. That's about it."
- "The short life span. And the low illumination. That's about it."
- "They used to be made in Kentucky and now they're made in China. They didn't last that long either. I heard they are mercury-based and you have to be careful when you dispose of them. The politicians are asking for a 35% raise and its making the power company filthy rich. It's about making them rich. That's all."

Overall Satisfaction with Program

Likewise, overall satisfaction with Kentucky Power's CFL program is very high. Ninety-seven percent expressed satisfaction with the program, with over two-thirds (68%) saying they are "very satisfied".



Base: Those with one or more CFLs still in use (n=245)

Of the two individuals who said they were ***dissatisfied*** with the program, one person complained that other customers received more than the four CFLs he received, and another questioned why Kentucky Power would ask for a rate increase if the CFL distribution program is trying to help customers save energy and money.

Verbatim Comments:
"Why were you dissatisfied with this program from Kentucky Power?"

- "Because some of the people got eight, ten, twelve bulbs and I only got four and I don't understand the reasoning why."
- "The political reasons. If they passed out all of these light bulbs that are supposed to be energy efficient and if it's saving energy so much, why are they asking for a 35% raise in Kentucky? No, that's it."

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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AEP®

Evaluation Report

Kentucky Power Company

Energy Education for Students

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

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American Electric Power Service Corporation
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Table of Contents

Executive Summary

The objective of the Kentucky Power Company's (KPC) Energy Education for Students Program (EEFS) is to promote the conservation and efficient use of electricity by encouraging the use of energy efficient ENERGY STAR® CFLs in place of incandescent light bulbs. Qualified customers in targeted schools receive a package of four ENERGY STAR® CFLs along with energy education materials. This report provides the evaluation results for the 2009 and 2010 program years, and a prospective analysis for the years 2012-2014.

The evaluation consisted of an impact analysis, market effects and process evaluation, and a cost-benefit analysis for the program participants in years 2009 and 2010. The prospective analysis used the evaluation results to forecast the effectiveness of the program in 2012-2014 with respect to KPC's winter peak. For 2009 and 2010, the EEFS program distributed 10,708 CFLs to 2,677 KPC customers, providing 594 MWh of net annualized energy savings, 144 kW of summer peak demand reductions, and 72 kW of winter peak demand reductions. The process evaluation concluded that the promotion and delivery processes were effective and that there was a sizable market for CFLs.

Based on the results of the evaluation, the EEFS program was determined to be cost-effective under the two of the cost-benefit tests used in the California Standard Practice Manual and KPC should continue to utilize the program through the remainder of the current program life (2011). The prospective analysis of the program for 2012-2014 predicts the program will be cost-effective; however, it is recommended that KPC evaluate potential replacements for the EEFS program in their portfolio of energy efficiency programs.

2009-2010 Cost-Benefit Evaluation Results

Cost Benefit Test	Summer Peak Ratio	Winter Peak Ratio
Program Administrator Cost (PACT)	2.00	1.79
Total Resource Cost (TRC)	2.28	2.04
Ratepayer Impact Measure (RIM)	0.50	0.44
Participant Cost (PCT)	N/A	N/A

2012-2014 Cost-Benefit Prospective Results

Cost Benefit Test	Winter Peak Ratio
Program Administrator Cost (PACT)	1.28
Total Resource Cost (TRC)	1.65
Ratepayer Impact Measure (RIM)	0.47
Participant Cost (PCT)	N/A

Program Description

Kentucky Power Company manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The Kentucky National Energy Education Development (NEED) Project was developed to implement an energy education program at participating middle schools within the service territory with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and was approved by the Public Service Commission (PSC) on February 24, 2009 (Case No. 2008-00349) to help meet Kentucky Power's goals.

The major goals of the program are to:

1) Provide education to students about energy, electricity, the environment and economics
2) Encourage the use of energy efficient lighting in the homes of students
3) Reduce customer usage of electric energy
4) Increase customer satisfaction and services
5) Reduce Kentucky Power's long-range peak demand.

The Energy Education For Students Program was designed as both an energy education program and as a program to promote energy efficient lighting in residential homes. KPC worked in partnership with the Kentucky NEED Project to provide energy education materials to the participating middle schools and a package of four (4) ENERGY STAR® qualified CFLs to each seventh grade student at the participating schools. This allowed students to better understand the purpose and benefits of implementing energy efficient CFLs in their home and to study the capabilities and direct savings of CFLs.

The lower wattage of CFLs versus the higher wattage of incandescent bulbs to attain the same level of lumens reduces energy consumption, which in-turn lowers the customer's monthly electric bill, and provides both energy and demand savings to KPC. Additionally, the life of the high-efficiency CFLs exceed that of the incandescent lamps by about a factor of ten, thus reducing equipment costs and adding another benefit of using this energy conservation measure in a customer's home. Although, today's higher purchase price could still be considered somewhat of a barrier which prevents customers from purchasing a CFL versus an incandescent bulb, this barrier is less overwhelming than in previous years, and can be overcome with additional education regarding the financial benefits of CFLs. Historically, CFLs were limited to specific home lighting applications, but improving CFL technology has created more applications for the use of CFLs.

Despite the increased availability and applicability of CFLs, there are still significant numbers of customers in the KPC service territory that are not aware of the many benefits that CFLs provide. KPC believes that the education of improved technology of energy efficient products, such as CFLs, can have a significant benefit if targeted to students at schools within its service territory. Energy, economics, and environmental issues are currently taught in schools today and energy conservation affects each of these three issues. This Program also provides another low-cost avenue for KPC to reach its customers via students of the participating schools.

KPC staff coordinated the enrollment of the participating middle schools, the scheduling of educational workshops in conjunction with the Kentucky NEED Project, and the delivery of educational materials and CFLs. The educational workshops were conducted to ensure that all participating middle schools received the same information concerning the Energy Education For Students Program. Two workshops were scheduled in each area. Invitations were mailed to the teachers of each seventh grade class of each school district. The Program was introduced and described and each teacher received a workshop manual containing a NEED Teacher Guide with educational materials on energy, electricity, the environment and economics. For those teachers unable to attend a scheduled workshop, KPC staff scheduled a meeting with the teachers at the school to introduce the Program and provide the workshop manual with the educational materials. The teachers used the workshop manual as a teaching guide to introduce the Program and provided the educational materials to their seventh grade class. Each student was given a form to be filled out by their parents and returned to the teacher to verify that the parent is a KPC customer. Upon receiving the completed forms from the students, KPC personnel visited the school, collected the forms, and provided the four-packs of ENERGY STAR® qualified CFLs to the teachers, to be given to the participating students. Providing the CFLs to the students for installation in their homes allowed a hands-on application to study the capabilities and benefits of CFLs.

Process and Market Evaluation

Summary

KPC utilized middle schools to administer the Program to deliver education materials and a four-pack of ENERGY STAR® qualified CFLs to each qualified customer. The EEFS promotions were reasonably effective. All school superintendents gave support to the program, but KPC staff indicated that receiving principal support was more problematic. Once contacted, teachers were very receptive to the program. A teacher follow-up survey, conducted in May 2010, indicated that the NEED workshops and the education materials provided were valuable tools for promoting and teaching energy conservation measures to both them and their students. The delivery mechanism was effective. Partnering with NEED facilitated effective program delivery at a reasonable cost. Careful selection of the schools involved ensured that program benefits went mostly to KPC customers. The provision of energy efficiency related educational material along with the energy saving CFLs potentially provided the opportunity for additional energy savings in the student's homes. Free ridership was not found to be excessive. Goals appeared to be appropriately set. KPC reached the customer participation goal in a cost-effective manner that provided excellent customer satisfaction ratings.

Promotional Effectiveness

During the 2009 school year nineteen schools, exclusively within the KPC service territory, participated in the EEFS program. KPC contacted the superintendent of each selected school district, described the Program, obtained their approval to implement the Program within their school district, and then contacted the individual school principals before making contact with the teachers. KPC staff mailed invitations to the selected teachers. During the 2010 school year twenty schools participated, five of which also participated in the 2009 program. All contacted superintendents supported the program. KPC staff indicated that the teachers were the main obstacle to promotion, specifically the teacher's schedule, demands, and pre-conceived notions about the efficacy of energy education. During 2010 KPC further enhanced program promotion as they developed a presentation board that could be used by clubs to increase energy efficiency awareness. Quarterly emails were also sent to teachers to promote the effectiveness of the program.

Delivery Mechanism

KPC staff coordinated the enrollment of the participating schools and partnered with the Kentucky National Energy Education Development (NEED) Project to implement the Program with seventh grade students at participating schools within the KPC service territory. NEED conducted teacher workshops on a scheduled basis to ensure that all participating schools were provided the same information regarding the Program. Two workshops were scheduled in each area. Invitations were mailed to the teachers of each seventh grade class in each school. The Program was introduced and described and each teacher received a workshop manual (cover sheet shown in Appendix A, Exhibit 1) containing a NEED Teacher Guide (Appendix A, Exhibit 2 and 3) with educational materials on energy, electricity, the environment and economics. For those teachers unable to attend a scheduled workshop, KPC staff scheduled a meeting with the teachers at the school to introduce the Program and provide the workshop manual with the educational materials. The teachers used the workshop manual as a teaching guide to introduce the Program and provided the educational materials to their seventh grade class. Each student was given a form (Appendix A, Exhibit 3) to be filled out by their parents and returned to the teacher to verify that the parent is a KPC customer. KPC personnel visited the school, collected the forms, and provided the four-packs of ENERGY STAR® qualified CFLs to the teachers to be given to the participating students. The incentive to the participant's households was that each student received education materials, a four-pack of ENERGY STAR® qualified CFLs, and potential energy savings resulting in savings with their electric bill. The delivery mechanism was effective in that it utilized existing institutions to provide a low-cost means of distributing CFLs, most CFLs went to KPC customers and, by reaching the youth, the program should enhance energy efficiency awareness in a group of people who can take steps to implement energy efficiency for many years.

Teacher Satisfaction was reasonably high. 60% of the teachers responded to the teacher's follow-up survey and all of those that responded indicated the NEED workshop and educational materials were valuable tools for promoting and teaching energy conservation measures to both them and their students. Additionally, the teachers indicated that their seventh grade students were receptive in understanding the benefits of installing energy conservation measures in their home, such as CFLs. Federal government is also working to enact guidelines for teaching energy education. Once adopted, more schools will participate to meet the guidelines.

KPC staff indicated that NEED provided an effective program delivery, but possibly they could take on more of the promotion and administrative work, although that would possibly increase the program cost.

Product Awareness

The Participants' pre-program awareness of energy efficient CFLs was mediocre, with 41% of the participants surveyed stating they had used CFLs in their home prior to the Program, and 59% of the participants surveyed having not previously used CFLs in their home.

Free Riders and Spillover

A free rider is a participant who utilized the provided CFLs, but would have purchased and installed equivalent CFLs had they not participated in the Program. Spillover refers to additional CFLs purchased by participants as a result of the program. From the survey responses, 27% of participants indicated they would have purchased and installed equivalent CFLs without the program and thus were classified as likely free riders in this program. The survey results also indicated that 24% of participants purchased additional CFLs since participating in the Program, providing a potential spillover effect and potentially providing additional energy savings. The authors of this report had some concerns with the survey wording, therefore, to stay conservative, the 27% free rider response was used for the impact analysis and the spillover effects were treated as zero.

Market Potential

Based on the responses to the 2010 Residential Appliance Saturation Survey, it was determined that 13% to 25% of rooms in KPC customer's homes utilize some CFLs as a source of lighting. The top three locations in the home where CFLs were the main source of lighting were the kitchen, living room and master bedroom, respectively. For all the locations in the home it can be said that three to six times more customers are still using incandescent bulbs for their main source of lighting. Therefore, there continues to be a significant market opportunity to promote energy efficient CFLs in the KPC service territory.

Customer Satisfaction

The participant follow-up survey showed that overall satisfaction with the Program was very high, with 95% of the survey respondents indicating they were very satisfied (59%) or satisfied (36%) with receiving the energy efficient CFLs. Approximately 4% of the respondents surveyed expressed dissatisfaction with the CFLs because the CFLs had either a short life, took too long to light up, or provided unsatisfactory light output. In addition, 92% of the participants that remembered receiving the energy educational materials were either very satisfied (52%) or satisfied (40%) with the educational materials. The survey results also indicated that 16% of the respondents removed their CFLs from their home mainly due to lamp failure, while another 16% of the respondents never installed their CFLs because they did not believe they had an appropriate location to place them in their home.

Impact Evaluation

The evaluation began with an engineering estimate analysis of the implementation data collected by KPC. The engineering estimates were used to develop gross measure savings without post-consumption data or a billing analysis. A billing analysis was not performed because the magnitude of impacts in a CFL program falls within the normal bill variability. Implementation data was utilized to determine frequencies of installed measures as well as many values needed to calculate engineering estimates of measure savings. For Net-To-Gross calculations, survey results provided a basis for net savings estimates.

In order to capture accurate per-participant savings numbers, the list of applicable customers must first be validated. For 2009, 1,130 customers received a four-pack of CFLs for a total of 4,520 bulbs distributed. However, after removing non-valid or missing account numbers, only 590 unique KPC customers could be identified (2,360 bulbs). The reason for the large discrepancy is due to missing account numbers. However, this is expected in any program where a measure is distributed to middle-school aged children. In 2010, 6,188 bulbs were distributed to 1,547 customers. Again, after removing non-valid or missing account numbers, only 603 unique customers could be identified (2,412 bulbs). In total there were 10,708 bulbs distributed to 2,677 customers, of which 4,772 bulbs and 1,193 customers were validated. The percentage of customers and bulbs distributed that would be considered valid is 45%. This is not an unexpected validation percentage due to the inherent forgetful nature of 7th graders. Because the program and potential for energy savings is small, nothing should be done to remedy the lack of valid customers at this time.

Once a valid set of customers was determined, the next step was to use the engineering estimate algorithm for CFLs (Appendix – Impact Methods and Assumptions) to determine an average per-participant energy, summer peak, and winter peak savings value. To calculate annualized energy savings, an average per-CFL savings must be determined based on the wattage of the bulb being removed (base wattage) and the wattage of the bulb being installed (replacement wattage). The difference in wattage is the per-hour usage, and this number is multiplied by the total number of bulbs installed, the average hours per day, and the average days per year of use to determine the per-participant, per-year usage. Once the average per-participant annualized savings were determined, values were discounted to account for the persistence of the measure. This new per-participant savings value is the "Gross" savings. To determine the "Net" savings, the gross savings number is multiplied by one minus the free ridership percentage and one plus the spillover percentage. To complete the savings calculation, transmission and distribution losses are accounted for, so that numbers can be presented at a level equivalent to generation. Going forward, the per-participant assumptions for estimating savings should be as follows

2009 and 2010 Average Per-Participant Savings

Statistic	kWh	kW Summer	kW Winter
Per-Participant Savings	222	0.054	0.033

For 2009, KPC had goals of providing 1,200 customers with CFLs and saving KPC customers 221 MWh, 5 kW in summer peak demand, and 110 kW in winter peak demand savings. The program was able to provide 1,130 participants with CFLS, and produce net annualized total program savings of 251 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized summer peak demand reductions were 61 kW and the net annualized winter peak demand reductions were 30 kW. KPC met 94% of the participant target, 113% of the energy target, 1,267% of the summer demand target, and 28% of the winter demand target.

For 2010, KPC had goals of providing 1,700 customers with CFLs and saving KPC customers 313 MWh, 17 kW in summer peak demand, and 156 kW winter peak demand savings. The program was able to provide 1,547 participants with CFLS, and produce net annualized total program savings of 343 MWh of energy savings, including transmission and distribution losses, persistence, and free ridership. The net annualized summer peak demand reductions were 83 kW and the net annualized winter peak demand reductions were 42 kW. KPC met 91% of the participant target, 110% of the energy target, 1,225% of the summer demand target, and 27% of the winter demand target.

For the first two years of the EEFS program, KPC was able to distribute 10,708 bulbs to 2,677 customers, producing net annualized program savings of 594 MWh of energy savings, 144 kW in summer demand and 72 kW in winter demand peak reductions. As a whole, KPC was able to meet 92% of the participant target, 111% of the energy target, 1,242% of the summer demand target, and 27% of the winter demand target.

Participation numbers were near the expected goals, and the total energy savings and summer demand savings were higher than expected. However, the winter peak demand savings was much lower. This was due to the participant survey results showing the bulbs being on more than expected during summer peak demand hours, and less than expected during winter peak demand hours. There are a multitude of reasons why the winter peak hour usage is low, though at this time any opinion tendered would be speculation without a more in depth survey from which to compare. The most likely reason for the low usage is that between 7am and 9am students are not in the primary rooms listed (living room, bedroom), but instead are in the bathroom or dining room. Installing bulbs in these locations would likely increase the potential winter demand savings, but it would also likely lower the annual energy savings due to the low utilization of bathrooms and dining rooms compared to other rooms.

Impact Results

The four key statistics used in an impact evaluation – number of participants, energy savings, summer peak demand reduction, winter peak demand reduction – are shown below. Included in the table are the program goals, the *ex-ante* savings, and the *ex-post* savings. *Ex-ante* savings are forecasted savings as reported by the program staff during the program's implementation. *Ex-post* savings are estimated savings as determined by the impact evaluation and reported in the evaluation report.

Impact Evaluation Results by Year

Category	Goal	Ex-ante	Ex-post	Percent of Goal
2009				
Participants	1,200	1,130	1,130	94%
Bulbs	4,800	4,520	4,520	94%
Energy (MWh)	221	208	251	113%
Summer Demand (kW)	5	5	61	1,267%
Winter Demand (kW)	110	104	30	28%
2010				
Participants	1,700	1,547	1,547	91%
Bulbs	6,800	6,188	6,188	91%
Energy (MWh)	313	285	343	110%
Summer Demand (kW)	7	6	83	1,225%
Winter Demand (kW)	156	142	42	27%
Total				
Participants	2,900	2,677	2,677	92%
Bulbs	11,600	10,708	10,708	92%
Energy (MWh)	534	493	594	111%
Summer Demand (kW)	12	11	144	1,242%
Winter Demand (kW)	267	246	72	27%

Cost Effectiveness Evaluation

AEP uses a cost effectiveness framework based on the 2002 California Standard Practice Manual: Economic Analysis for Demand-Side Programs and Projects. Four benefit cost tests were used as defined in the California Standard Practice Manual: Participant test (PCT), Ratepayer Impact Measure test (RIM), Total Resource Cost test (TRC), and the Program Administrator Cost test (PACT). In addition to the tests, costs of conserved energy will be calculated from the utility perspective. Within this framework, total program benefits are compared to total program costs. Program benefits are defined as the expected kWh/kW saving attributed to the program. These kWh/kW savings are then multiplied by the Company's most recently filed long-run incremental cost (value of avoided generation, transmission, distribution, line losses). The benefits can be expected to accrue over the life of the measure. The dollar value of these benefits may vary over time, reflecting changes in the cost of alternative supply sources and expected inflation. Costs associated with the program include all costs contributing to the realization of program benefits, regardless of who incurs the cost. Traditionally, included in the program costs are all labor costs, miscellaneous materials and expenses, Company paid rebates, promotional expenditures and any participant expenditures exceeding the Company rebate. For purposes of reporting and cost recovery in Kentucky, only costs incremental to the Company after beginning the program offerings are included in the costs. Employee labor costs are not included, unless new labor was utilized incrementally and specifically for DSM program implementation.

For 2009, the total program costs as filed were $17,184, of which $12,184 were listed as incentives. However, these costs do not include the unrecoverable administrative costs from KPC staff and AEPSC staff. An estimated $6,000 was included under administration to account for unrecoverable costs, bringing the total to $23,184 in actual costs related to the program. In 2010, the total filed program costs were $22,019, of which $17,019 were incentives. To account for unrecoverable admin costs and the costs from the 2010 evaluation of 2009 activity, another $10,562 and $4,179 were added to account for admin and evaluation costs respectively. As a whole, costs for this program are very low. Since the general rule for determining the cost of an evaluation is to use 5-10% of the total program cost, the ability to provide a robust analysis will be limited.

DSMore, an industry standard energy efficiency analysis software package, was utilized to perform the cost-benefit analysis tests from the California Standard Practice Manual. While costs as reported contain only the costs recoverable under the KPC DSM rider, the cost-benefit analysis attempted to account for all costs related to program implementation and evaluation. Therefore an estimate of the value of KPC and AEP Service Corporation (AEPSC) staff time utilized to implement and evaluate the program was added to the reported costs. The below table shows the breakdown by category of the costs used in the analysis.

Program Costs by Year and Type

Year	Administration	Promotions	Incentives	Evaluation	Total
2009	$6,000	$5,000	$12,184	$0	$23,184
2010	$10,562	$5,000	$17,019	$4,179	$36,760
2011	$0	$0	$0	$5,000	$5,000

Goals were reported as total amounts respective to the winter peak only, however, both summer and winter peak comparisons were used in the analysis – summer to account for KPC being in the AEP generation pool that experiences summer peaking conditions, and winter to account for KPC's maximum system load that occurs in the winter.

The results for the benefit/cost tests show that the program was cost-effective from Participant, Program Administrator, and Total Resource perspectives, although each ratio underperformed compared to projections in the program filing. The expected Total Resource Cost ratio was 8.09, Participant Cost ratio was 2.39, Ratepayer Impact Measure ratio was 3.06, and Program Administrator Cost ratio was 30.28. Contributing factors for this underperformance are most likely due to changes in the calculations of energy savings during the later years of the CFL bulb life. The Energy Independence and Security Act of 2007 (EISA) sets efficiency requirements for lighting that will cause the phasing out of most incandescent bulbs. This will increase the efficiency of the baseline comparison to the CFL, which justifies a discount in the future potential savings.

2009 and 2010 Summer Peak Cost Effectiveness Analysis

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	2.00	$ 62,000	$ 123,718	$ 61,718
Total Resource Cost (TRC)	2.28	$ 69,565	$ 123,718	$ 54,153
Ratepayer Impact Measure (RIM)	0.50	$ (125,251)	$ 123,718	$ 248,969
Participant Cost (PCT)	N/A	$ 244,136	$ 244,136	$ -

2009 and 2010 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.79	$ 48,941	$ 110,659	$ 61,718
Total Resource Cost (TRC)	2.04	$ 56,507	$ 110,659	$ 54,153
Ratepayer Impact Measure (RIM)	0.44	$ (138,309)	$ 110,659	$ 248,969
Participant Cost (PCT)	N/A	$ 244,136	$ 244,136	$ -

Prospective Analysis

The goal of a prospective analysis is to determine if, based on the current evaluation, there will be any changes to the cost effectiveness of the program in future years. Any number of factors may change the cost effectiveness, including but not limited to: changes in technology, increases in efficiency, saturation of a measure in the market, reduction of market potential due to economic factors, or changes in standards, codes, and baselines.

To prospectively analyze the EEFS program, results from the current evaluation were used as the starting point for the cost-benefit analysis. Future savings values were discounted due to increasing the free ridership percent as a result of effects from the Energy Independence and Security Act of 2007. While the reduction in savings could be attributed to an increase in efficiency in the baseline technology, thus reducing the per-bulb savings, it is more likely that future participants will simply not have an opportunity to purchase incandescent bulbs, thus an increase in free ridership. Currently, CFLs are ubiquitous at most big-box retailers and home stores reducing the availability of incandescent bulbs. However, the lower annualized energy savings due to the lack of incandescent bulbs is offset by an increase in the cost of avoided energy in future years. There are also concerns about the delivery mechanism in regards to free ridership. Because the CFLs are distributed to children, and not the predominant consumer in the house (parent/guardian), there is a higher probability that the option to receive free CFLs is not even available.

Due to the closeness of the 2009 and 2010 cost benefit analysis, only the winter peak cost benefit analysis was run. The results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective.

