KENTUCKY POWER COMPANY

Demand Side Management
Status Report

Case No. 2005-00333

August, 2005

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AMERICAN ELECTRIC POWER

August 15, 2005

Elizabeth O'Donnell, Executive Director
Kentucky Public Service Commission
P. O. Box 615
211 Sower Boulevard
Frankfort, KY 40602

Dear Ms. O'Donnell:

Re: Case No. 2005-00333

In the Matter of the Joint Application Pursuant to 1994 House Bill No. 501 for the Approval of Kentucky Power Company (KPCo/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 KPCo 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' nineteenth six-month status report and the specific program evaluation reports pursuant to Commission order for extending programs past December 31, 2005. The status report and the accompanying evaluation reports describe the operation and progress of the Demand-Side Management Plan.

Specifically, the Joint Applicants seek authority for Kentucky Power, 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.

In this filing, the DSM Collaborative is requesting Commission approval for a three-year extension of Kentucky Power's Targeted Energy Efficiency Program, High Efficiency Heat Pump – Mobile Home Program, Mobile Home New Construction Program and Modified Energy Fitness Program. Evaluation reports for the first two years of the previous three-year extension (2003 – 2004) have been provided to justify the continuation of the programs.

The DSM Collaborative is also requesting Commission approval to increase annual participation levels for the Modified Energy Fitness Program to 1,000 customers per year due to the customer's overwhelming endorsement of the program. With the current backlog of customers, the Company and the implementation contractor (Honeywell, DMC Services) both agree that the annual achievement of 1,000 energy audits is feasible.

The DSM Collaborative is also requesting Commission approval to discontinue the incentive at the end of the 2005 calendar year for the installation of high efficiency air conditioning in the Mobile Home New Construction Program due to lower than expected participation levels and the revised Federal energy efficiency standards that are scheduled to go into effect on January 23, 2006.

On April 14, 2005, the Department of Energy's Office of Hearing and Appeals (OHA) granted Nordyne's application for exception relief from the 2006 13.0 SEER requirement for split system air-conditioners of the 3 to 5 ton capacity. The OHA granted Nordyne's application, which in effect would permit a 12.0 SEER air-conditioning system to be installed in HUD-Code homes until January 1, 2010. Only Nordyne 12.0 SEER air-conditioning systems will be allowed to be installed in HUD-Code homes. Since 70% of the manufactured housing dealers use Nordyne equipment, this exception eliminates any possibility of upgrading air-conditioning systems next year. Therefore, the DSM Collaborative is recommending the measure for high efficiency air-conditioning be discontinued December 31, 2005.

The commercial DSM programs were discontinued December 31, 2002. The Company has continued to collect lost revenues for the installed energy conservation measures in the Commercial Smart Incentive Program in accordance with the sunset provision contained in the original filing. The Company will discontinue collecting lost revenues December 31, 2005. The DSM Collaborative is requesting Commission approval to cease applying the DSM factor to the commercial sector bills with the last billing cycle in December 2005. Any over or under collection amount would be proposed to be rolled into the residential sector as was done when the industrial sector's DSM programs were discontinued.

After updating the input files with 2005 data and running the B/C calculations, the cost-effectiveness of the programs were high compared to previous evaluation results. To determine which of the 2005 components contributed to the increased cost-effectiveness, the 2002 values were inserted into the calculations one at a time. In doing so, the analysis showed that the marginal costs, emission costs,

and On Peak and Off Peak system sales contributed significantly (greater than 0.1 impact) to the B/C ratios. The summary also shows the changes in the values of those components. The changes in amounts are computed by subtracting the 2002 values from the 2005 values. Therefore, a positive number indicates an increase in a value from 2002 to 2005. The attached summary (Appendix A of this letter) of the Benefit/Cost ratios explains the significant increase in the cost-effectiveness of the DSM programs. As a package, the four residential programs set forth in this filing have a combined TRC Benefit/Cost Ratio of 3.66 (excluding TRC for air conditioning measure in the Mobile Home New Construction Program).

The revised DSM Adjustment clause factor for each customer sector has been agreed upon and is proposed by the DSM Collaborative (see Exhibit C, Column 4, Lines 12 and 25). The proposed factor for the residential and commercial sectors is the midpoint between the ceiling and the floor calculations as demonstrated on Exhibit C. The floor was calculated by taking the Collaborative's projected remaining fourth quarter position (see Exhibit C, Column 4, Lines 2 and 15) and dividing by the adjusted estimated sector KWH sales for the remaining fourth quarter (see Exhibit C, Column 4, Lines 10 and 23). The ceiling was calculated by taking the Collaborative's projected remaining fourth quarter position (see Exhibit C, Column 4, Lines 4 and 17) and dividing by the adjusted estimated sector KWH sales for the remaining fourth quarter (see Exhibit C, Column 4, Lines 10 and 23).