2012-2014 Winter Peak Cost Effectiveness Analysis

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.28	$ 37,969	$ 174,606	$ 136,638
Total Resource Cost (TRC)	1.65	$ 68,732	$ 174,606	$ 105,875
Ratepayer Impact Measure (RIM)	0.47	$ (194,874)	$ 174,606	$ 369,481
Participant Cost (PCT)	N/A	$ 203,517	$ 203,517	$ -

Recommendations

The following recommendations are based solely on the expert opinions of the EE/DR Analytics team in regards to future years of the EEFS program.

1) Results of the prospective analysis show that continuation of the program into 2012-2014 is expected to be cost effective. However, due to the relative uncertainty of the DSMore model in using stochastic models, the opportunity for the program to become cost ineffective is a very real possibility. It is our recommendation that this program be reviewed by KPC staff for potential replacement in the EE Portfolio. Potential options for improved measure savings would be to substitute LEDs for CFLs, or include some weatherization measures as a kit.
2) Greater scrutiny should be applied to data collection and tracking. Every customer list should have at a minimum, the customer's utility bill account number in the same format as it is stored in the CIS, the install date of the measure (handout date), and number and wattage of the CFLs.
3) Future costs should be captured in a more organized and delineated manner. Each program should have its own accounting area (project ID), separate from other KPC business. Within each project, there should be a consistent set of cost descriptions for each program to account for utility admin, implementation admin, materials, marketing, incentives, and evaluation.
4) On-going program management should be handled by KPC staff, including tracking of customer participation and estimated ex-ante savings.
5) KPC staff labor time spent on the Program should be captured so that the true total cost of delivering the program can be known.
6) To increase teacher workshop participation, consideration should be given to providing an additional incentive to the teachers related to their time requirements for attending the workshop.
7) An additional survey of the participants should be conducted to determine the persistence of the savings over the expected CFL life.
8) Education materials should be reexamined to ensure that the bulbs are recommended to be installed in an area to gain the maximum savings.

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

I. California Public Utilities Commission. California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006.

II. State of California Governor's Office of Planning and Research. California Standard Practice Manual: Economic Analysis of Demand Side Programs and Projects. July 2002.

III. PJM Forward Market Operations. Energy Efficiency Measurement & Verification. Revision 01. March 1, 2010.

IV. Vermont Energy Investment Corporation. State of Ohio Energy Efficiency Technical Reference Manual. *Ohio TRM – Draft 8-6-2010*. Public Utilities Commission of Ohio, 2010. PDF. 6 August 2010.

V. Ohio Electric Utilities. Draft Technical Reference Manual (TRM) for Ohio Senate Bill 221 Energy Efficiency and Conservation Program and 09-512-GE-UNC. September/October 2009.

VI. Morrison, Richard. Kentucky Power Company DSM Program Template. *Kentucky Power Company Program Template for DSM Programs Revised 052010 Expand Redline*. MS Excel Workbook. 20 May 2010.

VII. AEP Load Research Analysis Evaluation Report for the Energy Education for Students Program in Kentucky Power Company Program Period: January 2009 – December 2009. August 2010.

VIII. Sonderegger, Robert C. A Baseline Model for Utility Bill Analysis Using Both Weather and Non-Weather Related Variables. June 1998.

IX. Kentucky Power DSM Collaborative Report. January 1, 2008 to December 31, 2008.

X. Kentucky Power DSM Collaborative Report. January 1, 2009 to December 31, 2009.

XI. Kentucky Power DSM Collaborative Report. January 1, 2010 to December 31, 2010.

Appendix - Impact Methods and Assumptions

Impact Methods

For the purposes of this evaluation, impacts were based on an annualized incremental savings method. An annualized incremental savings is equivalent to what a customer would save in the first year of the measure installation, assuming the measure was installed on January 1st of that year. That savings was applied for each year of the measure's life, with savings discounted after the EISA Act of 2007 which reduces the availability for savings in future years due to lack of available alternatives. A calculated energy savings is the savings that is expected over the life of the measure, from the date the customer received/installed the measure, to the completion of the measure's expected life. The calculated measure is used to determine Net Loss Savings. Both analyses speak to the efficacy of the measure in both the initial expected impact from an average installation and also the long-term savings from the specific installations.

Technology Description

A low wattage ENERGY STAR qualified compact fluorescent screw-in bulb (CFL) is purchased through a retail outlet in place of an incandescent screw-in bulb. The incremental cost of the CFL compared to the incandescent light bulb is offset via either rebate coupons or via upstream markdowns. Assumptions are based on a time of sale purchase, not as a retrofit or direct install installation. This characterization assumes that the CFL is installed in a residential location. Where the implementation strategy does not allow for the installation location to be known and absent verifiable evaluation data to support an appropriate residential versus commercial split, it is recommended to use this residential characterization for all purchases to be appropriately conservative in savings assumptions.

Algorithms

$$kWh = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times \left(H \times 365\right) \times \left(1 + IF\right)$$

$$kW = \frac{\left(W_{base} - W_{replace}\right)}{1000} \times CF \times (1 + IF)$$

Terms

Term	Description
kWh	Energy Savings.
kW	Demand Savings.
W_{base}	Wattage of bulb being removed.
$W_{replace}$	Wattage of bulb being installed.
H	Average Daily hours-of-use.
IF	Interactive Factor.
CF	Coincidence Factor.

Validation Rules

Rule
1. Customer must have a valid bill account number with the utility.
2. Customer's account must have been active prior to the measure being received until the date of the analysis (or the end of the measure's expected life).
3. Measure must have been installed during the program's implementation period (for this program, 2009-2010).

Assumptions

Assumption	Value
Program Start	January 1st, 2009
Program End	December 31st, 2010
Free Ridership	27%
Spillover	0%
Energy Losses (whole year)	8.7%
Demand Losses (at peak)	10.8%
Installation Ratio	61.1%
Measure's expected life in years	6
Average Daily Hours of Use	4.5
Days per year of Use	351
Energy Waste Heat Factor	1.07
Demand Waste Heat Factor	1.21
Summer Coincidence Factor	0.29
Winter Coincidence Factor	0.27

EISA Discounts

Percentage Adjustments for Energy Star Lighting with Base Wattage					
Watts Low	Watts High	<= 2011	2012	2013	>= 2014
0	15	100%	100%	100%	63%
16	20	100%	100%	62%	62%
21	∞	100%	63%	63%	63%

Wattage Adjustments for Energy Star Lighting without Base Wattage					
Watts Low	Watts High	<= 2011	2012	2013	>= 2014
0	15	3.25	3.25	3.25	2.05
16	20	3.25	3.25	2.00	2.00
21	∞	3.25	2.06	2.06	2.06

Appendix – Exhibits

Exhibit 1 – Cover Sheet of Workshop Manual

Change the World, Start with ENERGY STAR®

ENERGY STAR

AEP KENTUCKY POWER®

In partnership with

Kentucky NEED Project

Putting Energy into Kentucky Schools

Exhibit 2 – Teacher's Guide (page 1)

Change the World
Start with ENERGY STAR®

NEED Teacher Guide

THE NEED PROJECT
P.O. BOX 10101 • MANASSAS, VA 20108
1-800-875-5029 • www.NEED.org

Exhibit 3 – Teacher's Guide (page 2)

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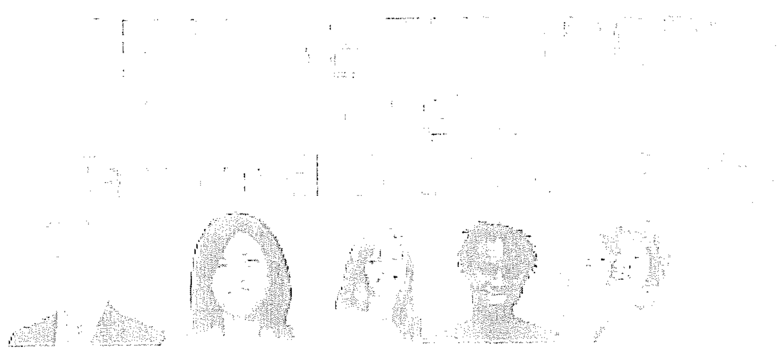

"I will do my part to save energy and help fight global warming. I Pledge to change a light and do even more."

- Replace at least one light in my home with an ENERGY STAR® qualified one.
- Make sure my home is well sealed and insulated.
- Choose ENERGY STAR® qualified equipment for my home office.
- Enable my ENERGY STAR® computer and monitor to sleep while I'm away.
- Choose ENERGY STAR® qualified products for my kitchen and laundry.

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Exhibit 4 – Data Collection Form

Dear Parent or Guardian:

Kentucky Power in partnership with the National Energy Education Development (NEED) Project will be providing energy education materials and a package of four (4) compact fluorescent bulbs (approximate cost $10) to 7th grade students within the Kentucky Power service territory. To verify that you are a Kentucky Power customer, please provide the following information on behalf of your student and have him or her return it to their classroom.

Customer (Account) Name ______________________________

Address ______________________________

City ______________________________

State Kentucky ______________ Phone numbers for program evaluation purposes only

Zip ______________ Phone ______________

Kentucky Power Electricity Bill Account Number. Example: 000-000-000-0-0

Thank you for participating in Kentucky Power's Energy Education for Students Program.

AEP KENTUCKY POWER

Dear Parent or Guardian:

Kentucky Power in partnership with the National Energy Education Development (NEED) Project will be providing energy education materials and a package of four (4) compact fluorescent bulbs (approximate cost $10) to 7th grade students within the Kentucky Power service territory. To verify that you are a Kentucky Power customer, please provide the following information on behalf of your student and have him or her return it to their classroom.

Customer (Account) Name ______________________________

Address ______________________________

City ______________________________

State Kentucky ______________ Phone numbers for program evaluation purposes only

Zip ______________ Phone ______________

Kentucky Power Electricity Bill Account Number. Example: 000-000-000-0-0

Thank you for participating in Kentucky Power's Energy Education for Students Program.

AEP KENTUCKY POWER

Appendix – Survey

Kentucky Power

CFL Distribution Program Study
Energy Education For Students
Segment Report

THOROUGHBRED™
RESEARCH GROUP

Thoroughbred Research Group
1941 Bishop Lane Suite 1017
Louisville, KY 40218
www.torinc.net

Research Methodology

Project Background

Kentucky Power implemented a program to distribute packages of compact fluorescent lights (CFLs) to residents of their service area by distributing complimentary four-packs of CFLs through local schools. In an effort to estimate the effectiveness of the program and to better understand consumer behavior related to the distribution, Kentucky Power and AEP contracted with Thoroughbred Research Group to conduct a survey among residential customers who received one or more of the four-pack CFLs for use in their homes.

Specific objectives of the research included:

- Document the extent to which the 4-pack CFLs are currently in use in homes
- Determine the types of bulbs the CFLs replaced and the wattage of bulbs replaced (if replacing incandescent bulbs)
- Measure the amount of time the CFLs are in use
- Identify where in the home the CFLs have been installed
- Determine general levels of satisfaction with the CFL distribution program

Research Methodology

This study consisted of a telephone survey of 121 Kentucky Power customers who had received one or more of the CFL packs through the school outreach program. Kentucky Power supplied Thoroughbred Research with a list of participating customer names and telephone numbers.

Interviews were gathered between May 17 and May 22, 2010. The questionnaire for this study was developed by the staff of AEP and Kentucky Power. Surveys averaged approximately seven minutes to complete.

Representing a population of 507 unique customer households, this sample of 121 interviews produces results accurate to within no more than plus or minus 6.5 percentage points at 90% confidence.

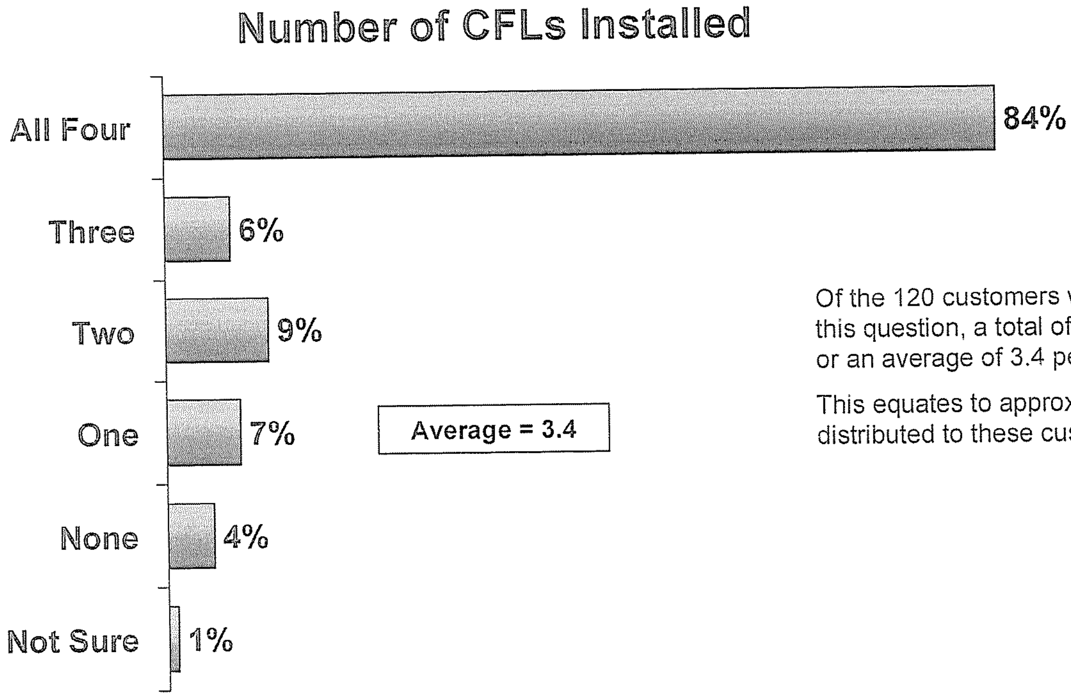
Key Findings

1. Among the 121 respondents in this study, we asked each respondent to detail the experience with the most recent 4-pack of CFLs they received from Kentucky Power (in the event they received more than one package). With descriptions on a total of 484 CFLs (121 x 4), we found that:
   - 331 of the CFLs are currently still in use in the home (68%)
   - 76 were installed but are no longer in use (16%)
   - 77 were never installed (16%)

2. Nearly eight out of ten participants reported having used the CFLs to replace one or more incandescent bulbs. About 71% of the total CFLs distributed replaced an incandescent bulb, with an average wattage of 65 watts.
3. On average, the CFLs distributed through this program that are still in use are operating 4.6 hours per day.
4. Two-thirds of the CFLs still in use are placed in three areas of the home – a bedroom (27%), the kitchen (25%) and the living room (23%).
5. About four in ten program participants said they had already installed CFLs in their home prior to receiving this pack from Kentucky Power. These customers reported having had an average of 6.9 prior CFLs per household.
6. About one in four (27%) said they did not have any CFLs prior to receiving them from Kentucky Power, but had planned to do so; and 24% said they did not have any prior, but had since purchased additional CFLs.
7. Satisfaction with the CFL bulbs received is very high among program participants -- 95% expressed satisfaction with the bulbs they received.
8. Recall of the educational materials included with the package of CFLs was only 46%. Those who recall the materials, however, were generally satisfied (92%).

Number of CFLs Installed

Nearly three out of four customers reported having installed all of the CFLs they received from Kentucky Power. Only 4% reported they had not yet installed any of the CFLs.



Base: All Respondents (n=121)

Of the 120 customers who provided an answer to this question, a total of 407 CFLs were installed, or an average of 3.4 per customer.

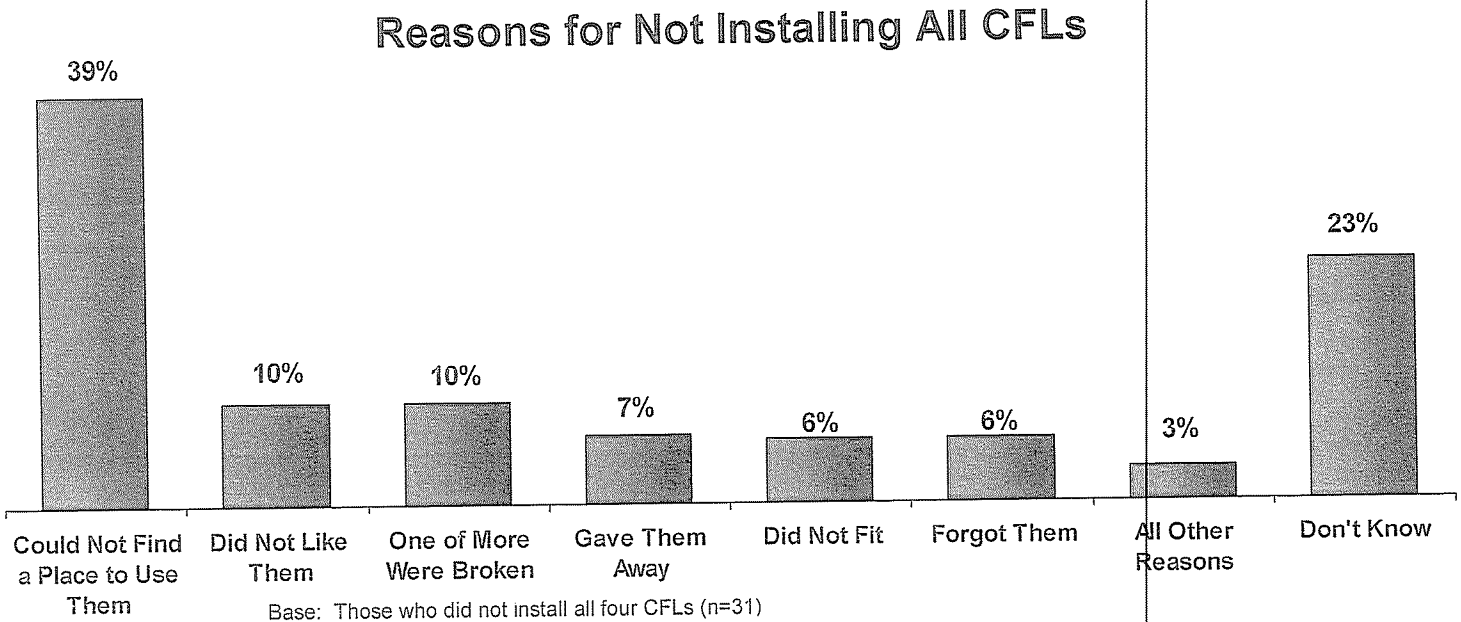
This equates to approximately 84% of the CFLs distributed to these customers.

Reasons for Not Installing All CFLs

The 31 respondents (about 26% of the total sample) who did not install all four of the CFLs they received were asked why they had not used all four bulbs.

The dominant reason was not being able to find a place in the home to use all of the bulbs (mentioned by 39%). Another 10% of this group said they did not like the CFLs, and 10% also reported that one or more of the CFLs they received were broken.

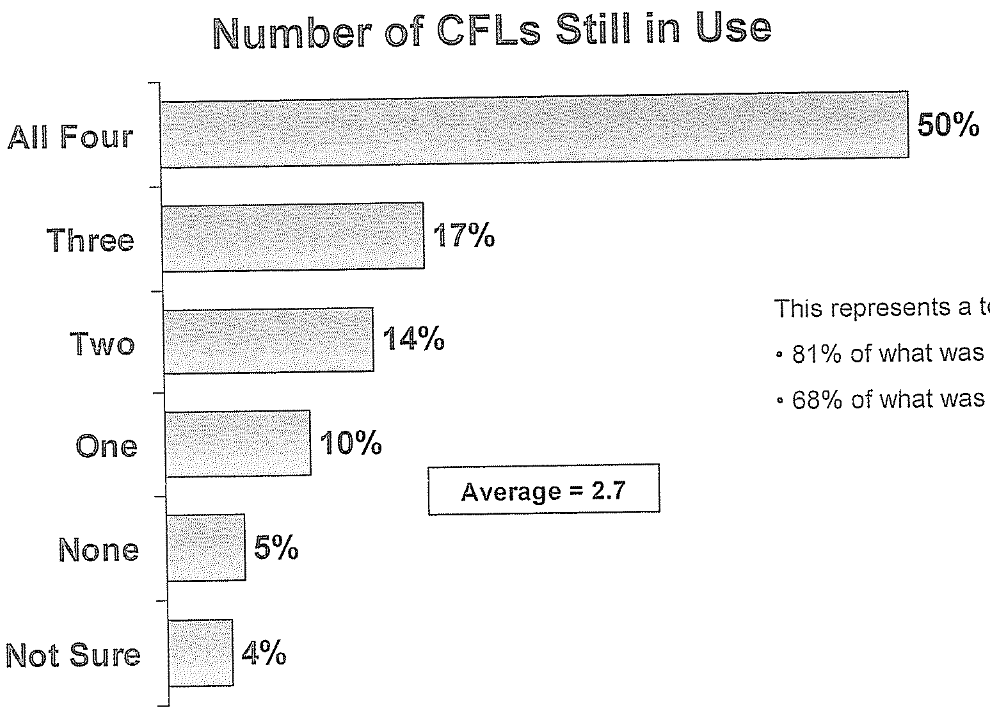
Almost on in four (23%) said they do not know why they have not installed all of the CFLs they received.



Base: Those who did not install all four CFLs (n=31)

Number of CFLs Still in Use

Among those who originally installed at least one of the CFLS they received, half (50%) say all four CFLs are still in use in their homes. Only 5% reported none of the bulbs they had originally installed are still in use.



Base: Those who installed one or more CFLs (n=115)

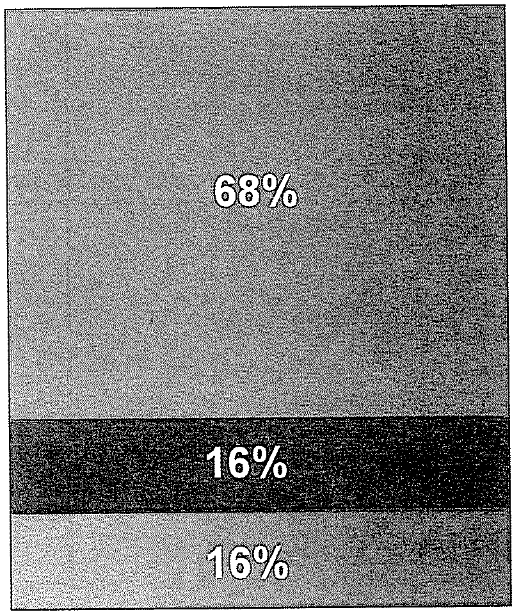
This represents a total of 331 CFLs still being in use, or

- 81% of what was originally installed, and
- 68% of what was originally distributed

Net Distribution, Installation and Use

484 CFL Bulbs Distributed

The results of this survey indicate that 68% of the CFLs Kentucky Power distributed through its school outreach program are currently being used in customers' homes.



Still in Use = 331

Installed, No Longer in Use/Not Sure if In Use = 76

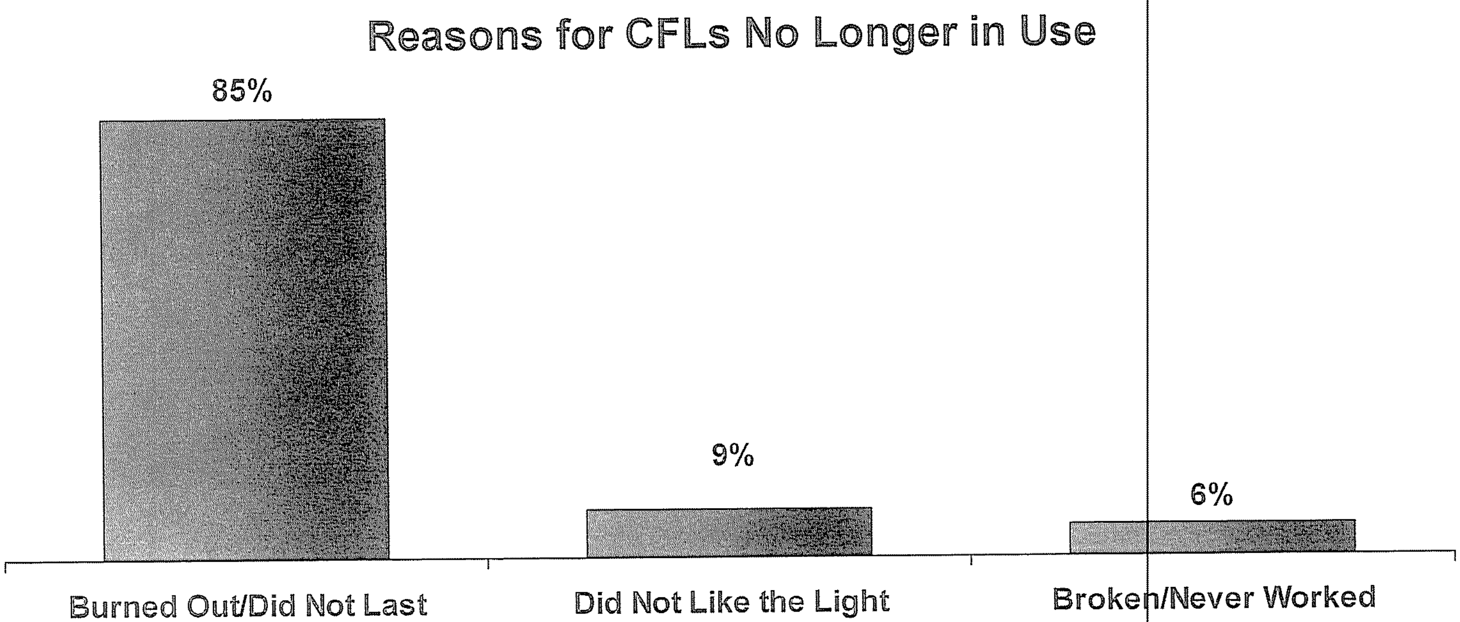
Never Installed/Not Sure if Installed = 77

Base: All respondents (n=121)

Reasons for CFLs No Longer in Use

The 33 respondents who reported that one or more of the CFLs they originally installed are no longer in use in their home, the primary reason is that the bulbs had burned out and no longer work (mentioned by 85% of this group).

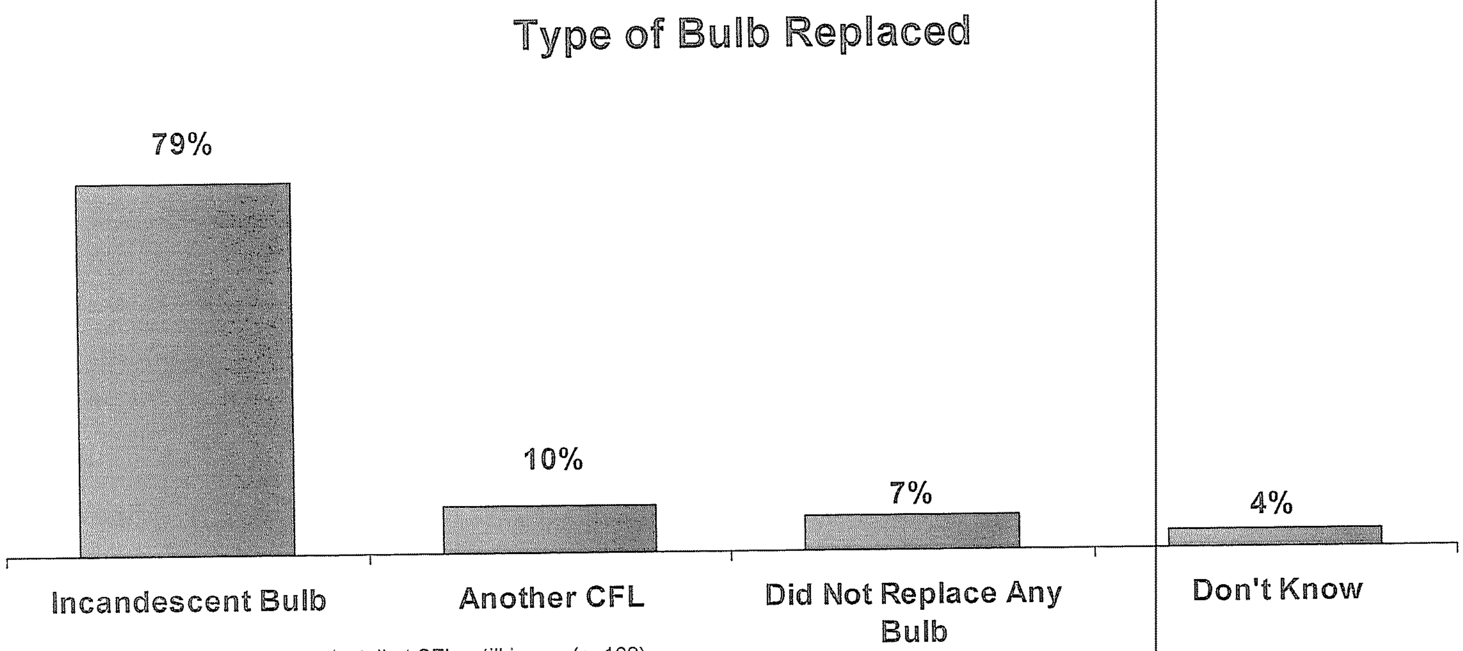
Another 9% said they did not like the light the CFL produces, and 6% reported the bulbs were broken or never worked at all.



Base: Those who installed one or more CFLs no longer in use (n=33)

Type of Bulb Replaced

Nearly eight out of ten reported they used the CFLs they received from Kentucky Power to replace an incandescent light bulb in their home. Ten percent replaced another CFL in the home, and 7% said the bulbs they received did not replace any previous bulbs in the home.



Base: Those with one or more installed CFLs still in use (n=109)

Wattage of Incandescent Bulbs Replaced

Those who used the CFLs they received from Kentucky Power to replace one or more incandescent bulbs in their homes (86 of the 121 survey participants) were asked to detail the wattage of each bulb replaced. In total, these respondents gave responses for 262 light bulbs.

Excluding "don't know" responses, 51% of the CFLs replaced a 60-watt incandescent bulb, 30% replaced a 75-watt bulb and 9% replaced a 40-watt bulb.

Wattage of Incandescent Bulbs Replaced

	Number	Percent of All Responses	Percent of Known Wattage
15 Watt	4	2%	2%
40 Watt	23	9%	9%
60 Watt	125	48%	51%
70 Watt	1	< 0.5%	<0.5%
75 Watt	73	28%	30%
80 Watt	2	1%	1%
100 Watt	17	6%	7%
Don't Know	17	6%	
Total	262	100%	100%

Base: Those who replaced one or more incandescent bulbs with a CFL (n=86)

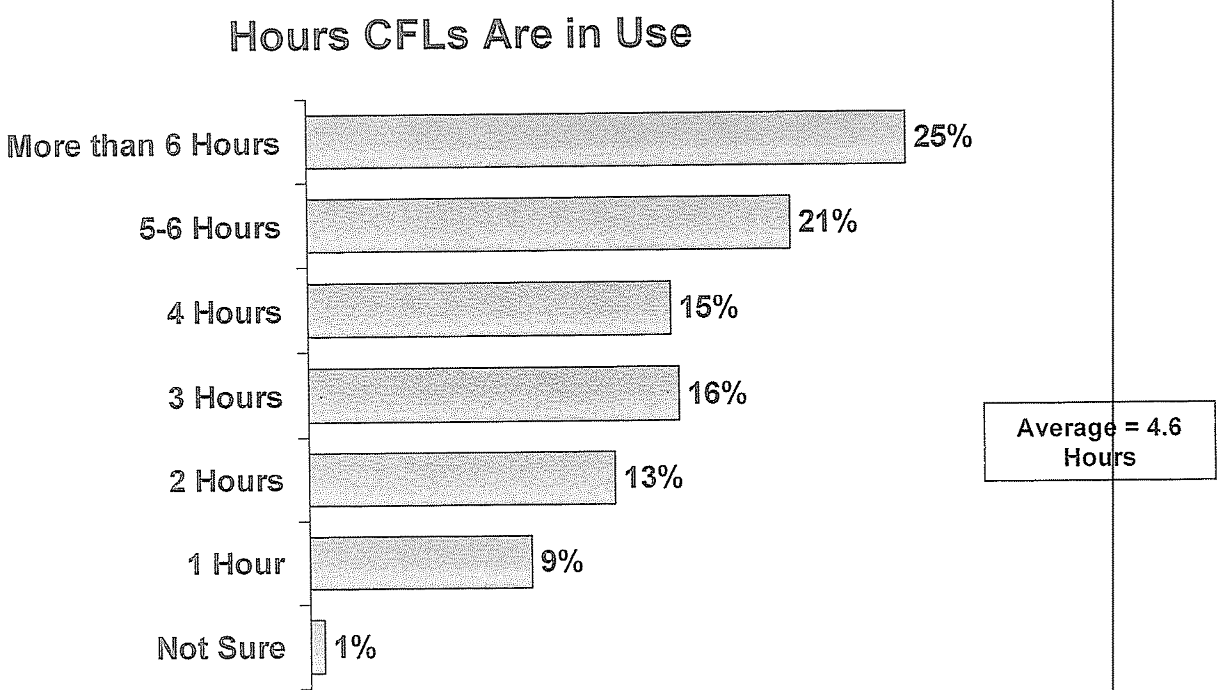
In total, these 262 CFLs replaced a 65-watt incandescent bulb on average.

The 262 bulbs detailed in the table at the left represent 54% of the total CFLs distributed, and 79% of the total CFLs still in use.

Hours in Use

Respondents with one or more of the CFLs still in use in their home were also asked to how long each bulb is typically used each day in the home.

When aggregating the responses for all 331 CFLs described in this survey, the average daily use was 4.6 hours per CFL still in use.

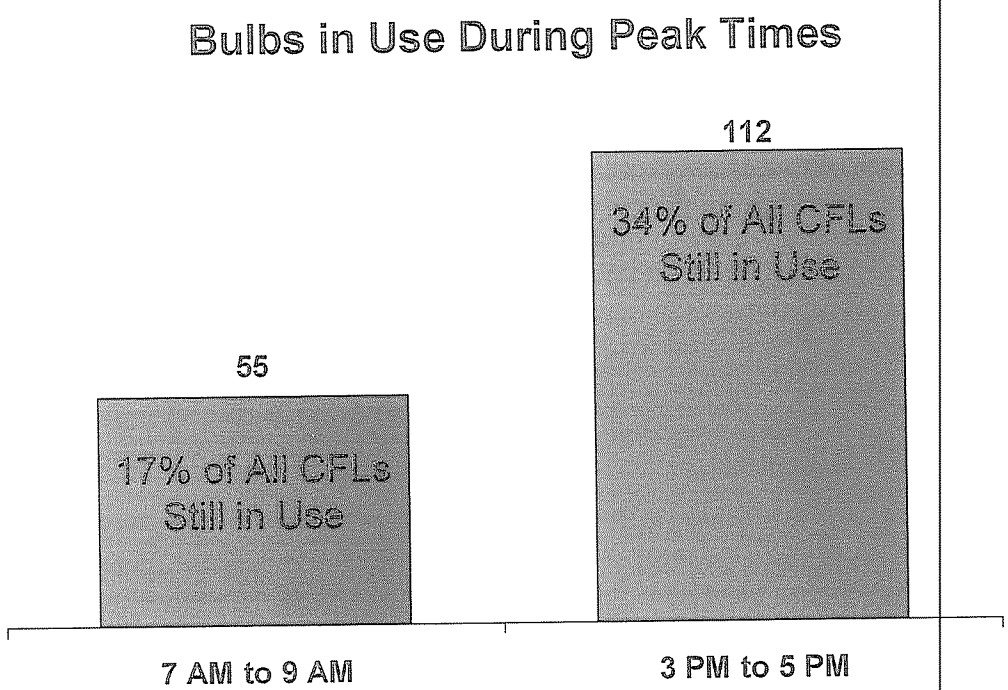


Base: Those with one or more CFLs still in use (n=109)

Peak Hour Use

Of the 331 CFLs described in this study, 55 bulbs (or 17%) were reported to be in use during the morning peak period of 7:00 AM through 9:00 AM

Respondents reported 112 bulbs (or 34%) in use for the afternoon peak time period of 3:00 PM through 5:00 PM.



Base: Those with one or more CFLs still in use (n=109)

Placement of CFLs in Home

Of the 331 CFLs still in use, about two-quarters are used in three areas of the home – a bedroom (27%), the kitchen (25%) and the living room (23%).

Where in Home CFLs are Used

	Number	Percent of All Responses	Percent of Known Placements
Bedroom	90	27%	27%
Kitchen	82	25%	25%
Living Room	76	23%	23%
Bathroom	29	9%	9%
Family/TV Room	14	4%	4%
Entry Hall	14	4%	4%
Outside	9	3%	3%
Dining Room	6	2%	2%
Garage/Basement	5	3%	3%
Laundry Room	4	1%	1%
Home Office	1	<0.5%	<0.5%
Don' Know/No Answer	1	<0.5%	
Total	331	100%	100%

75%

Base: Those with one or more CFLs still in use (n=109)

Experience with Other CFLs in the Home

Fewer than half (41%) reported having had CFLs installed in their home prior to receiving the four-pack from Kentucky Power. Of this group, the average number of previously installed CFLs in the home was 6.9 bulbs.

Other CFLs in the Home

Other CFLs in Home Prior to Receiving 4-Pack from Kentucky Power	41%
Average Number of Previously Installed CFLs	6.9
No CFLs Prior to Receiving 4-Pack from Kentucky Power	59%
• But were planning on getting CFLs	27%
• Have purchased additional CFLS since	24%

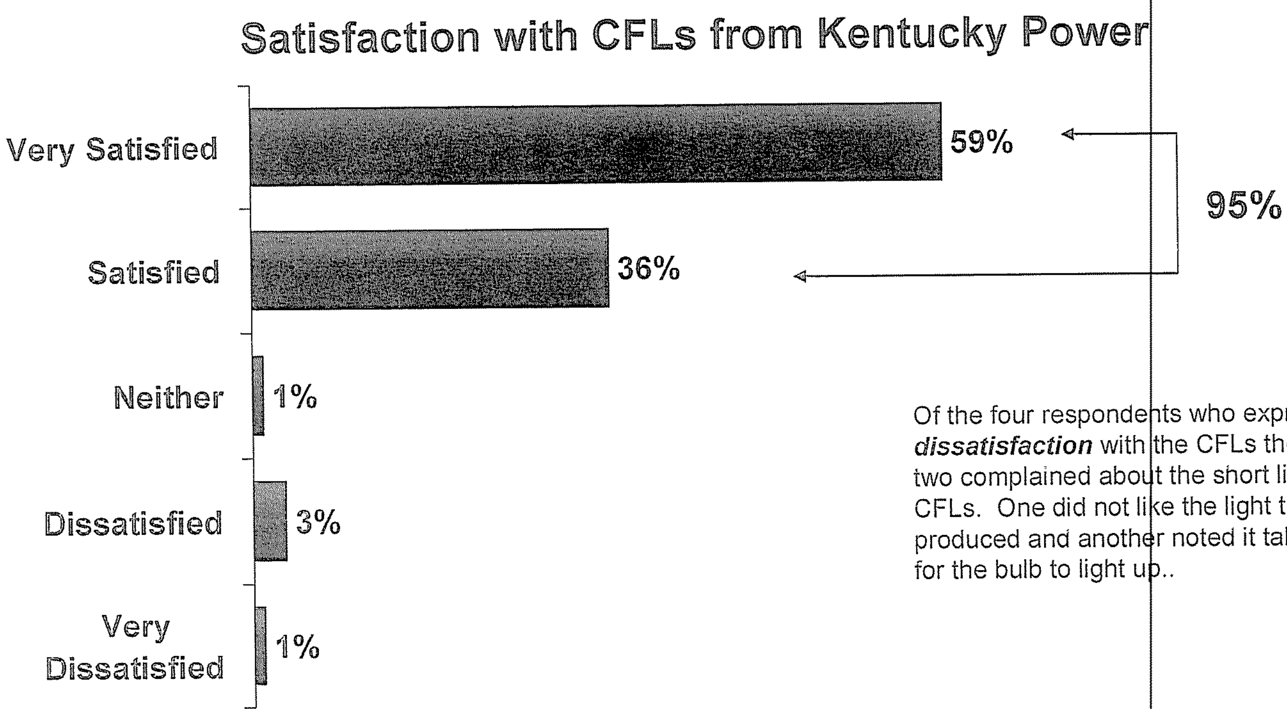
Base: Those with one or more CFLs still in use (n=109)

The remaining 59% reported they did not have any CFLs in their home prior to receiving some from Kentucky Power.

A total of 27% said they were planning on buying some, and 24% said they have since bought additional CFLs for their home.

Satisfaction with CFLs Received

Satisfaction with the CFL distribution program among participants is very high. Ninety-five percent expressed being satisfied with the CFLs they received from Kentucky Power, with 59% indicating they are "very satisfied".



Base: Those with one or more CFLs still in use (n=109)

Of the four respondents who expressed ***dissatisfaction*** with the CFLs they received, two complained about the short life of the CFLs. One did not like the light the CFL produced and another noted it takes too long for the bulb to light up..

Verbatim Comments:

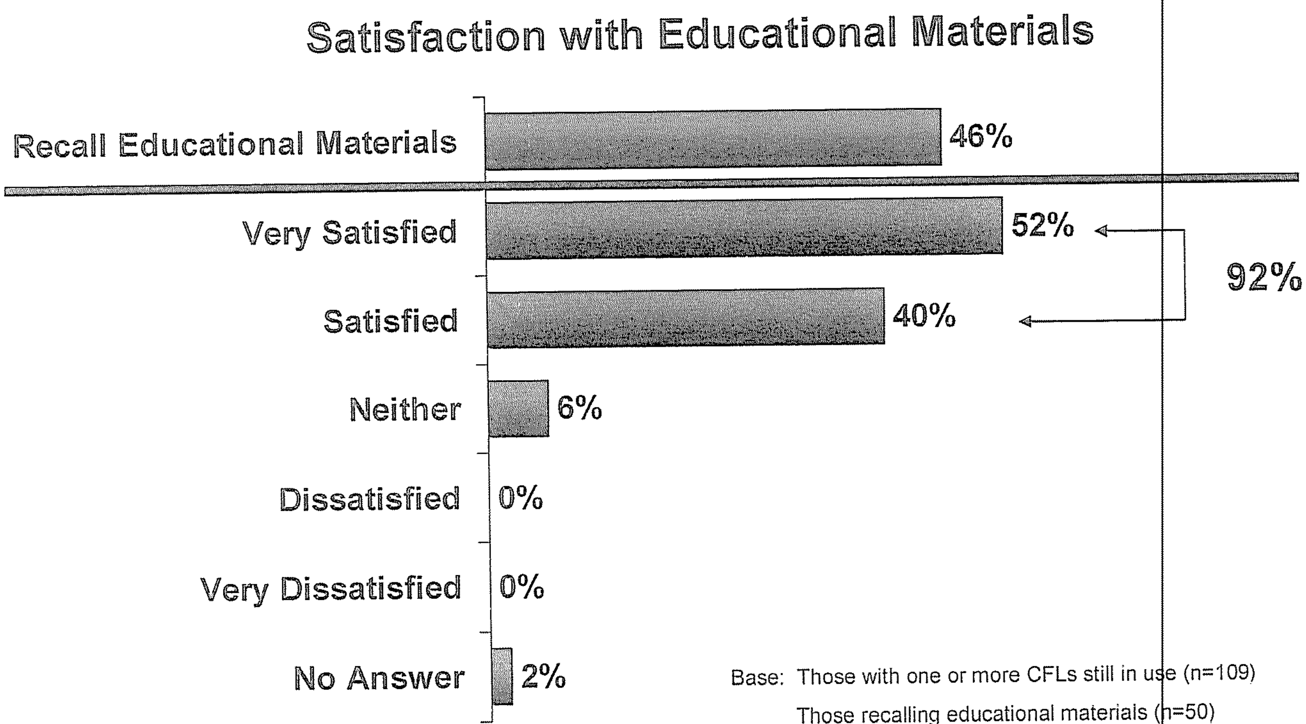
"Why were you dissatisfied with the CLFs you received from Kentucky Power?"

- "I don't like the light that they put out. They don't put out that much light."
- "The light takes too long to light up. That's it."
- "They didn't last long enough and did not put out enough light. That's it."
- "They say they have a life span of five years and they only lasted five or six months. That's all."

Overall Satisfaction with Educational Materials

Fewer than half of those surveys recalled educational materials that were included with the package of CFLs received from their child's school.

Among those who recall the materials, however, 92% expressed satisfaction. The remaining 8% were neutral.



Appendix – Teacher Questionnaire

Questionnaire Sample

Good Morning All,

The Kentucky Power Company (KPC) is in the process of evaluating our 2009 Energy Education for Students Program. KPC is currently designing a survey that will be sent to a random sample of participants. KPC is also very interested in obtaining feedback from participating teachers on how effective the NEED workshop was and the materials contained in the manual. Your answers to the brief survey listed below will help KPC improve the delivery of the program and possibly promote other energy conservation measures through school systems within our service territory.

Thank you in advance for completing the brief questionnaire.

Sincerely,

Don Music
Kentucky Power Company

Phone: (606) 929 1540
Fax: (606) 929 1441
Cell: (606) 922 9954

Survey Questions: Please mark (x) one answer only for each question and return your completed questionnaire in this e-mail to Don Music of KPC.)

1) If you attended the NEED Project workshop in 2009, do you feel this workshop was a valuable educational tool to promote energy conservation measures to teachers, such as the ENERGY STAR® compact fluorescent lights (CFLs)?

__100%__Yes

___ 0%__ No

____0%__ I did not attend

2) Do you feel the materials provided in the NEED workshop manual were informational as a teaching tool to educate your students on energy conservation?

___**100%**_Yes

_____**0%**_ No

_____**0%**_ Not sure

3) How receptive were your students in understanding the benefits of installing energy conservation measures in their home, such as CFLs?

___**40%**_ very receptive

___**60%**_ somewhat receptive

____**0%**_ not receptive

4) Did you provide any materials from the NEED workshop manual to your students to take home with them?

__**100%**__Yes

________ No

Please provide any other comments that you may have that would be helpful to KPC in promoting the Energy Education For Students Program in the future.

No Comments Provided ____

Questionnaire Results

Ten out of a total of fifteen teachers responded to the questionnaire.

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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AEP®

Evaluation Report

Kentucky Power Company

Energy Efficiency Portfolio

Evaluation Report for 2009-2010

July 2011

Prepared For:

Kentucky Power Company

Prepared By:

EE/DR Analytics Team
American Electric Power Service Corporation
1 Riverside Plaza, 13th Floor
Columbus, OH 43215

Table of Contents

Executive Summary

Kentucky Power Company (KPC) manages a suite of energy efficiency programs to provide customers with assistance in reducing electric bills and to meet corporate energy efficiency goals. The programs were developed with the assistance of the Kentucky Power Company Demand-Side Management Collaborative (Collaborative) and were approved by the Public Service Commission (PSC) to help meet Kentucky Power's goals. This report provides the cost-benefit evaluation results for the 2009 and 2010 program years. Subsequent sections provide program results and the verbatim description of each of the cost-benefit tests used for the KPC program evaluations as described in the California Standard Practice Manual. The KPC portfolio was cost effective for the 2009 and 2010 program years.