The Joint Applicants request the Commission to approve the following:

(1) A request for a three-year extension of the Targeted Energy Efficiency Program, the High Efficiency Heat Pump – Mobile Home Program, the Mobile Home New Construction Program and the Modified Energy Fitness Program.

(2) The DSM Collaborative's request to increase annual participation levels for the Modified Energy Fitness Program to 1,000 audits per year.

(3) The DSM Collaborative's request to discontinue the incentive for the installation of high efficiency air conditioning in the Mobile Home New Construction Program at the end of the 2005 calendar year.

(4) The four residential programs as set forth in our filing. The four Programs as a package have a TRC Benefit/Cost Ratio of 3.66 (excluding TRC for air conditioning measure in the Mobile Home New Construction Program).

(5) The Experimental DSM Electric Tariff to become effective September 28, 2005. This will allow the Company to utilize new factors with the first billing cycle in October 2005.

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

Sincerely,

Errol K. Wagner
Director of Regulatory Services

enclosure

APPENDIX A

Summary

The following shows which changes in data contributes to benefit/cost ratios that are higher than those seen historically for Mobile Home Heat Pump and Mobile Home New Construction programs. Updates to marginal costs, emissions, and system sales files were the drivers for the higher B/C ratios.

Marginal costs for the On Peak period increased up to 118% and for Off Peak increased up to 68% due to increases in coal cost and SO2 and NOx allowance costs. Emissions rates for SO2 increased a maximum of 96% while CO2 and NOx decreased 15% and 33% respectively. System sales utilization decreased 35% and 80% for On Peak and Off Peak, respectively, from the 2002 file. The combination of these changes results in the higher B/C ratios.

B/C Ratio Analysis

The following shows where the rise in the cost/benefit ratios comes from for the Mobile Home Heat Pump and Mobile Home New Construction DSM programs.

The methodology for taking a closer look at the B/C ratios was to start with all of the 2005 input files and then add in 2002 input files one at a time to see which files had significant impacts (greater that 0.1 impact) on any B/C ratio. The files that commonly drove this magnitude of change were the marginal cost, emissions, and the system sales files. Once all of the 2002 input files were used to determine the B/C ratio, the ratios fell in line with historical magnitudes.

Table 1 shows the B/C ratios for the MHHP program, and how they change by adding back in the 2002 input files.

Table 1: MHHP B/C Ratios Change with Addition of 2002 Input Files

	TRC	PART.	UC	RIM
All 2005 Input Files	5.53	3.49	4.42	0.75
Use 02 MC File	-1.29	0.00	-1.02	-0.18
Use 02 SS File	0.38	0.00	0.30	0.06
Use 02 TD File	0.00	0.00	0.00	0.00
Use 02 EM File	-2.87	0.00	-2.30	-0.16
Use 02 XV File	0.00	0.00	0.00	0.00
All 2002 Input Files	1.75	3.49	1.40	0.47

Tables 2 and 3 show the B/C ratios for the MHNC program, heat pump and high efficiency AC respectively, and how they change by adding back in the 2002 input files.

Table 2: MHNC Heat Pump B/C Ratios Change with Addition of 2002 Input Files

	TRC	PART.	UC	RIM
All 2005 Input Files	4.14	2.37	6.60	0.78
Use 02 MC File	-0.97	0.00	-1.54	-0.18
Use 02 SS File	0.29	0.00	0.46	0.06
Use 02 TD File	0.00	0.00	0.00	0.00
Use 02 EM File	-2.27	0.00	-3.62	-0.15
Use 02 XV File	0.00	0.00	0.00	0.00
All 2002 Input Files	1.19	2.37	1.90	0.51

Table 3: MHNC High Efficiency AC B/C Ratios Change with Addition of 2002 Input Files

	TRC	PART.	UC	RIM
All 2005 Input Files	5.15	1.69	5.35	1.60
Use 02 MC File	-0.33	0.00	-0.35	-0.11
Use 02 SS File	0.13	0.00	0.13	0.04
Use 02 TD File	0.00	0.00	0.00	0.00
Use 02 EM File	-3.44	0.00	-3.58	-0.66
Use 02 XV File	0.00	0.00	0.00	0.00
All 2002 Input Files	1.5	1.69	1.55	0.87

The files that frequently contribute significant changes to the B/C ratios include the marginal cost, emissions, and the system sales files.