2009 and 2010 Summer Peak Cost Effectiveness Analysis – Program Portfolio

Summer Peak	Ratio	NPV	PV Benefits	PV Costs
~~Program Administrator Cost (PACT)~~	~~1.47~~	~~$1,172,433~~	~~$3,681,163~~	~~$2,508,731~~
Total Resource Cost (TRC)	1.56	$1,318,387	$3,681,163	$2,362,776
Ratepayer Impact Measure (RIM)	0.47	-$4,112,043	$3,681,163	$7,793,207
Participant Cost (PCT)	6.18	$5,916,499	$7,058,091	$1,141,593
TRC with WAP	1.17	$539,181	$3,681,163	$3,141,983
PCT with WAP	6.84	$6,662,339	$7,803,931	$1,141,593

2009 and 2010 Winter Peak Cost Effectiveness Analysis – Program Portfolio

Winter Peak	Ratio	NPV	PV Benefits	PV Costs
Program Administrator Cost (PACT)	1.80	$2,008,459	$4,517,191	$2,508,731
Total Resource Cost (TRC)	1.91	$2,154,414	$4,517,191	$2,362,776
Ratepayer Impact Measure (RIM)	0.58	-$3,276,017	$4,517,191	$7,793,207
Participant Cost (PCT)	6.18	$5,916,499	$7,058,091	$1,141,593
TRC with WAP	1.44	$1,375,208	$4,517,191	$3,141,983
PCT with WAP	6.84	$6,662,339	$7,803,931	$1,141,593

2009 and 2010 Per Participant and Total Savings by Program and Sub Group

		Per Participant Savings			Total Program Savings		
Program	**Sub Group**	**kWh**	**kW Summer**	**kW Winter**	**MWh**	**kW Summer**	**kW Winter**
COCFL		248	0.052	0.049	2,119	448	417
EEFS		222	0.054	0.033	594	144	72
HEHP	Resistance	1,342	(0.140)	0.520	460	(48)	178
HEHP	Replacement	1,698	(0.020)	0.590	1,233	(15)	428
MEF		651	(0.030)	0.240	1,304	(60)	480
MHHP		2,583	0.460	0.760	1,015	181	299
MHNC		1,681	0.455	0.101	692	188	101
TEE	All-Electric	1,962	0.280	0.510	1,187	169	309
TEE	Non-All-Electric	873	0.220	0.140	120	30	19
				Total Portfolio Savings	8,724	1,037	2,303

Program Administrator Cost Test (PACT)

Definition

The Program Administrator Cost Test measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.

Benefits and Costs

The benefits for the Program Administrator Cost Test are the avoided supply costs of energy and demand, the reduction in transmission, distribution, generation, and capacity valued at marginal costs for the periods when there is a load reduction. The avoided supply costs should be calculated using net program savings, savings net of changes in energy use that would have happened in the absence of the program. For fuel substitution programs, benefits include the avoided supply costs for the energy-using equipment not chosen by the program participant only in the case of a combination utility where the utility provides both fuels.

The costs for the Program Administrator Cost Test are the program costs incurred by the administrator, the incentives paid to the customers, and the increased supply costs for the periods in which load is increased. Administrator program costs include initial and annual costs, such as the cost of utility equipment, operation and maintenance, installation, program administration, and customer dropout and removal of equipment (less salvage value). For fuel substitution programs, costs include the increased supply costs for the energy-using equipment chosen by the program participant only in the case of a combination utility, as above.

In this test, revenue shifts are viewed as a transfer payment between participants and all ratepayers. Though a shift in revenue affects rates, it does not affect revenue requirements, which are defined as the difference between the net marginal energy and capacity costs avoided and program costs. Thus, if NPVpa > 0 and NPVRIM < 0, the administrator's overall total costs will decrease, although rates may increase because the sales base over which revenue requirements are spread has decreased.

AEP Generation Pool (Summer) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the PACT test at Summer Peak. For this test, Weatherization Assistance Program (WAP) dollars do not apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL	3.51	$259,299	$362,492	$103,194
EEFS	2.00	$62,000	$123,718	$61,718
HEHP	1.31	$165,856	$702,324	$536,468
MEF	0.62	-$274,063	$450,187	$724,250
MHHP	3.28	$470,444	$676,565	$206,121
MHNC	1.92	$225,232	$470,462	$245,230
TEE w/ WAP				
TEE w/o WAP	1.42	$263,665	$895,415	$631,750
Portfolio	1.47	$1,172,433	$3,681,164	$2,508,731

Kentucky Power (Winter) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the PACT test at Winter Peak. For this test, Weatherization Assistance Program (WAP) dollars do not apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL	3.47	$254,528	$357,722	$103,194
EEFS	1.79	$48,941	$110,659	$61,718
HEHP	2.27	$679,564	$1,216,032	$536,468
MEF	0.90	-$74,873	$649,377	$724,250
MHHP	3.72	$560,865	$766,986	$206,121
MHNC	1.67	$165,093	$410,323	$245,230
TEE w/ WAP				
TEE w/o WAP	1.59	$374,341	$1,006,092	$631,750
Portfolio	1.80	$2,008,460	$4,517,191	$2,508,731

Total Resource Cost Test (TRC)

Definition

The Total Resource Cost Test measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.

The test is applicable to conservation, load management, and fuel substitution programs. For fuel substitution programs, the test measures the net effect of the impacts from the fuel not chosen versus the impacts from the fuel that is chosen as a result of the program. TRC test results for fuel substitution programs should be viewed as a measure of the economic efficiency implications of the total energy supply system (gas and electric).

A variant on the TRC test is the Societal Test. The Societal Test differs from the TRC test in that it includes the effects of externalities (e.g., environmental, national security), excludes tax credit benefits, and uses a different (societal) discount rate.

Benefits and Costs

This test represents the combination of the effects of a program on both the customers participating and those not participating in a program. In a sense, it is the summation of the benefit and cost terms in the Participant and the Ratepayer Impact Measure tests, where the revenue (bill) change and the incentive terms intuitively cancel (except for the differences in net and gross savings).

The benefits calculated in the Total Resource Cost Test are the avoided supply costs, the reduction in transmission, distribution, generation, and capacity costs valued at marginal cost for the periods when there is a load reduction. The avoided supply costs should be calculated using net program savings, savings net of changes in energy use that would have happened in the absence of the program. For fuel substitution programs, benefits include the avoided device costs and avoided supply costs for the energy, using equipment not chosen by the program participant.

The costs in this test are the program costs paid by the utility and the participants plus the increase in supply costs for the periods in which load is increased. Thus all equipment costs, installation, operation and maintenance, cost of removal (less salvage value), and administration costs, no matter who pays for them, are included in this test. Any tax credits are considered a reduction to costs in this test. For fuel substitution programs, the costs also include the increase in supply costs for the utility providing the fuel that is chosen as a result of the program.

AEP Generation Pool (Summer) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the TRC test at Summer Peak. For this test, Weatherization Assistance Program (WAP) dollars apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL	4.23	$276,697	$362,492	$85,795
EEFS	2.28	$69,565	$123,718	$54,153
HEHP	1.01	$4,779	$702,324	$697,545
MEF	0.80	-$114,192	$450,187	$564,379
MHHP	4.61	$529,875	$676,565	$146,690
~~MHNC~~	~~2.58~~	~~$287,998~~	~~$470,462~~	~~$182,464~~
TEE w/ WAP	0.63	-$515,541	$895,415	$1,410,957
TEE w/o WAP	1.42	$263,665	$895,415	$631,750
Portfolio w/ WAP	1.17	$539,181	$3,681,163	$3,141,983
Portfolio w/o WAP	1.56	$1,318,387	$3,681,163	$2,362,776

Kentucky Power (Winter) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the TRC test at Winter Peak. For this test, Weatherization Assistance Program (WAP) dollars apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL	4.17	$271,926	$357,722	$85,795
EEFS	2.04	$56,507	$110,659	$54,153
HEHP	1.74	$518,487	$1,216,032	$697,545
MEF	1.15	$84,998	$649,377	$564,379
MHHP	5.23	$620,296	$766,986	$146,690
MHNC	2.25	$227,859	$410,323	$182,464
TEE w/ WAP	0.71	-$404,865	$1,006,092	$1,410,957
TEE w/o WAP	1.59	$374,341	$1,006,092	$631,750
Portfolio w/ WAP	1.44	$1,375,208	$4,517,191	$3,141,983
Portfolio w/o WAP	1.91	$2,154,414	$4,517,191	$2,362,776

Ratepayer Impact Measure Test (RIM)

Definition

The Ratepayer Impact Measure (RIM) test measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program. Rates will go down if the change in revenues from the program is greater than the change in utility costs. Conversely, rates or bills will go up if revenues collected after program implementations are less than the total costs incurred by the utility in implementing the program. This test indicates the direction and magnitude of the expected change in customer bills or rate levels.

Benefits and Costs

The benefits calculated in the RIM test are the savings from avoided supply costs. These avoided costs include the reduction in transmission, distribution, generation, and capacity costs for periods when load has been reduced and the increase in revenues for any periods in which load has been increased. The avoided supply costs are a reduction in total costs or revenue requirements and are included for both fuels for a fuel substitution program. The increases in revenues are also included for both fuels for fuel substitution programs. Both the reductions in supply costs and the revenue increases should be calculated using net energy savings.

The costs for this test are the program costs incurred by the utility, and/or other entities incurring costs and creating or administering the program, the incentives paid to the participant, decreased revenues for any periods in which load has been decreased and increased supply costs for any periods when load has been increased. The utility program costs include initial and annual costs, such as the cost of equipment, operation and maintenance, installation, program administration, and customer dropout and removal of equipment (less salvage value). The decreases in revenues and the increases in the supply costs should be calculated for both fuels for fuel substitution programs using net savings.

AEP Generation Pool (Summer) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the RIM test at Summer Peak. For this test, Weatherization Assistance Program (WAP) dollars do not apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL	0.53	-$319,814	$362,492	$682,306
EEFS	0.50	-$125,251	$123,718	$248,969
HEHP	0.37	-$1,176,820	$702,324	$1,879,144
MEF	0.32	-$970,509	$450,187	$1,420,696
MHHP	0.65	-$361,547	$676,565	$1,038,112
MHNC	0.61	-$304,310	$470,462	$774,772
TEE w/ WAP				
TEE w/o WAP	0.51	-$853,792	$895,415	$1,749,208
Portfolio	0.47	-$4,112,043	$3,681,163	$7,793,207

Kentucky Power (Winter) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the RIM test at Winter Peak. For this test, Weatherization Assistance Program (WAP) dollars do not apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL	0.52	-$324,585	$357,722	$682,306
EEFS	0.44	-$138,309	$110,659	$248,969
HEHP	0.65	-$663,113	$1,216,032	$1,879,144
MEF	0.46	-$771,319	$649,377	$1,420,696
MHHP	0.74	-$271,126	$766,986	$1,038,112
MHNC	0.53	-$364,449	$410,323	$774,772
TEE w/ WAP				
TEE w/o WAP	0.58	-$743,116	$1,006,092	$1,749,208
Portfolio	0.58	-$3,276,017	$4,517,191	$7,793,207

Participant Cost Test (PCT)

Definition

The Participants Test is the measure of the quantifiable benefits and costs to the customer due to participation in a program. Since many customers do not base their decision to participate in a program entirely on quantifiable variables, this test cannot be a complete measure of the benefits and costs of a program to a customer.

Benefits and Costs

The benefits of participation in a demand-side program include the reduction in the customer's utility bill(s), any incentive paid by the utility or other third parties, and any federal, state, or local tax credit received. The reductions to the utility bill(s) should be calculated using the actual retail rates that would have been charged for the energy service provided (electric demand or energy or gas). Savings estimates should be based on gross savings, as opposed to net energy savings.

In the case of fuel substitution programs, benefits to the participant also include the avoided capital and operating costs of the equipment/appliance not chosen. For load building programs, participant benefits include an increase in productivity and/or service, which is presumably equal to or greater than the productivity/ service without participating. The inclusion of these benefits is not required for this test, but if they are included then the societal test should also be performed.

The costs to a customer of program participation are all out-of-pocket expenses incurred as a result of participating in a program, plus any increases in the customer's utility bill(s). The out-of-pocket expenses include the cost of any equipment or materials purchased, including sales tax and installation; any ongoing operation and maintenance costs; any removal costs (less salvage value); and the value of the customer's time in arranging for the installation of the measure, if significant.

AEP Generation Pool (Summer) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the PCT test at Summer Peak. For this test, Weatherization Assistance Program (WAP) dollars apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL		$734,082	$734,082	$0
EEFS		$244,136	$244,136	$0
HEHP	2.21	$962,272	$1,759,397	$797,126
MEF		$1,274,458	$1,274,458	$0
MHHP	8.00	$1,042,743	$1,191,775	$149,032
MHNC	3.66	$519,667	$715,102	$195,435
TEE w/ WAP		$1,884,981	$1,884,981	$0
TEE w/o WAP		$1,139,141	$1,139,141	$0
Portfolio w/ WAP	6.84	$6,662,339	$7,803,931	$1,141,593
Portfolio w/o WAP	6.18	$5,916,499	$7,058,091	$1,141,593

Kentucky Power (Winter) Results

The following table displays the results of the cost-benefit analysis for each program in the KPC portfolio with respect to the PCT test at Winter Peak. For this test, Weatherization Assistance Program (WAP) dollars apply.

Program	Ratio	NPV	PV Benefits	PV Costs
COCFL		$734,082	$734,082	$0
EEFS		$244,136	$244,136	$0
HEHP	2.21	$962,272	$1,759,397	$797,126
MEF		$1,274,458	$1,274,458	$0
MHHP	8.00	$1,042,743	$1,191,775	$149,032
MHNC	3.66	$519,667	$715,102	$195,435
TEE w/ WAP		$1,884,981	$1,884,981	$0
TEE w/o WAP		$1,139,141	$1,139,141	$0
Portfolio w/ WAP	6.84	$6,662,339	$7,803,931	$1,141,593
Portfolio w/o WAP	6.18	$5,916,499	$7,058,092	$1,141,593

References

The references listed below were used to help prepare the information contained within this plan. All are available upon request in electronic form.

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VIII. Claggett, Wade M. Kentucky Power Company Energy Education for Students Program Evaluation 2009-2010. July, 2011.

IX. Claggett, Wade M. Kentucky Power Company High Efficiency Heat Pump Program Evaluation 2009-2010. July, 2011.

X. Claggett, Wade M. Kentucky Power Company Modified Energy Fitness Program Evaluation 2009-2010. July, 2011.

XI. Claggett, Wade M. Kentucky Power Company Mobile Home Heat Pump Program Evaluation 2009-2010. July, 2011.

XII. Claggett, Wade M. Kentucky Power Company Mobile Home New Construction Program Evaluation 2009-2010. July, 2011.

XIII. Claggett, Wade M. Kentucky Power Company Targeted Energy Efficiency Program Evaluation 2009-2010. July, 2011.

Appendix – EE/DR Analytics Team Members

The EE/DR Analytics team consists of members of various groups in the corporate office who collaborate using their Utility industry and DSM industry experiences to provide robust EM&V analyses.

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KENTUCKY POWER COMPANY — Exhibit C

DERIVATION OF 3 SECTOR SURCHARGES FOR 3 YR EXPERIMENT

	RESIDENTIAL SECTOR	TOTAL YEARS 1 thru 15	YEAR 16 (2011) 1st HALF	YEAR 16 (2011) 3rd QTR	YEAR 16 (2011) 4th QTR	TOTAL
		(1)	(2)	(3)	(4)	(5)
1	CURRENT PERIOD AMOUNT TO BE RECOVERED	$14,413,742	$1,175,415	$979,451	$985,916	$17,554,524
2	CUMULATIVE (OVER)/UNDER COLLECTION	0	427,163	(488,221)	68,790	-
3	18 MOS. RETROACTIVE(OVER)/UNDER ADJUSTMENT	(41,824)	0	0	0	(41,824)
4	TOTAL TO BE RECOVERED	14,371,918	1,602,578	491,230	1,054,706	17,512,700
5	TOTAL AMOUNT RECOVERED	13,944,409	2,090,799	0	0	16,035,208
6	EXPECTED FUTURE RECOVERIES	0	0	422,440	561,601	984,041
7	TRANSFER PORTION OF BALANCE FROM INDUSTRIAL	(9,833)	0	0	0	(9,833)
8	TRANSFER PORTION OF BALANCE FROM COMMERCIAL	9,487	0	0	0	9,487
9	(OVER)/UNDER COLLECTION TO BE REFUNDED	$427,163	($488,221)	$68,790	$493,105	$493,105
10	AMOUNT TO BE RECOVERED				$1,054,706	
11	ADJ. ESTIMATED SECTOR KWH - YEAR 16			545,788,500	636,014,500	
	SURCHARGE RANGE ($ PER KWH)					
12	FLOOR (CARRYOVER)	COL. 5, L 2 / COL. 5, L 11			0.000108	
13	MIDPOINT - proposed rate			0.000774	0.000883	
14	CEILING (TOTAL COST)	COL. 5, L 4 / COL. 5, L 11			0.001658	

	COMMERCIAL SECTOR	TOTAL YEARS 1 thru 15	YEAR 16 (2011) 1st HALF	YEAR 16 (2011) 3rd QTR	YEAR 16 (2011) 4th QTR	TOTAL
		(1)	(2)	(3)	(4)	(5)
15	CURRENT PERIOD AMOUNT TO BE RECOVERED	$2,899,453	$8,594	$448,113	$791,472	$4,147,632
16	CUMULATIVE (OVER)/UNDER COLLECTION	0	(20,360)	(80,683)	160,434	0
17	18 MOS. RETROACTIVE(OVER)/UNDER ADJUSTMENT	1,520	0	0	0	1,520
18	TOTAL TO BE RECOVERED	2,900,973	(11,766)	367,430	951,906	4,149,152
19	TOTAL AMOUNT RECOVERED	2,908,568	68,917	0	0	2,977,485
20	EXPECTED FUTURE RECOVERIES	0	0	206,996	556,333	763,329
21	TRANSFER PORTION OF BALANCE FROM INDUSTRIAL	(3,278)	0	0	0	(3,278)
22	TRANSFER BALANCE TO RESIDENTIAL	(9,487)	0	0	0	(9,487)
22	(OVER)/UNDER COLLECTION TO BE REFUNDED	($20,360)	($80,683)	$160,434	$395,573	$395,573
23	AMOUNT TO BE RECOVERED				$951,906	
24	ADJ. ESTIMATED SECTOR KWH - YEAR 16			370,960,800	361,020,800	
	SURCHARGE RANGE ($ PER KWH)					
25	FLOOR (CARRYOVER)				0.000444	
26	MIDPOINT - proposed rate			0.000558	0.001541	
27	CEILING (TOTAL COST)				0.002637	

	INDUSTRIAL SECTOR	TOTAL YEARS 1 thru 15	YEAR 16 (2011) 1st HALF	YEAR 16 (2011) 3rd QTR	YEAR 16 (2011) 4th QTR	TOTAL
		(1)	(2)	(3)	(4)	(5)
28	CURRENT PERIOD AMOUNT TO BE RECOVERED	$79,026	$0	$0	$0	$79,026
29	CUMULATIVE (OVER)/UNDER COLLECTION	0	0	0	0	0
30	18 MOS. RETROACTIVE(OVER)/UNDER ADJUSTMENT	0	0	0	0	0
31	TOTAL TO BE RECOVERED	79,026	0	0	0	79,026
32	TOTAL AMOUNT RECOVERED	92,137	0	0	0	92,137
33	EXPECTED FUTURE RECOVERIES	0	0	0	0	0
34	TRANSFER BALANCE TO RESIDENTIAL & COMMERCIAL	13,111	0	0	0	13,111
35	(OVER)/UNDER COLLECTION TO BE REFUNDED	$0	$0	$0	$0	$0
36	AMOUNT TO BE RECOVERED				$0	
37	ADJ. ESTIMATED SECTOR KWH - YEAR 16			770,250,600	834,463,000	
	SURCHARGE RANGE ($ PER KWH)					
38	FLOOR (CARRYOVER)				0.000000	
39	MIDPOINT			0.000000	0.000000	
40	CEILING (TOTAL COST) - proposed rate				0.000000	

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YR PROGRAM

YEAR 1 / PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/YR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/YR (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	552	148	$221.65	$122,351	2,690	398,120	$0.03	$12,397	$43,177		$43,177	$177,925
Targeted Energy Efficiency - All Electric	223	101	$1,026.88	$228,994	5,570	562,570	$0.03	$17,513	$0	$11,450	$11,450	$257,957
- Non-All Electric	74	35	$372.19	$27,542	680	23,800	$0.03	$744	$719		$719	$29,005
Compact Fluorescent Bulb	269	73	$56.06	$15,081	62	4,526	$0.03	$140	$425		$425	$15,646
High - Efficiency Heat Pump - Resistance Heat	539	216	$73.49	$39,611	2,275	491,400	$0.03	$15,292	$10,634		$10,634	$65,537
- Non Resistance Heat	527	206	$61.31	$32,310	813	167,478	$0.03	$5,215	$8,796		$8,796	$46,321
High - Efficiency Heat Pump - Mobile Home	356	158	$496.95	$176,914	2,160	341,280	$0.03	$10,617	$13,834		$13,834	$201,365
Mobile Home New Construction	70	22	$292.69	$20,488	0	0				$1,024	$1,024	$21,512
TOTAL RESIDENTIAL PROGRAMS	2,610	959		$663,291		1,989,174		$61,918	$77,585	$12,474	$90,059	$815,268
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	91	19	$1,258.51	$114,524	0	0			$0	$5,726	$5,726	$120,250
- Class 2	5	1	$1,875.40	$9,377	0	0			$0	$469	$469	$9,846
Smart Financing - Existing Building	1	0	$5,794.00	$5,794	22,000	0	$0.04	$0	$506		$506	$6,300
Smart Financing - New Building	0	0		$0	30,600	0	$0.04	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	97	20		$129,695		0		$0	$506	$6,195	$6,701	$136,396
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	15	1	$149.40	$2,241	0	0			$0	$112	$112	$2,353
Smart Audit - Class 2	2	1	$8,980.00	$17,960	0	0			$0	$898	$898	$18,858
Smart Financing - General	0	0		$3,919	28,200	0	$0.04	$0	$0	$196	$196	$4,115
Smart Financing - Compressed Air System	0	0		$0	164,800	0	$0.03	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	17	2		$24,120		0		$0	$0	$1,206	$1,206	$25,326
TOTAL COMPANY	2,724	981		$817,106		1,989,174		$61,918	$78,091	$19,875	$97,966	$976,990

* Lost revenue and efficiency incentives are based on initial values per the settlement agreement.

1997

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 1997

YEAR 2 (1st HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/6 MOS (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/6 MOS (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	273	651	$260.68	$71,167	1,345	875,595	$0.03	$27,266	$21,354	n/a	$21,354	$119,787
Targeted Energy Efficiency - All Electric	118	279	$818.97	$96,638	2,785	777,015	$0.03	$24,188	$0	$4,832	$4,832	$125,658
- Non-All Electric	26	88	$88.23	$2,294	340	29,920	$0.03	$935	$252	n/a	$252	$3,481
Compact Fluorescent Bulb	0	269		$0	31	8,339	$0.03	$258	$0	n/a	$0	$258
High - Efficiency Heat Pump - Resistance Heat	123	590	$2.58	$317	1,138	671,420	$0.03	$20,895	$2,427	n/a	$2,427	$23,639
- Non Resistance Heat	124	581	$2.56	$318	407	236,467	$0.03	$7,364	$2,070	n/a	$2,070	$9,752
High - Efficiency Heat Pump - Mobile Home	109	403	$157.87	$17,208	1,080	435,240	$0.03	$13,540	$4,236	n/a	$4,236	$34,984
Mobile Home New Construction	12	78	$635.17	$7,622	0	0	n/a	n/a	$0	$381	$381	$8,003
TOTAL RESIDENTIAL PROGRAMS	785	2,939		$195,564		3,033,996		$94,446	$30,339	$5,213	$35,552	$325,562
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	243	207	$264.00	$64,152	0	0	n/a	n/a	$0	$3,208	$3,208	$67,360
- Class 2	11	9	$2,705.00	$29,755	0	0	n/a	n/a	$0	$1,488	$1,488	$31,243
Smart Financing - Existing Building	0	1	n/a	$5,629	11,000	11,000	$0.04	$469	$0	$281	$281	$6,379
Smart Financing - New Building	1	0	$4,692.00	$4,692	15,300	0	$0.04	$0	$50	n/a	$50	$4,742
TOTAL COMMERCIAL PROGRAMS	255	217		$104,228		11,000		$469	$50	$4,977	$5,027	$109,724
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	9	20	$279.56	$2,516	0	0	n/a	n/a	$0	$126	$126	$2,642
Smart Audit - Class 2	1	2	$1,133.00	$1,133	0	0	n/a	n/a	$0	$57	$57	$1,190
Smart Financing - General	0	0	n/a	$7,840	14,100	0	$0.04	$0	$0	$392	$392	$8,232
Smart Financing - Compressed Air System	0	0		$0	82,400	0	$0.03	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	10	22		$11,489		0		$0	$0	$575	$575	$12,064
TOTAL COMPANY	1,050	3,178		$311,281		3,044,996		$94,915	$30,389	$10,765	$41,154	$447,350

* Lost revenue and efficiency incentives are based on initial values per the settlement agreement.

1997

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YR PROGRAM

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YEAR 2 (3rd QTR) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/QTR (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	257	957	$184.99	$47,542	341	326,337	$0.03	$10,156	$5,340	n/a	$5,340	$63,038
Targeted Energy Efficiency - All Electric	51	369	$1,090.08	$55,594	1,392	513,648	$0.03	$15,980	$0	$2,780	$2,780	$74,354
- Non-All Electric	15	108	$193.33	$2,900	170	18,360	$0.03	$574	$25	n/a	$25	$3,499
Compact Fluorescent Bulb	0	269	n/a	$0	16	4,304	$0.03	$133	$0	$0	$0	$133
High - Efficiency Heat Pump - Resistance Heat	109	717	$55.05	$6,000	547	392,199	$0.03	$12,213	$787	n/a	$787	$19,000
- Non Resistance Heat	84	695	$66.18	$5,559	221	153,595	$0.03	$4,786	$2,445	n/a	$2,445	$12,790
High - Efficiency Heat Pump - Mobile Home	77	509	$689.62	$53,101	625	318,125	$0.03	$9,894	$2,503	n/a	$2,503	$65,498
Mobile Home New Construction	0	82	n/a	$6,092	0	0			$0	$305	$305	$6,397
TOTAL RESIDENTIAL PROGRAMS	593	3,706		$176,788		1,726,568		$53,736	$11,100	$3,085	$14,185	$244,709
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	98	383	$413.13	$40,487	0	0			$0	$2,024	$2,024	$42,511
- Class 2	5	19	$2,705.00	$13,525	0	0			$0	$676	$676	$14,201
Smart Financing - Existing Building	2	2	$3,067.00	$6,134	11,100	22,200	$0.04	$940	$1,627	n/a	$1,627	$8,701
Smart Financing - New Building	0	1	n/a	$0	7,650	7,650	$0.04	$327	$0	$0	$0	$327
TOTAL COMMERCIAL PROGRAMS	105	405		$60,146		29,850		$1,267	$1,627	$2,700	$4,327	$65,740
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	3	26	$666.00	$1,998	0	0			$0	$100	$100	$2,098
Smart Audit - Class 2	0	3	n/a	$0	0	0			$0	$0	$0	$0
Smart Financing - General	0	0	n/a	$4,785	14,625	0	$0.04	$0	$0	n/a	$0	$4,785
Smart Financing - Compressed Air System	0	0		$0	41,200	0	$0.04	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	3	29		$6,783		0		$0	$0	$100	$100	$6,883
TOTAL COMPANY	701	4,140		$243,717		1,756,418		$55,003	$12,727	$5,885	$18,612	$317,332

* Lost revenue and efficiency incentives are based on prospective values.

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YR PROGRAM

YEAR 2 (4th QTR) / PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/QTR (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	432	1,287	$259.53	$112,115	341	438,867	$0.03	$13,658	$8,977	n/a	$8,977	$134,750
Targeted Energy Efficiency - All Electric	124	443	$924.15	$114,595	1,393	617,099	$0.03	$19,198	$0	$5,730	$5,730	$139,523
- Non-All Electric	78	146	$103.55	$8,077	170	24,820	$0.03	$775	$129	n/a	$129	$8,981
Compact Fluorescent Bulb	0	269	n/a	$0	17	4,573	$0.03	$141	$0	$0	$0	$141
High - Efficiency Heat Pump - Resistance Heat	111	823	$106.90	$11,866	547	450,181	$0.03	$14,019	$801	n/a	$801	$26,686
- Non Resistance Heat	102	782	$142.21	$14,505	221	172,822	$0.03	$5,385	$2,969	n/a	$2,969	$22,859
High - Efficiency Heat Pump - Mobile Home	50	565	$406.70	$20,335	625	353,125	$0.03	$10,982	$1,625	n/a	$1,625	$32,942
Mobile Home New Construction	0	82	n/a	($749)	0	0				($37)	($37)	($786)
TOTAL RESIDENTIAL PROGRAMS	897	4,397		$280,744		2,061,487		$64,158	$14,501	$5,693	$20,194	$365,096
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	71	473	$230.92	$16,395	0	0			$0	$820	$820	$17,215
- Class 2	21	33	$2,705.00	$56,805	0	0			$0	$2,840	$2,840	$59,645
Smart Financing - Existing Building	9	8	$2,282.56	$20,543	11,100	88,800	$0.04	$3,761	$7,320	n/a	$7,320	$31,624
Smart Financing - New Building	0	1	n/a	$0	7,650	7,650	$0.04	$327	$0	n/a	$0	$327
TOTAL COMMERCIAL PROGRAMS	101	515		$93,743		96,450		$4,088	$7,320	$3,660	$10,980	$108,811
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	18	37	$524.22	$9,436	0	0			$0	$472	$472	$9,908
Smart Audit - Class 2	0	3	n/a	$1,094	0	0			$0	$55	$55	$1,149
Smart Financing - General	0	0	n/a	$11,802	14,625	0	$0.04	$0	$0	n/a	$0	$11,802
Smart Financing - Compressed Air System	0	0	n/a	$0	41,200	0	$0.04	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	18	40		$22,332		0		$0	$0	$527	$527	$22,859
TOTAL COMPANY	1,016	4,952		$396,819		2,157,937		$68,246	$21,821	$9,880	$31,701	$496,766

* Lost revenue and efficiency incentives are based on prospective values.

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 3(1st HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/6 MOS (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/6 MOS (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	544	1,768	$184.44	$100,334	682	1,205,776	$0.03	$37,524	$11,304	n/a	$11,304	$149,162
Targeted Energy Efficiency - All Electric	122	565	$1,132.92	$138,216	2,784	1,572,960	$0.03	$48,935	$0	$6,911	$6,911	$194,062
- Non-All Electric	24	203	$112.92	$2,710	340	69,020	$0.03	$2,156	$40	n/a	$40	$4,906
Compact Fluorescent Bulb	0	269	$0.00	$0	32	8,608	$0.03	$266	$0	$0	$0	$266
High - Efficiency Heat Pump - Resistance Heat	21	887	$70.10	$1,472	1,094	970,378	$0.03	$30,218	$152	n/a	$152	$31,842
- Non Resistance Heat	26	848	$70.00	$1,820	442	374,816	$0.03	$11,679	$757	n/a	$757	$14,256
High - Efficiency Heat Pump - Mobile Home	66	616	$535.30	$35,330	1,250	770,000	$0.03	$23,947	$2,145	n/a	$2,145	$61,422
Mobile Home New Construction	0	82	n/a	$0	0	0	n/a		$0	$0	$0	$0
TOTAL RESIDENTIAL PROGRAMS	803	5,238		$279,882		4,971,558		$154,725	$14,398	$6,911	$21,309	$455,916
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	204	597	$194.13	$39,602	0	0	n/a		$0	$1,980	$1,980	$41,582
- Class 2	28	60	$1,600.00	$44,800	0	0	n/a		$0	$2,240	$2,240	$47,040
Smart Financing - Existing Building	8	16	$5,581.50	$44,652	22,200	355,200	$0.04	$15,043	$6,506	n/a	$6,506	$66,201
Smart Financing - New Building	1	1	$4,564.00	$4,564	15,300	15,300	$0.04	$654	$29	$0	$29	$5,247
TOTAL COMMERCIAL PROGRAMS	241	674		$133,618		370,500		$15,697	$6,535	$4,220	$10,755	$160,070
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	12	51	$246.08	$2,953	0	0	n/a		$0	$148	$148	$3,101
Smart Audit - Class 2	1	3	$1,800.00	$1,800	0	0	n/a		$0	$90	$90	$1,890
Smart Financing - General	0	0	$0.00	$1,338	29,250	0	$0.04	$0	$0	$67	$67	$1,405
Smart Financing - Compressed Air System	0	0	$0.00	$0	82,400	0	$0.04	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	13	54		$6,091		0		$0	$0	$305	$305	$6,396
TOTAL COMPANY	1,057	5,966		$419,591		5,342,058		$170,422	$20,933	$11,436	$32,369	$622,382

* Lost revenue and efficiency incentives are based on prospective values.

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KENTUCKY POWER COMPANY

ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 3(2nd HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/6 MOS (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/6 MOS (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	448	2,277	$301.30	$134,982	682	1,552,914	$0.03	$48,327	$9,309	$0	$9,309	$192,618
Targeted Energy Efficiency - All Electric	131	697	$1,187.51	$155,564	2,784	1,940,448	$0.03	$60,367	$0	$7,778	$7,778	$223,709
- Non-All Electric	42	238	$139.62	$5,864	340	80,920	$0.03	$2,528	$70	$0	$70	$8,462
Compact Fluorescent Bulb	0	269	$0.00	$0	32	8,608	$0.03	$266	$0	$0	$0	$266
High - Efficiency Heat Pump - Resistance Heat	108	940	$147.45	$15,925	1,094	1,028,360	$0.03	$32,023	$780	$0	$780	$48,728
- Non Resistance Heat	64	894	$72.27	$4,625	442	395,148	$0.03	$12,313	$1,863	$0	$1,863	$18,801
High - Efficiency Heat Pump - Mobile Home	173	764	$514.50	$89,009	1,250	955,000	$0.03	$29,701	$5,623	$0	$5,623	$124,333
Mobile Home New Construction	33	11	$549.45	$18,132	0	0	n/a		$0	$907	$907	$19,039
TOTAL RESIDENTIAL PROGRAMS	999	6,090		$424,101		5,961,398		$185,525	$17,645	$8,685	$26,330	$635,956
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	178	795	$534.85	$95,203	0	0	n/a		$0	$4,760	$4,760	$99,963
- Class 2	9	73	$2,800.00	$25,200	0	0	n/a		$0	$1,260	$1,260	$26,460
Smart Financing - Existing Building	29	32	$1,878.86	$54,487	22,200	710,400	$0.04	$30,085	$23,585	$0	$23,585	$108,157
Smart Financing - New Building	5	6	$1,529.20	$7,646	15,300	91,800	$0.04	$3,926	$144	$0	$144	$11,716
TOTAL COMMERCIAL PROGRAMS	221	906		$182,536		802,200		$34,011	$23,729	$6,020	$29,749	$246,296
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	3	59	$852.33	$2,557	0	0	n/a		$0	$128	$128	$2,685
Smart Audit - Class 2	0	4	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	1	0	$0.00	$2,430	29,250	0	$0.04	$0	$383	$0	$383	$2,813
Smart Financing - Compressed Air System	0	0	$0.00	$0	82,400	0	$0.04	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	4	63		$4,987		0		$0	$383	$128	$511	$5,498
TOTAL COMPANY	1,224	7,059		$611,624		6,763,598		$219,536	$41,757	$14,833	$56,590	$887,750

* Lost revenue and efficiency incentives are based on prospective values.

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KENTUCKY POWER COMPANY

ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 4 (1st HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/HALF (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	306	2,694	$312.58	$95,650	707	1,904,658	$0.03	$59,273	$10,370	$0	$10,370	$165,293
Targeted Energy Efficiency - All Electric	75	773	$1,907.41	$143,056	630	486,990	$0.03	$15,150	$0	$7,153	$7,153	$165,359
- Non-All Electric	12	249	$112.00	$1,344	306	76,194	$0.03	$2,380	$60	$0	$60	$3,784
Compact Fluorescent Bulb	0	269	$0.00	$0	31	8,339	$0.03	$258	$0	$0	$0	$258
High - Efficiency Heat Pump - Resistance Heat	99	1,002	$273.74	$27,100	1,200	1,202,400	$0.03	$37,443	$4,375	$0	$4,375	$68,918
- Non Resistance Heat	2	853	$50.00	$100	442	377,026	$0.03	$11,748	$0	$5	$5	$11,853
High - Efficiency Heat Pump - Mobile Home	101	826	$545.99	$55,145	1,475	1,218,350	$0.03	$37,891	$8,505	$0	$8,505	$101,541
Mobile Home New Construction ***	98	45	$587.20	$57,546	1,756	79,020	$0.03	$2,458	$4,353	$0	$4,353	$64,357
TOTAL RESIDENTIAL PROGRAMS	693	6,711		$379,941		5,352,977		$166,601	$27,663	$7,158	$34,821	$581,363
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	186	964	$204.71	$38,076	0	0	n/a		$0	$1,904	$1,904	$39,980
- Class 2	16	87	$2,705.00	$43,280	0	0	n/a		$0	$2,164	$2,164	$45,444
Smart Financing - Existing Building	6	51	$5,109.67	$30,658	13,282	677,382	$0.04	$28,687	$1,395	$0	$1,395	$60,740
Smart Financing - New Building	3	9	$0.00	$2,350	14,101	126,909	$0.04	$5,428	$787	$0	$787	$8,565
TOTAL COMMERCIAL PROGRAMS	211	1,111		$114,364		804,291		$34,115	$2,182	$4,068	$6,250	$154,729
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	60	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	4	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	1	$0.00	$0	0	0	$0.04	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.04	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	65		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	904	7,920		$494,305		6,215,216		$200,716	$29,845	$11,226	$41,071	$736,092

* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of 06/30/96.

*** Participants since 09/01/98.

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 4 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/HALF (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	2,519	$0.00	$972	707	1,780,933	$0.03	$55,423	$0	$0	$0	$56,395
Targeted Energy Efficiency - All Electric	66	700	$1,222.76	$80,702	630	441,000	$0.03	$13,720	$0	$4,035	$4,035	$98,457
- Non-All Electric	8	220	$67.50	$540	306	67,320	$0.03	$2,103	$40	$0	$40	$2,683
Compact Fluorescent Bulb	0	123	$0.00	$0	31	3,813	$0.03	$118	$0	$0	$0	$118
High - Efficiency Heat Pump - Resistance Heat	140	810	$211.14	$29,560	1,200	972,000	$0.03	$30,268	$6,187	$0	$6,187	$66,015
- Non Resistance Heat	0	593	$0.00	$0	447	265,071	$0.03	$8,260	$0	$0	$0	$8,260
High - Efficiency Heat Pump - Mobile Home	134	739	$539.07	$72,236	1,475	1,090,025	$0.03	$33,900	$11,284	$0	$11,284	$117,420
Mobile Home New Construction ***	123	196	$581.42	$71,515	1,755	343,980	$0.03	$10,698	$5,464	$0	$5,464	$87,677
TOTAL RESIDENTIAL PROGRAMS	471	5,900		$255,525		4,964,142		$154,490	$22,975	$4,035	$27,010	$437,025
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	188	1,129	$356.11	$66,948	0	0	n/a		$0	$3,347	$3,347	$70,295
- Class 2	21	103	$2,705.00	$56,805	0	0	n/a		$0	$2,840	$2,840	$59,645
Smart Financing - Existing Building	25	66	$2,726.04	$68,151	13,282	876,612	$0.04	$37,125	$5,814	$0	$5,814	$111,090
Smart Financing - New Building	8	13	$3,087.00	$24,696	14,101	183,313	$0.04	$7,840	$2,099	$0	$2,099	$34,635
TOTAL COMMERCIAL PROGRAMS	242	1,311		$216,600		1,059,925		$44,965	$7,913	$6,187	$14,100	$275,665
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	57	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	4	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	1	$0.00	$0	0	0	$0.04	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.04	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	62		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	713	7,273		$472,125		6,024,067		$199,455	$30,888	$10,222	$41,110	$712,690

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/96.
*** Participants since 09/01/98.

Year 2000

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 5 (1st half) / PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/HALF (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	2,161	$0.00	$0	707	1,527,827	$0.03	$47,546	$0	$0	$0	$47,546
Targeted Energy Efficiency - All Electric	66	659	$1,272.61	$83,992	630	415,170	$0.03	$12,916	$0	$4,200	$4,200	$101,108
- Non-All Electric	28	202	$90.82	$2,543	306	61,812	$0.03	$1,931	$141	$0	$141	$4,615
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Resistance Heat	38	683	$200.00	$7,600	1,200	819,600	$0.03	$25,522	$1,679	$0	$1,679	$34,801
- Non Resistance Heat	0	348	$0.00	$0	447	155,556	$0.03	$4,847	$0	$0	$0	$4,847
High - Efficiency Heat Pump - Mobile Home	45	683	$500.00	$22,500	1,475	1,007,425	$0.03	$31,331	$3,789	$0	$3,789	$57,620
Mobile Home New Construction ***	101	302	$530.20	$53,550	1,755	530,010	$0.03	$16,483	$4,486	$0	$4,486	$74,519
TOTAL RESIDENTIAL PROGRAMS	278	5,038		$170,185		4,517,400		$140,576	$10,095	$4,200	$14,295	$325,056
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	144	1,126	$397.19	$57,195	0	0	n/a		$0	$2,860	$2,860	$60,055
- Class 2	8	112	$2,705.00	$21,640	0	0	n/a		$0	$1,082	$1,082	$22,722
Smart Financing - Existing Building	16	86	$1,307.31	$20,917	13,282	1,142,252	$0.04	$48,374	$3,721	$0	$3,721	$73,012
Smart Financing - New Building	4	20	$6,298.75	$25,195	14,101	282,020	$0.04	$12,062	$1,049	$0	$1,049	$38,306
TOTAL COMMERCIAL PROGRAMS	172	1,344		$124,947		1,424,272		$60,436	$4,770	$3,942	$8,712	$194,095
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	450	6,382		$295,132		5,941,672		$201,012	$14,865	$8,142	$23,007	$519,151

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/97
*** Participants since 09/01/98

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 5 (2nd half) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4)	NET LOST REV/HALF (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10)	TOTAL * INCENTIVE (11)	TOTAL EST. COSTS TO BE RECOVERED (12)
				(1)X(3)		(2)X(5)		(6)X(7)		(4)X(5%)	(9)+(10)	(4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	1,525	$0.00	$0	706	1,076,650	$0.03	$33,505	$0	$0	$0	$33,505
Targeted Energy Efficiency - All Electric	99	583	$1,115.41	$110,426	630	367,290	$0.03	$11,426	$0	$5,521	$5,521	$127,373
- Non-All Electric	21	170	$94.67	$1,988	306	52,020	$0.03	$1,625	$105	$0	$105	$3,718
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Resistance Heat	25	481	$200.00	$5,000	1,200	577,200	$0.03	$17,974	$1,105	$0	$1,105	$24,079
- Non Resistance Heat	0	147	$0.00	$0	446	65,562	$0.03	$2,043	$0	$0	$0	$2,043
High - Efficiency Heat Pump - Mobile Home	43	572	$495.35	$21,300	1,476	844,272	$0.03	$26,257	$3,621	$0	$3,621	$51,178
Mobile Home New Construction ***	94	403	$575.00	$54,050	1,755	707,265	$0.03	$21,996	$4,175	$0	$4,175	$80,221
TOTAL RESIDENTIAL PROGRAMS	282	3,881		$192,764		3,690,259		$114,826	$9,006	$5,521	$14,527	$322,117
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	159	1,026	$165.24	$26,273	0	0	n/a		$0	$1,314	$1,314	$27,587
- Class 2	29	98	$2,705.00	$78,445	0	0	n/a		$0	$3,922	$3,922	$82,367
Smart Financing - Existing Building	24	97	$914.54	$21,949	13,282	1,288,354	$0.04	$54,562	$5,581	$0	$5,581	$82,092
Smart Financing - New Building	0	21	$0.00	$7,269	14,102	296,142	$0.04	$12,666	$0	$0	$0	$19,935
TOTAL COMMERCIAL PROGRAMS	212	1,242		$133,936		1,584,496		$67,228	$5,581	$5,236	$10,817	$211,981
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		0	$0	0	0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	0	$0	0	0
TOTAL COMPANY	494	5,123		$326,700		5,274,755		$182,054	$14,587	$10,757	$25,344	$534,098

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/97
*** Participants since 09/01/98.

Year 2001

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 6 (1st Half) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	1,044	$0.00	$0	707	738,108	$0.03112	$22,970	$0	$0	$0	$22,970
Targeted Energy Efficiency - All Electric	62	535	$1,276.94	$79,170	630	337,050	$0.03111	$10,486	$0	$3,959	$3,959	$93,615
- Non-All Electric	18	137	$87.89	$1,582	306	41,922	$0.03124	$1,310	$90	$0	$90	$2,982
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Resistance Heat	23	438	$201.04	$4,624	1200	525,600	$0.03114	$16,367	$1,016	$0	$1,016	$22,007
- Non Resistance Heat	0	81	$0.00	$0	447	36,207	$0.03116	$1,128	$0	$0	$0	$1,128
High - Efficiency Heat Pump - Mobile Home	53	558	$472.15	$25,024	1475	823,050	$0.03110	$25,597	$4,463	$0	$4,463	$55,084
Mobile Home New Construction ***	83	488	$537.04	$44,574	1755	856,440	$0.03110	$26,635	$3,687	$0	$3,687	$74,896
TOTAL RESIDENTIAL PROGRAMS	239	3,281		$154,974		3,358,377		$104,493	$9,256	$3,959	$13,215	$272,682
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	134	1,017	$321.82	$43,124	0	0	n/a	$0	$0	$2,156	$2,156	$45,280
- Class 2	28	105	$1,510.00	$42,280	0	0	n/a	$0	$0	$2,114	$2,114	$44,394
Smart Financing - Existing Building	15	112	$2,309.00	$34,635	13,282	1,487,584	$0.04235	$62,999	$3,488	$0	$3,488	$101,122
Smart Financing - New Building	8	25	$4,016.13	$32,129	14,101	352,525	$0.04277	$15,077	$2,099	$0	$2,099	$49,305
TOTAL COMMERCIAL PROGRAMS	185	1,259		$152,168		1,840,109		$78,076	$5,587	$4,270	$9,857	$240,101
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	424	4,540		$307,142		5,198,486		$182,569	$14,843	$8,229	$23,072	$512,783

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/98.
*** Participants since 01/01/98.

Year 2001

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 6 (2nd Half) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACT. PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL EST. COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	535	$0.00	$0	706	377,710	$0.03112	$11,754	$0	$0	$0	$11,754
Targeted Energy Efficiency - All Electric	88	486	$1,018.86	$89,660	630	306,180	$0.03111	$9,525	$0	$4,483	$4,483	$103,668
- Non-All Electric	46	122	$81.46	$3,747	306	37,332	$0.03124	$1,166	$231	$0	$231	$5,144
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Resistance Heat	30	412	$173.33	$5,200	1,200	494,400	$0.03114	$15,396	$1,326	$0	$1,326	$21,922
- Non Resistance Heat	0	35	$0.00	$0	446	15,610	$0.03116	$486	$0	$0	$0	$486
High - Efficiency Heat Pump - Mobile Home	47	469	$510.64	$24,000	1,476	692,244	$0.03110	$21,529	$3,958	$0	$3,958	$49,487
Mobile Home New Construction ***	92	568	$555.43	$51,100	1,755	996,840	$0.03110	$31,002	$4,087	$0	$4,087	$86,189
TOTAL RESIDENTIAL PROGRAMS	303	2,627		$173,707		2,920,316		$90,858	$9,602	$4,483	$14,085	$278,650
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	131	966	$454.04	$59,479	0	0	n/a	$0	$0	$2,974	$2,974	$62,453
- Class 2	5	111	$9,817.20	$49,086	0	0	n/a	$0	$0	$2,454	$2,454	$51,540
Smart Financing - Existing Building	15	109	$1,664.27	$24,964	13,282	1,447,738	$0.04235	$61,312	$3,488	$0	$3,488	$89,764
Smart Financing - New Building	18	34	$1,799.28	$32,387	14,102	479,468	$0.04277	$20,507	$4,722	$0	$4,722	$57,616
TOTAL COMMERCIAL PROGRAMS	169	1,220		$165,916		1,927,206		$81,819	$8,210	$5,428	$13,638	$261,373
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	472	3,847		$339,623		4,847,522		$172,677	$17,812	$9,911	$27,723	$540,023

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/98
*** Participants since 07/01/98.

Year 2002

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES
FOR 3 YEAR PROGRAM

Exhibit C

YEAR 7 (1st Half)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER	CUMULATIVE PARTICIPANT NUMBER **	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT	TOTAL ACTUAL PROGRAM COSTS	NET LOST REV/HALF (KWH/PARTIC)	TOTAL ENERGY SAVINGS KWH/HALF	NET LOST REVENUE ($/KWH)	TOTAL NET * LOST REVENUES	EFFICIENCY INCENTIVE (EX. C, PG.18C)	MAXIMIZING INCENTIVE (5% of COSTS)	TOTAL * INCENTIVE	TOTAL ACTUAL COSTS TO BE RECOVERED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
				(1)X(3)		(2)X(5)		(6)X(7)		(4)X(5%)	(9)+(10)	(4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	116	$0.00	$0	707	82,012	$0.03112	$2,552	$0	$0	$0	$2,552
Targeted Energy Efficiency - All Electric	63	442	$1,752.40	$110,401	1,028	454,376	$0.03111	$14,136	$0	$5,520	$5,520	$130,057
- Non-All Electric	32	135	$65.47	$2,095	315	42,525	$0.03124	$1,328	$137	$0	$137	$3,560
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Resistance Heat	1	314	$1,152.00	$1,152	1,200	376,800	$0.03114	$11,734	$44	$0	$44	$12,930
- Non Resistance Heat	0	0	$0.00	$0	447	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Mobile Home	43	414	$619.77	$26,650	1,144	473,616	$0.03110	$14,729	$1,244	$0	$1,244	$42,623
Mobile Home New Construction ***	57	568	$641.77	$36,581	1,809	1,027,512	$0.03110	$31,956	$231	$0	$231	$68,768
TOTAL RESIDENTIAL PROGRAMS	196	1,989		$176,879		2,456,841		$76,435	$1,656	$5,520	$7,176	$260,490
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	125	923	$432.92	$54,115	0	0	n/a	$0	$0	$2,706	$2,706	$56,821
- Class 2	8	104	$3,711.00	$29,688	0	0	n/a	$0	$0	$1,484	$1,484	$31,172
Smart Financing - Existing Building	7	101	$2,552.71	$17,869	13,282	1,341,482	$0.04235	$56,812	$1,628	$0	$1,628	$76,309
Smart Financing - New Building	5	42	$1,394.60	$6,973	14,101	592,242	$0.04277	$25,330	$1,312	$0	$1,312	$33,615
TOTAL COMMERCIAL PROGRAMS	145	1,170		$108,645		1,933,724		$82,142	$2,940	$4,190	$7,130	$197,917
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	341	3,159		$285,524		4,390,565		$158,577	$4,596	$9,710	$14,306	$458,407

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/1999.
*** Participants since 01/01/1999.

Year 2002

Exhibit C

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES
FOR 3 YEAR PROGRAM

YEAR 7 (2nd Half) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	706	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency - All Electric	76	457	$1,039.33	$78,989	1,028	469,796	$0.03111	$14,615	$0	$3,949	$3,949	$97,553
- Non-All Electric	13	156	$85.92	$1,117	315	49,140	$0.03124	$1,535	$56	$0	$56	$2,708
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Resistance Heat	0	177	$0.00	($352)	1,200	212,400	$0.03114	$6,614	$0	$0	$0	$6,262
- Non Resistance Heat	0	0	$0.00	$0	446	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Mobile Home	43	308	$603.84	$25,965	1,144	352,352	$0.03110	$10,958	$1,244	$0	$1,244	$38,167
Mobile Home New Construction ***	61	519	$644.46	$39,312	1,809	938,871	$0.03110	$29,199	$248	$0	$248	$68,759
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TOTAL RESIDENTIAL PROGRAMS	193	1,617		$145,031		2,022,559		$62,921	$1,548	$3,949	$5,497	$213,449
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COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	786	$0.00	$74,422	0	0	n/a	$0	$0	$3,721	$3,721	$78,143
- Class 2	0	90	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	25	97	$909.76	$22,744	13,282	1,288,354	$0.04235	$54,562	$5,814	$0	$5,814	$83,120
Smart Financing - New Building	16	44	$2,424.94	$38,799	14,102	620,488	$0.04277	$26,538	$4,197	$0	$4,197	$69,534
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TOTAL COMMERCIAL PROGRAMS	41	1,017		$135,965		1,908,842		$81,100	$10,011	$3,721	$13,732	$230,797
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
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TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	234	2,634		$280,996		3,931,401		$144,021	$11,559	$7,670	$19,229	$444,246
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* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/1999.
*** Participants since 07/01/1999.

Year 2003

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 8 (1st HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/HALF (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	707	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	100	467	$849.84	$84,984	1,028	480,076	$0.03111	$14,935	$0	$4,249	$4,249	$104,168
- Non-All Electric	7	151	$79.29	$555	314	47,414	$0.03124	$1,481	$30	$0	$30	$2,066
Compact Fluorescent Bulb	0	0	$0.00		0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	94	$0.00	$0	1,200	112,800	$0.03114	$3,513	$0	$0	$0	$3,513
- Non Resistance Heat	0	0	$0.00	$0	447	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	34	268	$379.41	$12,900	1,144	306,592	$0.03110	$9,535	$983	$0	$983	$23,418
Mobile Home New Construction ***												
- Heat Pump	46	460	$482.61	$22,200	1,808	831,680	$0.03110	$25,865	$187	$0	$187	$48,252
- Air Conditioner	0	0	$0.00	$0	157	0	$0.03124	$0	$0	$0	$0	$0
Modified Energy Fitness	101	23	$142.72	$14,415	1,194	27,462	$0.03116	$856	$2,127	$0	$2,127	$17,398
TOTAL RESIDENTIAL PROGRAMS	288	1,463		$135,054		1,806,024		$56,185	$3,327	$4,249	$7,576	$198,815
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	620	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	73	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	110	$0.00	$0	13,282	1,461,020	$0.04235	$61,874	$0	$0	$0	$61,874
Smart Financing - New Building	0	49	$0.00	$0	14,101	690,949	$0.04277	$29,552	$0	$0	$0	$29,552
TOTAL COMMERCIAL PROGRAMS	0	852		$0		2,151,969		$91,426	$0	$0	$0	$91,426
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	288	2,315		$135,054		3,957,993		$147,611	$3,327	$4,249	$7,576	$290,241

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/2000.
*** Participants since 01/01/2000.

Year 2003

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C
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YEAR 8 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/HALF (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	706	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	69	473	$974.94	$67,271	1,028	486,244	$0.03111	$15,127	$0	$3,364	$3,364	$85,762
- Non-All Electric	69	167	$76.10	$5,251	316	52,772	$0.03124	$1,649	$295	$0	$295	$7,195
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	63	$0.00	$0	1,200	75,600	$0.03114	$2,354	$0	$0	$0	$2,354
- Non Resistance Heat	0	0	$0.00	$0	446	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	29	256	$453.45	$13,150	1,144	292,864	$0.03110	$9,108	$839	$0	$839	$23,097
Mobile Home New Construction ***												
- Heat Pump	64	419	$649.59	$41,574	1,810	758,390	$0.03110	$23,586	$260	$0	$260	$65,420
- Air Conditioner	1	0	$150.00	$150	158	0	$0.03124	$0	$0	$0	$0	$150
Modified Energy Fitness	441	324	$431.43	$190,262	1,194	386,856	$0.03116	$12,054	$9,287	$0	$9,287	$211,603
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TOTAL RESIDENTIAL PROGRAMS	673	1,702		$317,658		2,052,726		$63,878	$10,681	$3,364	$14,045	$395,581
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COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	453	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	63	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	77	$0.00	$0	13,282	1,022,714	$0.04235	$43,312	$0	$0	$0	$43,312
Smart Financing - New Building	0	47	$0.00	$0	14,102	662,794	$0.04277	$28,348	$0	$0	$0	$28,348
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TOTAL COMMERCIAL PROGRAMS	0	640		$0		1,685,508		$71,660	$0	$0	$0	$71,660
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS -												
(w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	673	2,342		$317,658		3,738,234		$135,538	$10,681	$3,364	$14,045	$467,241
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/2000.
*** Participants since 07/01/2000.

Year 2004

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C

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YEAR 9 (1st HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	707	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	72	463	$751.54	$54,111	1,028	475,964	$0.03111	$14,807	$0	$2,706	$2,706	$71,624
- Non-All Electric	10	179	$78.60	$786	314	56,206	$0.03124	$1,756	$43	$0	$43	$2,585
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	42	$0.00	$0	1,200	50,400	$0.03114	$1,569	$0	$0	$0	$1,569
- Non Resistance Heat	0	0	$0.00	$0	447	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	41	247	$428.05	$17,550	1,144	282,568	$0.03110	$8,788	$1,186	$0	$1,186	$27,524
Mobile Home New Construction ***												
- Heat Pump	68	394	$503.68	$34,250	1,808	712,352	$0.03110	$22,154	$276	$0	$276	$56,680
- Air Conditioner	1	1	$150.00	$150	157	157	$0.03124	$5	$0	$0	$0	$155
Modified Energy Fitness	334	735	$417.76	$139,531	1,194	877,590	$0.03116	$27,346	$7,034	$0	$7,034	$173,911
TOTAL RESIDENTIAL PROGRAMS	526	2,061		$246,378		2,455,237		$76,425	$8,539	$2,706	$11,245	$334,048
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	338	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	30	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	54	$0.00	$0	13,282	717,228	$0.04235	$30,375	$0	$0	$0	$30,375
Smart Financing - New Building	0	43	$0.00	$0	14,101	606,343	$0.04277	$25,933	$0	$0	$0	$25,933
TOTAL COMMERCIAL PROGRAMS	0	465		$0		1,323,571		$56,308	$0	$0	$0	$56,308
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	526	2,526		$246,378		3,778,808		$132,733	$8,539	$2,706	$11,245	$390,356

* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of 06/30/2001.

*** Participants since 01/01/2001.

Year 2004

Exhibit C

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 9 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/PARTIC) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	706	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	89	462	$1,118.43	$99,540	1,028	474,936	$0.03111	$14,775	$0	$4,977	$4,977	$119,292
- Non-All Electric	72	205	$60.60	$4,363	316	64,780	$0.03124	$2,024	$308	$0	$308	$6,695
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	15	$0.00	$0	1,200	18,000	$0.03114	$561	$0	$0	$0	$561
- Non Resistance Heat	0	0	$0.00	$0	446	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	46	239	$469.57	$21,600	1,144	273,416	$0.03110	$8,503	$1,330	$0	$1,330	$31,433
Mobile Home New Construction ***												
- Heat Pump	70	379	$597.14	$41,800	1,810	685,990	$0.03110	$21,334	$284	$0	$284	$63,418
- Air Conditioner	0	2	#DIV/0!	$0	158	316	$0.03124	$10	$0	$0	$0	$10
Modified Energy Fitness	391	1,070	$347.20	$135,756	1,194	1,277,580	$0.03116	$39,809	$8,234	$0	$8,234	$183,799
TOTAL RESIDENTIAL PROGRAMS	668	2,372		$303,059		2,795,018		$87,016	$10,156	$4,977	$15,133	$405,208
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	191	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	10	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	41	$0.00	$0	13,282	544,562	$0.04235	$23,062	$0	$0	$0	$23,062
Smart Financing - New Building	0	30	$0.00	$0	14,102	423,060	$0.04277	$18,094	$0	$0	$0	$18,094
TOTAL COMMERCIAL PROGRAMS	0	272		$0		967,622		$41,156	$0	$0	$0	$41,156
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	668	2,644		$303,059		3,762,640		$128,172	$10,156	$4,977	$15,133	$446,364

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/2001.
*** Participants since 07/01/2001.

Year 2005

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 10 (1st Half)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTR (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	707	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	88	477	$1,109.22	$97,611	896	427,392	$0.03111	$13,296	$0	$4,881	$4,881	$115,788
- Non-All Electric	57	218	$62.47	$3,561	267	58,206	$0.03124	$1,818	$1,125	$0	$1,125	$6,504
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	1,200	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	447	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	34	231	$560.21	$19,047	1,145	264,495	$0.03110	$8,226	$2,693	$0	$2,693	$29,966
Mobile Home New Construction ***												
- Heat Pump	67	371	$614.85	$41,195	1,808	670,768	$0.03110	$20,861	$8,372	$0	$8,372	$70,428
- Air Conditioner	0	2	$0.00	$0	157	314	$0.03124	$10	$0	$0	$0	$10
Modified Energy Fitness	371	1,479	$400.87	$148,723	613	906,627	$0.03116	$28,250	$15,612	$0	$15,612	$192,585
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TOTAL RESIDENTIAL PROGRAMS	617	2,778		$310,137		2,327,802		$72,461	$27,802	$4,881	$32,683	$415,281
	========	========		========		========		========	========	========	========	========
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	64	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	3	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	29	$0.00	$0	13,282	385,178	$0.04235	$16,312	$0	$0	$0	$16,312
Smart Financing - New Building	0	18	$0.00	$0	14,101	253,818	$0.04277	$10,856	$0	$0	$0	$10,856
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL COMMERCIAL PROGRAMS	0	114		$0		638,996		$27,168	$0	$0	$0	$27,168
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	617	2,892		$310,137		2,966,798		$99,629	$27,802	$4,881	$32,683	$442,449
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/2002.
*** Participants since 01/01/2002.

Year 2005

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 10 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	706	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	85	492	$1,207.52	$102,639	896	440,832	$0.03111	$13,714	$0	$5,132	$5,132	$121,485
- Non-All Electric	26	233	$65.85	$1,712	266	61,978	$0.03124	$1,936	$513	$0	$513	$4,161
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	1,200	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	446	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Mobile Home	40	225	$476.78	$19,071	1,144	257,400	$0.03110	$8,005	$3,168	$0	$3,168	$30,244
Mobile Home New Construction ***												
- Heat Pump	83	385	$544.23	$45,171	1,810	696,850	$0.03110	$21,672	$10,372	$0	$10,372	$77,215
- Air Conditioner	0	2	$0.00	$0	158	316	$0.03124	$10	$0	$0	$0	$10
Modified Energy Fitness	351	1,826	$373.12	$130,965	612	1,117,512	$0.03116	$34,822	$14,770	$0	$14,770	$180,557
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TOTAL RESIDENTIAL PROGRAMS	585	3,163		$299,558		2,574,888		$80,159	$28,823	$5,132	$33,955	$413,672
	========	========		========		========		========	========	========	========	========
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	20	$0.00	$0	13,282	265,640	$0.04235	$11,250	$0	$0	$0	$11,250
Smart Financing - New Building	0	11	$0.00	$0	14,102	155,122	$0.04277	$6,635	$0	$0	$0	$6,635
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL COMMERCIAL PROGRAMS	0	31		$0		420,762		$17,885	$0	$0	$0	$17,885
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	585	3,194		$299,558		2,995,650		$98,044	$28,823	$5,132	$33,955	$431,557
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/2002.
*** Participants since 07/01/2002.

Year 2006

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KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 11 (1st HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	707	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	75	496	$974.31	$73,073	896	444,416	$0.03111	$13,826	$0	$3,654	$3,654	$90,553
- Non-All Electric	34	249	$84.56	$2,875	267	66,483	$0.03124	$2,077	$671	$0	$671	$5,623
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	1,200	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	447	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	48	230	$446.06	$21,411	1,145	263,350	$0.03110	$8,190	$3,802	$0	$3,802	$33,403
Mobile Home New Construction ***												
- Heat Pump	90	425	$561.21	$50,509	1,810	769,250	$0.03110	$23,924	$11,246	$0	$11,246	$85,679
- Air Conditioner	0	2	$0.00	$0	157	314	$0.03124	$10	$0	$0	$0	$10
Modified Energy Fitness	440	2,185	$275.33	$121,144	613	1,339,405	$0.03116	$41,736	$18,515	$0	$18,515	$181,395
TOTAL RESIDENTIAL PROGRAMS	687	3,587		$269,012		2,883,218		$89,763	$34,234	$3,654	$37,888	$396,663
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	687	3,587		$269,012		2,883,218		$89,763	$34,234	$3,654	$37,888	$396,663

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/2003.
*** Participants since 01/01/2003.

Year 2006

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 11 (2nd HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER	CUMULATIVE PARTICIPANT NUMBER **	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT	TOTAL ACTUAL PROGRAM COSTS	NET LOST REV/QTRS (KWH/ PARTICIPANT)	TOTAL ENERGY SAVINGS KWH/ HALF	NET LOST REVENUE ($/KWH)	TOTAL NET * LOST REVENUES	EFFICIENCY INCENTIVE (EX. C, PG.18C)	MAXIMIZING INCENTIVE (5% of COSTS)	TOTAL * INCENTIVE	TOTAL ACTUAL COSTS TO BE RECOVERED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
				(1)X(3)		(2)X(5)		(6)X(7)		(4)X(5%)	(9)+(10)	(4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	706	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	87	481	$1,147.46	$99,829	896	430,976	$0.03111	$13,408	$0	$4,991	$4,991	$118,228
- Non-All Electric	46	254	$84.00	$3,864	266	67,564	$0.03124	$2,111	$908	$0	$908	$6,883
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	1,200	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	446	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	45	245	$460.00	$20,700	1,144	280,280	$0.03110	$8,717	$3,564	$0	$3,564	$32,981
Mobile Home New Construction ***												
- Heat Pump	94	460	$544.15	$51,150	1,808	831,680	$0.03110	$25,865	$11,746	$0	$11,746	$88,761
- Air Conditioner	0	2	$0.00	$0	158	316	$0.03124	$10	$0	$0	$0	$10
Modified Energy Fitness	560	2,391	$427.85	$239,596	612	1,463,292	$0.03116	$45,596	$23,565	$0	$23,565	$308,757
TOTAL RESIDENTIAL PROGRAMS	832	3,833		$415,139		3,074,108		$95,707	$39,783	$4,991	$44,774	$555,620
	========	========		========		========		========	========	========	========	========
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	832	3,833		$415,139		3,074,108		$95,707	$39,783	$4,991	$44,774	$555,620
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 12/31/2003.
*** Participants since 07/01/2003.

Year 2007

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 12 (1st HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	707	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	128	295	$1,022.27	$130,851	896	264,320	$0.04346	$11,487	$0	$6,543	$6,543	$148,881
- Non-All Electric	29	115	$86.48	$2,508	277	31,855	$0.04362	$1,390	$572	$0	$572	$4,470
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	1,200	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	447	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	50	153	$450.00	$22,500	1,145	175,185	$0.04346	$7,614	$3,960	$0	$3,960	$34,074
Mobile Home New Construction ***												
- Heat Pump	84	304	$563.10	$47,300	1,810	550,240	$0.04348	$23,924	$10,497	$0	$10,497	$81,721
- Air Conditioner	0	0	$0.00	$0	157	0	$0.04343	$0	$0	$0	$0	$0
Modified Energy Fitness	515	1,605	$381.00	$196,214	613	983,865	$0.04349	$42,788	$21,671	$0	$21,671	$260,673
Case No 2006 - 00373, Dated December 14, 2006:												
- HEAP - Kentucky Power Company's Information Technology Implementation Costs				$58,968								$58,968
- HEAP - KACA's Information Technology Implementation Costs				$15,700								$15,700
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL RESIDENTIAL PROGRAMS	806	2,472		$474,041		2,005,465		$87,203	$36,700	$6,543	$43,243	$604,487
	========	========		========		========		========	========	========	========	========
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL COMMERCIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a		$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
	------------	------------		------------		------------		------------	------------	------------	------------	------------
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	806	2,472		$474,041		2,005,465		$87,203	$36,700	$6,543	$43,243	$604,487
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/2005.
*** Participants since 07/01/2005.

Year 2007

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C
PAGE
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YEAR 12 (2nd Half)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	706	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	100	421	$879.82	$87,982	896	377,216	$0.04346	$16,394	$0	$4,399	$4,399	$108,775
- Non-All Electric	50	151	$89.58	$4,479	276	41,676	$0.04362	$1,818	$987	$0	$987	$7,284
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	1,200	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	446	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	45	209	$450.00	$20,250	1,144	239,096	$0.04346	$10,391	$3,564	$0	$3,564	$34,205
Mobile Home New Construction ***												
- Heat Pump	129	426	$551.94	$71,200	1,808	770,208	$0.04348	$33,489	$16,120	$0	$16,120	$120,809
- Air Conditioner	0	0	$0.00	$0	158	0	$0.04343	$0	$0	$0	$0	$0
Modified Energy Fitness	485	2,113	$353.79	$171,590	612	1,293,156	$0.04349	$56,239	$20,409	$0	$20,409	$248,238
TOTAL RESIDENTIAL PROGRAMS	809	3,320		$355,501		2,721,352		$118,331	$41,080	$4,399	$45,479	$519,311
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	809	3,320		$355,501		2,721,352		$118,331	$41,080	$4,399	$45,479	$519,311

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 06/30/2005.
*** Participants since 07/01/2005.

Year 2008

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 13 (1st HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	119	521	$1,358.15	$161,620	1,016	529,336	$0.04346	$23,005	$9,189	$0	$9,189	$193,814
- Non-All Electric	56	196	$83.11	$4,654	568	111,328	$0.04345	$4,837	$3,454	$0	$3,454	$12,945
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	61	252	$457.38	$27,900	875	220,500	$0.04346	$9,583	$8,539	$0	$8,539	$46,022
Mobile Home New Construction ***												
- Heat Pump	95	520	$552.63	$52,500	861	447,720	$0.04348	$19,467	$10,597	$0	$10,597	$82,564
- Air Conditioner	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	560	2,612	$361.32	$202,339	435	1,136,220	$0.04349	$49,414	$27,871	$0	$27,871	$279,624
TOTAL RESIDENTIAL PROGRAMS	891	4,101		$449,013		2,445,104		$106,306	$59,650	$0	$59,650	$614,969
	========	========		========		========		========	========	========	========	========
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	891	4,101		$449,013		2,445,104		$106,306	$59,650	$0	$59,650	$614,969
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of 06/30/2005.

*** Participants since 07/01/2005.

Year 2008

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C PAGE 14B of 19

YEAR 13 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER ** (2)	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT (3)	TOTAL ACTUAL PROGRAM COSTS (4) (1)X(3)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS												
Energy Fitness	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	89	545	$991.21	$88,218	1,016	553,720	$0.04346	$24,065	$6,873	$0	$6,873	$119,156
- Non-All Electric	20	223	$87.50	$1,750	568	126,664	$0.04345	$5,504	$1,234	$0	$1,234	$8,488
Compact Fluorescent Bulb	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Resistance Heat	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	74	289	$442.57	$32,750	874	252,586	$0.04346	$10,977	$10,359	$0	$10,359	$54,086
Mobile Home New Construction												
- Heat Pump	108	548	$550.00	$59,400	860	471,280	$0.04348	$20,491	$12,047	$0	$12,047	$91,938
- Air Conditioner	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	440	2,793	$356.35	$156,792	435	1,214,955	$0.04349	$52,838	$21,899	$0	$21,899	$231,529
TOTAL RESIDENTIAL PROGRAMS	731	4,398		$338,910		2,619,205		$113,875	$52,412	$0	$52,412	$505,197
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	731	4,398		$338,910		2,619,205		$113,875	$52,412	$0	$52,412	$505,197

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 01/01/2006.

Year 2009

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)		AVERAGE ACTUAL PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ACTUAL PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	119	575	**	$1,060.16	$126,159	1,016	584,200	$0.04346	$25,389	$9,189	$0	$9,189	$160,737
- Non-All Electric	22	210	**	$93.27	$2,052	568	119,280	$0.04352	$5,191	$1,357	$0	$1,357	$8,600
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Mobile Home	61	299	**	$449.18	$27,400	875	261,625	$0.04350	$11,381	$8,539	$0	$8,539	$47,320
Mobile Home New Construction													
- Heat Pump	88	552	**	$552.84	$48,650	861	475,272	$0.04351	$20,679	$9,816	$0	$9,816	$79,145
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	425	2,775	**	$383.51	$162,993	435	1,207,125	$0.04345	$52,450	$21,152	$0	$21,152	$236,595
High Efficiency Heat Pump													
- Resistance Heat Replacement	28	7	***	$305.36	$8,550	1,879	13,153	$0.04349	$572	$13,387	$0	$13,387	$22,509
- Heat Pump Replacement	61	16	***	$442.62	$27,000	301	4,816	$0.04353	$210	$0	$1,350	$1,350	$28,560
Energy Education for Student Program (NEED)	0	0	***	$0.00	$8,139	92	0	$0.04370	$0	$0	$0	$0	$8,139
Community Outreach Program (CFL)	926	149	***	$5.84	$5,404	92	13,708	$0.04370	$599	$4,621	$0	$4,621	$10,624
TOTAL RESIDENTIAL PROGRAMS	1,730	4,583			$416,347		2,679,179		$116,471	$68,061	$1,350	$69,411	$602,229
COMMERCIAL PROGRAMS													
Smart Audit - Class 1	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0			$0		0		$0	$0	$0	$0	$0
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)													
Smart Audit - Class 1	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0			$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	1,730	4,583			$416,347		2,679,179		$116,471	$68,061	$1,350	$69,411	$602,229

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 07/01/2006.
*** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

Year 2009

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C PAGE 15B of 19

YEAR 14 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)		AVERAGE ACTUAL PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ACTUAL PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ HALF (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	140	620	**	$993.48	$139,087	1,016	629,920	$0.04346	$27,376	$10,811	$0	$10,811	$177,274
- Non-All Electric	61	200	**	$101.34	$6,182	568	113,600	$0.04352	$4,944	$3,762	$0	$3,762	$14,888
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump - Mobile Home	99	342	**	$449.49	$44,500	874	298,908	$0.04350	$13,002	$13,859	$0	$13,859	$71,361
Mobile Home New Construction													
- Heat Pump	103	556	**	$544.17	$56,050	860	478,160	$0.04351	$20,805	$11,490	$0	$11,490	$88,345
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	375	2,631	**	$372.99	$139,871	435	1,144,485	$0.04345	$49,728	$18,664	$0	$18,664	$208,263
High Efficiency Heat Pump													
- Resistance Heat Replacement	63	60	***	$514.29	$32,400	1,879	112,740	$0.04349	$4,903	$30,120	$0	$30,120	$67,423
- Heat Pump Replacement	156	144	***	$451.92	$70,500	300	43,200	$0.04353	$1,880	$0	$3,525	$3,525	$75,905
Energy Education for Student Program (NEED)	1,130	558	***	$8.00	$9,045	92	51,336	$0.04370	$2,243	$5,627	$0	$5,627	$16,915
Community Outreach Program (CFL)	2,818	2,501	***	$10.19	$28,715	92	230,092	$0.04370	$10,055	$14,062	$0	$14,062	$52,832
TOTAL RESIDENTIAL PROGRAMS	4,945	7,612			$526,350		3,102,441		$134,936	$108,395	$3,525	$111,920	$773,206
COMMERCIAL PROGRAMS													
Smart Audit - Class 1	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	0	0			$0		0		$0	$0	$0	$0	$0
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)													
Smart Audit - Class 1	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0			$0		0		$0	$0	$0	$0	$0
TOTAL COMPANY	4,945	7,612			$526,350		3,102,441		$134,936	$108,395	$3,525	$111,920	$773,206

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 01/01/2007.
*** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

Year 2010

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 15 (1st HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)		AVERAGE ACTUAL PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ACTUAL PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTR (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	174	720	**	$1,161.51	$202,103	1,016	731,520	$0.04346	$31,792	$13,436	$0	$13,436	$247,331
- Non-All Electric	31	237	**	$114.10	$3,537	568	134,616	$0.04352	$5,858	$1,912	$0	$1,912	$11,307
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Mobile Home	97	416	**	$422.16	$40,950	875	364,000	$0.04350	$15,834	$13,579	$0	$13,579	$70,363
Mobile Home New Construction													
- Heat Pump	115	621	**	$527.83	$60,700	861	534,681	$0.04351	$23,264	$4,462	$0	$4,462	$88,426
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	501	2,762	**	$392.89	$196,836	435	1,201,470	$0.04345	$52,204	$24,935	$0	$24,935	$273,975
High Efficiency Heat Pump													
- Resistance Heat Replacement	97	135	***	$450.00	$43,650	1,879	253,665	$0.04349	$11,032	$46,376	$0	$46,376	$101,058
- Heat Pump Replacement	272	348	***	$416.73	$113,350	301	104,748	$0.04353	$4,560	$0	$5,668	$5,668	$123,578
Energy Education for Student Program (NEED)	488	1,299	***	$50.99	$24,881	73	94,827	$0.04327	$4,103	$2,430	$0	$2,430	$31,414
Community Outreach Program (CFL)	2,644	4,482	***	$16.10	$42,564	91	407,862	$0.04376	$17,848	$13,194	$0	$13,194	$73,606
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TOTAL RESIDENTIAL PROGRAMS	4,419	11,020			$728,571		3,827,389		$166,495	$120,324	$5,668	$125,992	$1,021,058
	========	========			========		========		========	========	========	========	========
COMMERCIAL PROGRAMS													
Smart Audit - Class 1	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
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TOTAL COMMERCIAL PROGRAMS	0	0			$0		0		$0	$0	$0	$0	$0
	========	========			========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)													
Smart Audit - Class 1	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0		$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
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TOTAL INDUSTRIAL PROGRAMS	0	0			$0		0		$0	$0	$0	$0	$0
	========	========			========		========		========	========	========	========	========
TOTAL COMPANY	4,419	11,020			$728,571		3,827,389		$166,495	$120,324	$5,668	$125,992	$1,021,058
	========	========			========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 01/01/2007.
*** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

Year 2010

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C PAGE 16B-1 of 19

YEAR 15 (2nd HALF)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT		AVERAGE ACTUAL PROGRAM COSTS	TOTAL ACTUAL PROGRAM	NET LOST REV/QTRS	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL *	TOTAL ACTUAL COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER		PER PARTICIPANT	COSTS	(KWH/ PARTICIPANT)	KWH/ QTRs	($/KWH)	REVENUES	(EX. C, PG.18C)	(5% of COSTS)	INCENTIVE	RECOVERED
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
				(4) / (1)			(2)X(5)		(6)X(7)		(4)X(5%)	(9)+(10)	(4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	172	787	**	$809.62	$139,254	1,016	799,592	$0.05746	$45,945	$13,282	$0	$13,282	$198,481
- Non-All Electric	23	242	**	$102.35	$2,354	568	137,456	$0.05746	$7,898	$1,419	$0	$1,419	$11,671
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Mobile Home	136	496	**	$469.49	$63,850	875	434,000	$0.05750	$24,955	$19,039	$0	$19,039	$107,844
Mobile Home New Construction													
- Heat Pump	119	617	**	$558.82	$66,500	861	531,237	$0.05745	$30,520	$13,274	$0	$13,274	$110,294
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	699	2,939	**	$317.39	$221,857	435	1,278,465	$0.05752	$73,537	$34,789	$0	$34,789	$330,183
High Efficiency Heat Pump													
- Resistance Heat Replacement	155	264	***	$326.00	$50,530	1,879	496,056	$0.05748	$28,513	$74,106	$0	$74,106	$153,149
- Heat Pump Replacement	237	621	***	$559.79	$132,670	301	186,921	$0.05750	$10,748	$0	$6,634	$6,634	$150,052
Energy Education for Student Program (NEED)	1,059	1,220	***	$5.55	$5,880	74	90,280	$0.05714	$5,159	$5,274	$0	$5,274	$16,313
Community Outreach Program (CFL)	2,167	3,516	***	$6.72	$14,570	91	319,956	$0.05768	$18,455	$10,813	$0	$10,813	$43,838
Residential Efficient Products													
- Compact Flourescent Lamp (CFL)	0	0		$0.00	$0	0	0	$0.05818	$0	$0	$0	$0	$0
- Specialty Bulbs	0	0		$0.00	$0	0	0	$0.05793	$0	$0	$0	$0	$0
- LED Lights	0	0		$0.00	$0	0	0	$0.05854	$0	$0	$0	$0	$0
HVAC Diagnostic & Tune-Up													
- Air Conditioner	0	0		$0.00	$0	0	0	$0.05749	$0	$0	$0	$0	$0
- Heat Pump	28	3		$101.79	$2,850	371	1,113	$0.05749	$64	$319	$0	$319	$3,233
Residential Load Management													
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Water Heating	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL RESIDENTIAL PROGRAMS	4,795	10,705			$700,315		4,275,076		$245,794	$172,315	$6,634	$178,949	$1,125,058
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Year 2010

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C PAGE 16B-2 of 19

YEAR 15 (2nd HALF)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER	CUMULATIVE PARTICIPANT NUMBER	AVERAGE ACTUAL PROGRAM COSTS PER PARTICIPANT	TOTAL ACTUAL PROGRAM COSTS	NET LOST REV/QTRS (KWH/ PARTICIPANT)	TOTAL ENERGY SAVINGS KWH/ QTRs	NET LOST REVENUE ($/KWH)	TOTAL NET * LOST REVENUES	EFFICIENCY INCENTIVE (EX. C, PG.18C)	MAXIMIZING INCENTIVE (5% of COSTS)	TOTAL * INCENTIVE	TOTAL ACTUAL COSTS TO BE RECOVERED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
			(4) / (1)			(2)X(5)		(6)X(7)		(4)X(5%)	(9)+(10)	(4)+(8)+(11)
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Commercial A/C & Heat Pump Program												
- Air Conditioner Replacement	0	0	$0.00	$0	0	0	$0.14803	$0	$0	$0	$0	$0
- Heat Pump Replacement	0	0	$0.00	$0	0	0	$0.58599	$0	$0	$0	$0	$0
HVAC Diagnostic & Tune-Up												
- Air Conditioner	0	0	$0.00	$0	0	0	$0.06480	$0	$0	$0	$0	$0
- Heat Pump	1	0	$125.00	$125	819	0	$0.06476	$0	$30	$0	$30	$155
Commercial Load Management												
- Air Conditioner	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Water Heating	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Commercial Incentive	0	0	$0.00	$0	0	0	$0.25657	$0	$0	$0	$0	$0
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TOTAL COMMERCIAL PROGRAMS	1	0		$125		0		$0	$30	$0	$30	$155
	========	========		========		========		========	========	========	========	========
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
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TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	4,796	10,705		$700,440		4,275,076		$245,794	$172,345	$6,634	$178,979	$1,125,213
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of 04/01/2007.

*** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

Year 2011

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 16 (1st HALF) / PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)		AVERAGE ACTUAL PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ACTUAL PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTR (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	110	814		$692.04	$76,124	1,050	854,700	$0.05746	$49,111	$16,253	$0	$16,253	$141,488
- Non-All Electric	6	208		$140.17	$841	448	93,184	$0.05746	$5,354	$0	$42	$42	$6,237
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Mobile Home	94	442		$502.11	$47,198	1,403	620,126	$0.05750	$35,657	$27,615	$0	$27,615	$110,470
Mobile Home New Construction													
- Heat Pump	68	624		$680.15	$46,250	731	456,144	$0.05745	$26,205	$6,393	$0	$6,393	$78,848
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	645	3,039		$346.52	$223,503	283	860,037	$0.05752	$49,469	$9,456	$0	$9,456	$282,428
High Efficiency Heat Pump													
- Resistance Heat Replacement	154	328	**	$452.59	$69,699	728	238,784	$0.05748	$13,725	$12,030	$0	$12,030	$95,454
- Heat Pump Replacement	212	608	**	$429.25	$91,000	923	561,184	$0.05750	$32,268	$25,033	$0	$25,033	$148,301
Energy Education for Student Program (NEED)	938	2,034	**	$12.40	$11,635	48	97,632	$0.05714	$5,579	$1,613	$0	$1,613	$18,827
Community Outreach Program (CFL)	2,518	5,442	**	$19.93	$50,179	50	272,100	$0.05768	$15,695	$9,871	$0	$9,871	$75,745
Residential Efficient Products													
- Compact Flourescent Lamp (CFL)	77,764	20,801		$1.82	$141,810	17	353,617	$0.05818	$20,573	$24,107	$0	$24,107	$186,490
- Specialty Bulbs	0	0		$0.00	$8	15	0	$0.05793	$0	$0	$0	$0	$8
- LED Lights	0	0		$0.00	$259	21	0	$0.05854	$0	$0	$0	$0	$259
HVAC Diagnostic & Tune-Up													
- Air Conditioner	64	19		$50.00	$3,200	155	2,945	$0.05749	$169	$84	$0	$84	$3,453
- Heat Pump	290	148		$72.24	$20,950	371	54,908	$0.05749	$3,157	$3,300	$0	$3,300	$27,407
Residential Load Management													
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Water Heating	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL RESIDENTIAL PROGRAMS	82,863	34,507			$782,656		4,465,361		$256,962	$135,755	$42	$135,797	$1,175,415

Year 2011

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 16 (1st HALF) PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	AVERAGE ACTUAL PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ACTUAL PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTR (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ACTUAL COSTS TO BE RECOVERED (12) (4)+(8)+(11)
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Commercial A/C & Heat Pump Program												
- Air Conditioner Replacement	1	0	$300.00	$300	140	0	$0.14803	$0	$1	$0	$1	$301
- Heat Pump Replacement	15	4	$256.67	$3,850	558	2,232	$0.58599	$1,308	$872	$0	$872	$6,030
HVAC Diagnostic & Tune-Up												
- Air Conditioner	1	0	$0.00	$0	343	0	$0.06480	$0	$7	$0	$7	$7
- Heat Pump	18	8	$72.22	$1,300	818	6,544	$0.06476	$424	$532	$0	$532	$2,256
Commercial Load Management												
- Air Conditioner	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Water Heating	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Commercial Incentive	0	0	$0.00	$0	0	0	$0.25657	$0	$0	$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	35	12		$5,450		8,776		$1,732	$1,412	$0	$1,412	$8,594
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INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	82,898	34,519		$788,106		4,474,137		$258,694	$137,167	$42	$137,209	$1,184,009
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* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

Year 2011

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C PAGE 17B-1 of 19

YEAR 16 (3rd QTR)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)		AVERAGE ESTIMATED PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ESTIMATED PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTRs (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ESTIMATED COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	130	878		$1,306.35	$169,826	526	461,828	$0.05749	$26,550	$19,208	$0	$19,208	$215,584
- Non-All Electric	26	168		$194.08	$5,046	224	37,632	$0.05746	$2,162	$0	$252	$252	$7,460
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Mobile Home	77	546		$487.52	$37,539	702	383,292	$0.05750	$22,039	$22,621	$0	$22,621	$82,199
Mobile Home New Construction													
- Heat Pump	70	581		$562.01	$39,341	365	212,065	$0.05749	$12,192	$6,581	$0	$6,581	$58,114
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	318	3,013		$409.00	$130,063	142	427,846	$0.05757	$24,631	$4,662	$0	$4,662	$159,356
High Efficiency Heat Pump													
- Resistance Heat Replacement	58	183	**	$410.74	$23,823	365	66,795	$0.05745	$3,837	$4,531	$0	$4,531	$32,191
- Heat Pump Replacement	146	285	**	$530.66	$77,477	461	131,385	$0.05750	$7,555	$17,240	$0	$17,240	$102,272
Energy Education for Student Program (NEED)	200	971	**	$18.24	$3,647	24	23,304	$0.05750	$1,340	$344	$0	$344	$5,331
Community Outreach Program (CFL)	1,432	3,157	**	$4.53	$6,482	26	82,082	$0.05765	$4,732	$5,613	$0	$5,613	$16,827
Residential Efficient Products													
- Compact Flourescent Lamp (CFL)	34,309	95,780		$3.80	$130,258	8	766,240	$0.05818	$44,580	$10,636	$0	$10,636	$185,474
- Specialty Bulbs	13	2		$25.85	$336	7	14	$0.05793	$1	$4	$0	$4	$341
- LED Lights	18	3		$48.39	$871	10	30	$0.05854	$2	$0	$44	$44	$917
HVAC Diagnostic & Tune-Up													
- Air Conditioner	93	114		$290.85	$27,049	78	8,892	$0.05749	$511	$122	$0	$122	$27,682
- Heat Pump	84	342		$40.67	$3,416	185	63,270	$0.05749	$3,637	$956	$0	$956	$8,009
Residential Load Management													
- Air Conditioner	30	7		$1,294.90	$38,847	0	0	$0.00000	$0	$0	$0	$0	$38,847
- Water Heating	30	7		$1,294.90	$38,847	0	0	$0.00000	$0	$0	$0	$0	$38,847
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TOTAL RESIDENTIAL PROGRAMS	37,034	106,037			$732,868		2,664,675		$153,769	$92,518	$296	$92,814	$979,451
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Year 2011

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 16 (3rd QTR)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	AVERAGE ESTIMATED PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ESTIMATED PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTRs (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ESTIMATED COSTS TO BE RECOVERED (12) (4)+(8)+(11)
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Commercial A/C & Heat Pump Program												
- Air Conditioner Replacement	19	10	$743.32	$14,123	71	710	$0.07447	$53	$18	$0	$18	$14,194
- Heat Pump Replacement	15	23	$1,328.33	$19,925	279	6,417	$0.07430	$477	$872	$0	$872	$21,274
HVAC Diagnostic & Tune-Up												
- Air Conditioner	45	25	$350.22	$15,760	172	4,300	$0.07424	$319	$326	$0	$326	$16,405
- Heat Pump	14	25	$127.29	$1,782	410	10,250	$0.07429	$761	$414	$0	$414	$2,957
Commercial Load Management												
- Air Conditioner	7	2	$616.86	$4,318	0	0	$0.00000	$0	$0	$0	$0	$4,318
- Water Heating	7	2	$616.86	$4,318	0	0	$0.00000	$0	$0	$0	$0	$4,318
Commercial Incentive	30	10	$10,347.27	$310,418	3,739	37,390	$0.07512	$2,809	$71,420	$0	$71,420	$384,647
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TOTAL COMMERCIAL PROGRAMS	137	97		$370,644		59,067		$4,419	$73,050	$0	$73,050	$448,113
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INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
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TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
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TOTAL COMPANY	37,171	106,134		$1,103,512		2,723,742		$158,188	$165,568	$296	$165,864	$1,427,564
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* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

Year 2011

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 16 (4th QTR)

PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)		AVERAGE ESTIMATED PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ESTIMATED PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTRs (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ESTIMATED COSTS TO BE RECOVERED (12) (4)+(8)+(11)
RESIDENTIAL PROGRAMS													
Energy Fitness	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Targeted Energy Efficiency													
- All Electric	110	908		$1,306.35	$143,699	526	477,608	$0.05749	$27,458	$16,253	$0	$16,253	$187,410
- Non-All Electric	23	181		$194.09	$4,464	224	40,544	$0.05746	$2,330	$0	$223	$223	$7,017
Compact Fluorescent Bulb	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
High - Efficiency Heat Pump													
- Mobile Home	59	306		$487.51	$28,763	702	214,812	$0.05750	$12,352	$17,333	$0	$17,333	$58,448
Mobile Home New Construction													
- Heat Pump	67	596		$558.34	$37,409	365	217,540	$0.05749	$12,506	$6,299	$0	$6,299	$56,214
- Air Conditioner	0	0		$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Modified Energy Fitness	248	3,107		$409.00	$101,433	142	441,194	$0.05757	$25,400	$3,636	$0	$3,636	$130,469
High Efficiency Heat Pump													
- Resistance Heat Replacement	60	465	**	$397.05	$23,823	365	169,725	$0.05745	$9,751	$4,687	$0	$4,687	$38,261
- Heat Pump Replacement	142	868	**	$545.61	$77,477	461	400,148	$0.05750	$23,009	$16,767	$0	$16,767	$117,253
Energy Education for Student Program (NEED)	862	1,669	**	$18.23	$15,718	24	40,056	$0.05750	$2,303	$1,483	$0	$1,483	$19,504
Community Outreach Program (CFL)	850	4,525	**	$4.52	$3,839	26	117,650	$0.05765	$6,783	$3,332	$0	$3,332	$13,954
Residential Efficient Products													
- Compact Flourescent Lamp (CFL)	23,872	125,257		$3.92	$93,468	8	1,002,056	$0.05818	$58,300	$7,400	$0	$7,400	$159,168
- Specialty Bulbs	12	23		$20.08	$241	7	161	$0.05793	$9	$4	$0	$4	$254
- LED Lights	757	339		$0.83	$625	10	3,390	$0.05854	$198	$0	$31	$31	$854
HVAC Diagnostic & Tune-Up													
- Air Conditioner	23	129		$353.83	$8,138	78	10,062	$0.05749	$578	$30	$0	$30	$8,746
- Heat Pump	26	384		$39.54	$1,028	185	71,040	$0.05749	$4,084	$296	$0	$296	$5,408
Residential Load Management													
- Air Conditioner	220	138		$415.81	$91,478	0	0	$0.00000	$0	$0	$0	$0	$91,478
- Water Heating	220	138		$415.81	$91,478	0	0	$0.00000	$0	$0	$0	$0	$91,478
TOTAL RESIDENTIAL PROGRAMS	27,551	139,033			$723,081		3,205,986		$185,061	$77,520	$254	$77,774	$985,916

Year 2011

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 16 (4th QTR) / PROGRAM DESCRIPTIONS	NEW PARTICIPANT NUMBER (1)	CUMULATIVE PARTICIPANT NUMBER (2)	AVERAGE ESTIMATED PROGRAM COSTS PER PARTICIPANT (3) (4) / (1)	TOTAL ESTIMATED PROGRAM COSTS (4)	NET LOST REV/QTRS (KWH/ PARTICIPANT) (5)	TOTAL ENERGY SAVINGS KWH/ QTRs (6) (2)X(5)	NET LOST REVENUE ($/KWH) (7)	TOTAL NET * LOST REVENUES (8) (6)X(7)	EFFICIENCY INCENTIVE (EX. C, PG.18C) (9)	MAXIMIZING INCENTIVE (5% of COSTS) (10) (4)X(5%)	TOTAL * INCENTIVE (11) (9)+(10)	TOTAL ESTIMATED COSTS TO BE RECOVERED (12) (4)+(8)+(11)
COMMERCIAL PROGRAMS												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
- Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Commercial A/C & Heat Pump Program												
- Air Conditioner Replacement	5	17	$738.60	$3,693	71	1,207	$0.07447	$90	$5	$0	$5	$3,788
- Heat Pump Replacement	10	24	$521.00	$5,210	279	6,696	$0.07430	$498	$581	$0	$581	$6,289
HVAC Diagnostic & Tune-Up												
- Air Conditioner	14	65	$338.71	$4,742	172	11,180	$0.07424	$830	$101	$0	$101	$5,673
- Heat Pump	8	31	$67.00	$536	410	12,710	$0.07429	$944	$236	$0	$236	$1,716
Commercial Load Management												
- Air Conditioner	18	15	$564.94	$10,169	0	0	$0.00000	$0	$0	$0	$0	$10,169
- Water Heating	18	15	$564.94	$10,169	0	0	$0.00000	$0	$0	$0	$0	$10,169
Commercial Incentive	58	55	$10,347.28	$600,142	3,739	205,645	$0.07512	$15,448	$138,078	$0	$138,078	$753,668
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TOTAL COMMERCIAL PROGRAMS	131	222		$634,661		237,438		$17,810	$139,001	$0	$139,001	$791,472
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INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)												
Smart Audit - Class 1	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	$0.00	$0	0	0	n/a	$0	$0	$0	$0	$0
Smart Financing - General	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	$0.00	$0	0	0	$0.00000	$0	$0	$0	$0	$0
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TOTAL INDUSTRIAL PROGRAMS	0	0		$0		0		$0	$0	$0	$0	$0
	========	========		========		========		========	========	========	========	========
TOTAL COMPANY	27,682	139,255		$1,357,742		3,443,424		$202,871	$216,521	$254	$216,775	$1,777,388
	========	========		========		========		========	========	========	========	========

* Lost revenue and efficiency incentives are based on prospective values.
** Cumulative participants include a reduction for the cumulative participants as of 01/01/2009 (High Efficiency Heat Pump, Energy Education for Students and Community Outreach Program (CFL)).

KENTUCKY POWER COMPANY
DERIVATION FOR
3 YEAR DSM EXPERIMENT
CALCULATION OF
EFFICIENCY INCENTIVE

PROGRAM DESCRIPTIONS	EFFICIENCY INCENTIVE $/PARTICIPANT (1) INITIAL VALUES	(2) PROSP. VALUES	(3) 1999 VALUES	(4) 2002/2003 VALUES	(5) 2005 VALUES	(6) 2008 VALUES	(7) 2009 VALUES	(8) 2010 VALUES	(9) 2011 VALUES
RESIDENTIAL PROGRAMS									
Energy Fitness	$78.22	$20.78	$33.89	$33.89	$33.89	n/a	n/a	n/a	n/a
Targeted Energy Efficiency									
- All Electric	$0.00	$0.00	$0.00	$0.00	$0.00	$77.22	$77.22	$77.22	$147.75
- Non-All Electric	$9.71	$1.66	$5.02	$4.28	$19.73	$61.68	$61.68	$61.68	($37.28)
Compact Fluorescent Bulb	$1.58	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
High - Efficiency Heat Pump									
- Resistance Heat	$19.73	$7.22	$44.19	$44.19	$44.19	n/a	n/a	n/a	n/a
- Non Resistance Heat	$16.69	$29.11	n/a	n/a	n/a	n/a	n/a	n/a	n/a
High - Efficiency Heat Pump									
- Mobile Home	$38.86	$32.50	$84.21	$28.92	$79.20	$139.99	$139.99	$139.99	$293.78
Mobile Home New Construction ***									
- Heat Pump	n/a	n/a	$44.42	$4.06	$124.96	$111.55	$111.55	$111.55	$94.01
- Air Conditioner				$0.41	$0.41	n/a	n/a	n/a	n/a
Modified Energy Fitness				$21.06	$42.08	$49.77	$49.77	$49.77	$14.66
High Efficiency Heat Pump									
- Resistance Heat Replacement							$478.10	$478.10	$78.12
- Heat Pump Replacement							$0.00	$0.00	$118.08
Energy Education for Student Program (NEED)							$4.98	$4.98	$1.72
Community Outreach Program (CFL)							$4.99	$4.99	$3.92
Residential Efficient Products									
- Compact Flourescent Lamp (CFL)								$0.69	$0.31
- Specialty Bulbs								$1.05	$0.34
- LED Lights								$0.00	($0.76)
HVAC Diagnostic & Tune-Up									
- Air Conditioner								$1.31	$1.31
- Heat Pump								$11.38	$11.38
Residential Load Management									
- Air Conditioner								$0.00	$0.00
- Water Heating								$0.00	$0.00
TOTAL RESIDENTIAL PROGRAMS									
*** Participants since 09/01/98									
COMMERCIAL PROGRAMS									
Smart Audit - Class 1	$0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Class 2	$0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Smart Financing - Existing Building	$506.34	$813.28	$232.54	$232.54	$232.54	$232.54	$232.54	$232.54	$232.54
Smart Financing - New Building	$50.33	$28.76	$262.33	$262.33	$262.33	$262.33	$262.33	$262.33	$262.33
Commercial A/C & Heat Pump Program									
- Air Conditioner Replacement								$0.93	$0.93
- Heat Pump Replacement								$58.10	$58.10
HVAC Diagnostic & Tune-Up									
- Air Conditioner								$7.24	$7.24
- Heat Pump								$29.56	$29.56
Commercial Incentive								$0.00	$2,380.66
Commercial Load Management									
- Air Conditioner								$0.00	$0.00
- Water Heating								$0.00	$0.00
TOTAL COMMERCIAL PROGRAMS									
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)									
Smart Audit - Class 1	$0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Smart Audit - Class 2	$0.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Smart Financing - General	$178.65	$382.80	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Smart Financing - Compressed Air System	$4,850.21	$4,048.80	n/a	n/a	n/a	n/a	n/a	n/a	n/a
TOTAL INDUSTRIAL PROGRAMS									
ANNUAL SHARED SAVINGS ($)									

NUMBER OF NEW PARTICIPANTS

PROGRAM DESCRIPTIONS	YEAR 1 (10)	YEAR 2 (11) 1st half	(12) 2nd half	YEAR 3 (13) 1st half	(14) 2nd half	YEAR 4 (15) 1st half	(16) 2nd half	YEAR 5 (17) 1st half	(18) 2nd half	YEAR 6 (19) 1st half	(20) 2nd half	YEAR 7 (21) 1st half
Energy Fitness	552	273	689	544	448	306	0	0	0	0	0	0
Targeted Energy Efficiency - All Electric	223	118	175	122	131	75	66	66	99	62	88	63
Targeted Energy Efficiency - Non-All Electric	74	26	93	24	42	12	8	28	21	18	46	32
Compact Fluorescent Bulb	269	0	0	0	0	0	0	0	0	0	0	0
High - Efficiency Heat Pump - Resistance Heat	539	123	220	21	108	99	140	38	25	23	30	1
High - Efficiency Heat Pump - Non Resistance Heat	527	124	186	26	64	2	0	0	0	0	0	0
High - Efficiency Heat Pump - Mobile Home	356	109	127	66	173	101	134	45	43	53	47	43
Mobile Home New Construction - Heat Pump	0	0	0	0	33	98	123	101	94	83	92	57
COMMERCIAL PROGRAMS Smart Audit - Class 1	91	243	169	204	178	166	188	144	159	134	131	125
Smart Audit - Class 2	5	11	26	28	9	16	21	8	29	28	5	8
Smart Financing - Existing Building	1	0	11	6	29	6	25	16	24	15	15	7
Smart Financing - New Building	0	1	0	1	5	3	8	4	0	8	18	5
INDUSTRIAL Smart Audit - Class 1	15	9	21	12	3	0	0	0	0	0	0	0
INDUSTRIAL Smart Audit - Class 2	2	1	0	1	0	0	0	0	0	0	0	0
Smart Financing - General	0	0	0	0	1	0	0	0	0	0	0	0
Smart Financing - Compressed Air System	0	0	0	0	0	0	0	0	0	0	0	0

PROGRAM DESCRIPTIONS	(22) 2nd half	YEAR 8 (23) 1st half	(24) 2nd half	YEAR 9 (25) 1st half	(26) 2nd half	YEAR 10 (27) 1st half	(28) 2nd half	YEAR 11 (29) 1st half	(30) 2nd half	YEAR 12 (31) 1st half	(32) 2nd half	YEAR 13 (33) 1st half	(34) 2nd half	YEAR 14 (35) 1st half	(36) 2nd half
Energy Fitness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Targeted Energy Efficiency - All Electric	76	100	69	72	89	88	85	75	87	128	100	119	89	119	140
Targeted Energy Efficiency - Non-All Electric	13	7	69	10	72	57	26	34	46	29	50	56	20	22	61
Compact Fluorescent Bulb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High - Efficiency Heat Pump - Resistance Heat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High - Efficiency Heat Pump - Non Resistance Heat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High - Efficiency Heat Pump - Mobile Home	43	34	29	41	46	34	40	48	45	50	45	61	74	61	99
Mobile Home New Construction - Heat Pump	61	46	64	68	70	67	83	90	94	84	129	95	108	88	103
Mobile Home New Construction - Air Conditioner		0	1	1	0	0	0	0	0	0	0	0	0	0	0
Modified Energy Fitness		101	441	334	391	371	351	440	560	515	485	560	440	425	375
High Efficiency Heat Pump - Resistance Heat Replacement														28	63
High Efficiency Heat Pump - Heat Pump Replacement														61	156
Energy Education for Student Program (NEED)														0	1,130
Community Outreach Program (CFL)														926	2,818
COMMERCIAL PROGRAMS Smart Audit - Class 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Audit - Class 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Financing - Existing Building	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Financing - New Building	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INDUSTRIAL Smart Audit - Class 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INDUSTRIAL Smart Audit - Class 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Financing - General	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Financing - Compressed Air System	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KENTUCKY POWER COMPANY DERIVATION FOR 3 YEAR DSM EXPERIMENT CALCULATION OF EFFICIENCY INCENTIVE																													Exhibit C PAGE 18B of	19
																			ANNUAL SHARED SAVINGS ($)											
PROGRAM DESCRIPTIONS	YEAR 15		YEAR 16			YEAR 1	YEAR 2		YEAR 3		YEAR 4		YEAR 5		YEAR 6		YEAR 7		YEAR 8		YEAR 9		YEAR 10		YEAR 11		YEAR 12		YEAR 13	
	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)
						(1)X(10)	(1)X(11)	(2)X(12)	(2)X(13)	(2)X(14)	(3)X(15)	(3)X(16)	(3)X(17)	(3)X(18)	(3)X(19)	(3)X(20)	(4)X(21)	(4)X(22)	(4)X(23)	(4)X(24)	(4)X(25)	(4)X(26)	(5)X(27)	(5)X(29)	(5)X(29)	(5)X(30)	(5)X(31)	(5)X(32)	(6)X(33)	(6)X(34)
	1st half	2nd half	1st half	3rd qtr	4th qtr		1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half
RESIDENTIAL PROGRAMS																														
Energy Fitness	0	0	0	0	0	$43,177	$21,354	$14,317	$11,304	$9,309	$10,370	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Targeted Energy Efficiency																														
- All Electric	174	172	110	130	110	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$9,169	$6,873
- Non-All Electric	31	23	6	26	23	$719	$252	$154	$40	$70	$60	$40	$141	$105	$90	$231	$137	$[illegible]6	$30	$295	$43	$308	$1,125	$513	$671	$908	$572	$987	$3,454	$1,234
Compact Fluorescent Bulb	0	0	0	0	0	$425	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
High - Efficiency Heat Pump																														
- Resistance Heat	0	0	0	0	0	$10,634	$2,427	$1,588	$152	$780	$4,375	$6,187	$1,679	$1,105	$1,016	$1,326	$44	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	0	0	0	$8,796	$2,070	$5,414	$757	$1,863	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
High - Efficiency Heat Pump																														
- Mobile Home	97	136	94	77	59	$13,834	$4,236	$4,128	$2,145	$5,623	$8,505	$11,284	$3,789	$3,621	$4,463	$3,958	$1,244	$1,2[illegible]4	$983	$839	$1,186	$1,330	$2,693	$3,168	$3,802	$3,564	$3,960	$3,564	$8,539	$10,359
Mobile Home New Construction ***																														
- Heat Pump	40	119	68	70	67	$0	$0	$0	$0	$0	$4,353	$5,464	$4,486	$4,175	$3,687	$4,087	$231	$2[illegible]8	$187	$260	$276	$284	$8,372	$10,372	$11,246	$11,746	$10,497	$16,120	$10,597	$12,047
- Air Conditioner	0	0	0	0	0														$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Modified Energy Fitness	501	699	645	318	248														$2,127	$9,287	$7,034	$8,234	$15,612	$14,770	$18,515	$23,565	$21,671	$20,409	$27,871	$21,899
High Efficiency Heat Pump																														
- Resistance Heat Replacement	97	155	154	58	60																									
- Heat Pump Replacement	272	237	212	146	142																									
Energy Education for Student Program (NEED)	488	1,059	938	200	862																									
Community Outreach Program (CFL)	2,644	2,167	2,518	1,432	850																									
Residential Efficient Products																														
- Compact Flourescent Lamp (CFL)		0	77,764	34,309	23,872																									
- Specialty Bulbs		0	0	13	12																									
- LED Lights		0	0	18	757																									
HVAC Diagnostic & Tune-Up																														
- Air Conditioner		0	64	93	23																									
- Heat Pump		28	290	84	26																									
Residential Load Management																														
- Air Conditioner			0	30	220																									
- Water Heating			0	30	220																									
TOTAL RESIDENTIAL PROGRAMS						$77,585	$30,339	$25,601	$14,398	$17,645	$27,663	$22,975	$10,095	$9,006	$9,256	$9,602	$1,656	$1,[illegible]48	$3,327	$10,681	$8,539	$10,156	$27,802	$28,823	$34,234	$39,783	$36,700	$41,080	$59,650	$52,412
*** Participants since 09/01/98																														
COMMERCIAL PROGRAMS																														
Smart Audit - Class 1	0	0	0	0	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
- Class 2	0	0	0	0	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Smart Financing - Existing Building	0	0	0	0	0	$506	$0	$8,946	$6,506	$23,585	$1,395	$5,814	$3,721	$5,581	$3,488	$3,488	$1,628	$5,[illegible]14	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Smart Financing - New Building	0	0	0	0	0	$0	$50	$0	$29	$144	$787	$2,099	$1,049	$0	$2,099	$4,722	$1,312	$4,[illegible]97	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Commercial A/C & Heat Pump Program																														
- Air Conditioner Replacement		0	1	19	5																									
- Heat Pump Replacement		0	15	15	10																									
HVAC Diagnostic & Tune-Up																														
- Air Conditioner		0	1	45	14																									
- Heat Pump		1	18	14	8																									
Commercial Incentive		0	0	30	58																									
Commercial Load Management																														
- Air Conditioner			0	7	18																									
- Water Heating			0	7	18																									
TOTAL COMMERCIAL PROGRAMS						$506	$50	$8,946	$6,535	$23,729	$2,182	$7,913	$4,770	$5,581	$5,587	$8,210	$2,940	$10,[illegible]11	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
INDUSTRIAL PROGRAMS -																														
(w/Est. Opt-Outs Removed)																														
Smart Audit - Class 1	0	0	0	0		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Smart Audit - Class 2	0	0	0	0		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Smart Financing - General	0	0	0	0		$0	$0	$0	$0	$383	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	0	0	0	0		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS						$0	$0	$0	$0	$383	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ANNUAL SHARED SAVINGS ($)						$78,091	$30,389	$34,547	$20,933	$41,757	$29,845	$30,888	$14,865	$14,587	$14,843	$17,812	$4,596	$11,[illegible]59	$3,327	$10,681	$8,539	$10,156	$27,802	$28,823	$34,234	$39,783	$36,700	$41,080	$59,650	$52,412
						=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======	=======

KENTUCKY POWER COMPANY DERIVATION FOR 3 YEAR DSM EXPERIMENT CALCULATION OF EFFICIENCY INCENTIVE						Exhibit C PAGE 18C of	19
PROGRAM DESCRIPTIONS	YEAR 14 (67)	(68)	YEAR 15 (69)	(70)	YEAR 16 (71)	(72)	(73)
	(7)X(35)	(7)X(36)	(8)X(37)	(8)X(38)	(9)X(39)	(9)X(40)	(9)X(41)
	1st half	2nd half	1st half	2nd half	1st half	3rd qtr	4th qtr
RESIDENTIAL PROGRAMS							
Energy Fitness	$0	$0	$0	$0	$0	$0	$0
Targeted Energy Efficiency							
- All Electric	$9,189	$10,811	$13,436	$13,282	$16,253	$19,208	$16,253
- Non-All Electric	$1,357	$3,762	$1,912	$1,419	($224)	($969)	($857)
Compact Fluorescent Bulb	$0	$0	$0	$0	$0	$0	$0
High - Efficiency Heat Pump							
- Resistance Heat	$0	$0	$0	$0	$0	$0	$0
- Non Resistance Heat	$0	$0	$0	$0	$0	$0	$0
High - Efficiency Heat Pump							
- Mobile Home	$8,539	$13,859	$13,579	$19,039	$27,615	$22,621	$17,333
Mobile Home New Construction ***							
- Heat Pump	$9,816	$11,490	$4,462	$13,274	$6,393	$6,581	$6,299
- Air Conditioner	$0	$0	$0	$0	$0	$0	$0
Modified Energy Fitness	$21,152	$18,664	$24,935	$34,789	$9,456	$4,662	$3,636
High Efficiency Heat Pump							
- Resistance Heat Replacement	$13,387	$30,120	$46,376	$74,106	$12,030	$4,531	$4,687
- Heat Pump Replacement	$0	$0	$0	$0	$25,033	$17,240	$16,767
Energy Education for Student Program (NEED)	$0	$5,627	$2,430	$5,274	$1,613	$344	$1,483
Community Outreach Program (CFL)	$4,621	$14,062	$13,194	$10,813	$9,871	$5,613	$3,332
Residential Efficient Products							
- Compact Flourescent Lamp (CFL)				$0	$24,107	$10,630	$7,400
- Specialty Bulbs				$0	$0	$4	$4
- LED Lights				$0	$0	($14)	($575)
HVAC Diagnostic & Tune-Up							
- Air Conditioner				$0	$84	$122	$30
- Heat Pump				$319	$3,300	$956	$296
Residential Load Management							
- Air Conditioner					$0	$0	$0
- Water Heating					$0	$0	$0
TOTAL RESIDENTIAL PROGRAMS	$68,061	$108,395	$120,324	$172,315	$135,531	$91,535	$76,088
*** Participants since 09/01/98							
COMMERCIAL PROGRAMS							
Smart Audit - Class 1	$0	$0	$0	$0	$0	$0	$0
- Class 2	$0	$0	$0	$0	$0	$0	$0
Smart Financing - Existing Building	$0	$0	$0	$0	$0	$0	$0
Smart Financing - New Building	$0	$0	$0	$0	$0	$0	$0
Commercial A/C & Heat Pump Program							
- Air Conditioner Replacement				$0	$1	$18	$5
- Heat Pump Replacement				$0	$872	$872	$581
HVAC Diagnostic & Tune-Up							
- Air Conditioner				$0	$7	$326	$101
- Heat Pump				$30	$532	$414	$236
Commercial Incentive				$0	$0	$71,420	$138,078
Commercial Load Management							
- Air Conditioner					$0	$0	$0
- Water Heating					$0	$0	$0
TOTAL COMMERCIAL PROGRAMS	$0	$0	$0	$30	$1,412	$73,050	$139,001
INDUSTRIAL PROGRAMS -							
(w/Est. Opt-Outs Removed)							
Smart Audit - Class 1	$0	$0	$0	$0	$0	$0	$0
Smart Audit - Class 2	$0	$0	$0	$0	$0	$0	$0
Smart Financing - General	$0	$0	$0	$0	$0	$0	$0
Smart Financing - Compressed Air System	$0	$0	$0	$0	$0	$0	$0
TOTAL INDUSTRIAL PROGRAMS	$0	$0	$0	$0	$0	$0	$0
ANNUAL SHARED SAVINGS ($)	$68,061	$108,395	$120,324	$172,345	$136,943	$164,565	$215,089

	KENTUCKY POWER COMPANY		Exhibit C	
	FORECAST OF 2011 KENTUCKY RETAIL ENERGY SALES IN KWH		PAGE 19 of	19
	FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL SECTORS			
	PROGRAM YR 16 - 2011			
LINE NO.	YEAR	RESIDENTIAL SECTOR	COMMERCIAL SECTOR	INDUSTRIAL SECTOR
1	TOTAL ULTIMATE SALES (KWH) *	1,199,800,000	736,400,000	1,614,400,000
2	LESS NON-METERED **	7,198,800	4,418,400	9,686,400
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3	TOTAL ESTIMATED RETAIL KWH SALES	1,192,601,200	731,981,600	1,604,713,600
4	LESS OPT - OUT CUSTOMERS KWH	0	0	0
		-------------------	-------------------	-------------------
5	KWH BEFORE LOST REVENUE IMPACTS	1,192,601,200	731,981,600	1,604,713,600
6	LESS LOST REVENUE IMPACTS ***	10,336,022	305,281	0
		-------------------	-------------------	-------------------
7	ADJUSTED KWH BY SECTOR	1,182,265,178	731,676,319	1,604,713,600
		============	============	============
8	LINE 7/LINE 1	98.5%	99.4%	99.4%
		============	============	============
LINE NO.	PROGRAM YR 16 (3rd QTR)	RESIDENTIAL SECTOR	COMMERCIAL SECTOR	INDUSTRIAL SECTOR
9	TOTAL ULTIMATE SALES (KWH) *	554,100,000	373,200,000	774,900,000
10	LINE 8	98.5%	99.4%	99.4%
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11	ADJUSTED KWH BY SECTOR	545,788,500	370,960,800	770,250,600
		============	============	============
LINE NO.	PROGRAM YR 16 (4th QTR)	RESIDENTIAL SECTOR	COMMERCIAL SECTOR	INDUSTRIAL SECTOR
12	TOTAL ULTIMATE SALES (KWH) *	645,700,000	363,200,000	839,500,000
13	LINE 8	98.5%	99.4%	99.4%
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14	ADJUSTED KWH BY SECTOR	636,014,500	361,020,800	834,463,000
		============	============	============
*	SOURCE: 2011 LOAD FORECAST COMPILED BY			
	AEP CORPORATE PLANNING AND BUDGETING DEPT.			
**	.60% ESTIMATED TO BE NON-METERED (OL) DETERMINED			
	FROM BILLED JURISDICTIONAL TARIFF SUMMARY FOR			
	12 MOS. ENDED DECEMBER 2009.			
***	LOST REVENUE IMPACTS			
	Page 17A of 18, Column 6 - TOTAL RESIDENTIAL PROGRAMS	4,465,361	8,776	-
	Page 17B of 18, Column 6 - TOTAL RESIDENTIAL PROGRAMS	2,664,675	59,067	-
	Page 17C of 18, Column 6 - TOTAL RESIDENTIAL PROGRAMS	3,205,986	237,438	-
	TOTAL	10,336,022	305,281	-