Marginal Cost

The $/MW energy delta shown in Table 4 results from subtracting the 2002 marginal cost from the 2005 marginal energy cost. Therefore, a positive number indicates an increase in marginal energy costs from 2002.

The marginal energy costs rose with double digit increases for most years and, in some cases, increased over 100% due to increases in coal cost and SO2 and NOx allowance costs. The only period for which there was a decrease was for off peak periods beginning in 2015. With the increase in marginal energy costs, DSM measures became more beneficial for all but the Participant Test.

Table 4: 2005 Marginal Energy Cost Minus 2002 Marginal Cost in $/MW

Year	Winter On Peak	Winter Off Peak	Summer On Peak	Summer Off Peak
2005	$ 13.00	$ 9.77	$ 16.31	$ 8.08
2006	$ 20.90	$ 10.55	$ 15.54	$ 7.40
2007	$ 16.81	$ 7.17	$ 9.91	$ 4.85
2008	$ 15.19	$ 8.22	$ 11.78	$ 4.77
2009	$ 14.88	$ 6.73	$ 12.28	$ 3.49
2010	$ 16.20	$ 7.51	$ 10.19	$ 1.83
2011	$ 21.20	$ 8.34	$ 15.59	$ 1.49
2012	$ 25.18	$ 7.38	$ 14.47	$ 0.50
2013	$ 17.99	$ 3.75	$ 15.65	$ 0.62
2014	$ 14.61	$ 1.23	$ 12.49	$ (1.58)
2015	$ 20.72	$ (5.40)	$ 11.01	$ (3.37)
2016	$ 22.31	$ (2.06)	$ 16.57	$ (1.61)
2017	$ 23.81	$ (3.28)	$ 17.07	$ (1.41)
2018	$ 23.95	$ (5.08)	$ 16.14	$ (1.96)
2019	$ 26.95	$ (3.33)	$ 19.23	$ (0.77)
2020	$ 29.59	$ (2.20)	$ 21.93	$ 0.38

Emissions

The $/MWh delta shown in Table 5 results from subtracting the 2002 emission rates from the 2005 emission rates. Therefore, a positive number indicates an increase in emission rates from 2002.

Data Descriptions:

SO2	SO2 emissions rates for all units
CO2	CO2 emissions rates for all units
NOx	NOx emissions rates for all units
SO2v	Value of SO2 emissions allowance

In percentage terms, there were decreases for all but SO2 emissions. The largest magnitude of increase was for SO2, with decreases for CO2 and NOX. These changes would affect all but the Participant test.

Table 5: 2005 Emissions Minus 2002 Emissions

Year	so2 (lbs/MWh)	co2 (lbs/MWh)	nox (lbs/MWh)	so2v$ ($/ton)
2005	-0.2	-450.9	-2.3	467.0
2006	0.5	-491.1	-2.6	502.0
2007	1.0	-669.0	-2.9	486.0
2008	3.9	-312.4	-2.2	469.0
2009	1.1	-329.5	-1.6	475.0
2010	-1.2	-258.0	-3.0	480.0
2011	-4.4	-766.7	-3.8	458.0
2012	-0.6	-690.8	-3.4	368.0
2013	-1.4	-966.0	-3.3	455.0
2014	-1.5	-980.1	-2.9	592.0
2015	1.0	-753.6	-1.5	578.0
2016	1.0	-756.4	-1.5	564.0
2017	1.2	-714.4	-1.3	550.0
2018	2.4	-639.2	-0.8	535.0
2019	2.4	-634.5	-0.8	519.0
2020	2.4	-634.5	-0.8	519.0

System Sales

The $/MW delta shown in Table 6 results from subtracting the 2002 system sales from the 2005 system sales. Therefore, a positive number indicates an increase from 2002.

In percentage terms, the Net Realization was a significant increase until 2014, when it decreased slightly relative to the 2002 input file. The utilization rates in the 2002 input file were set at 100%, and have been adjusted downward based on a February 2005 PROMOD run. The 100% utilization accounts for how the B/C ratios for all but the Participant Test increase in the sensitivity analysis when the 2002 system sales file is used.

Table 6: 2005 System Sales Minus 2002 System Sales

Year	Net Realization ($/MWh)	Total (% utilization)	Peak (% utilization)	Off Peak (% utilization)
2005	6.5	-65.0	-35.0	-80.0
2006	8.2	-65.0	-35.0	-80.0
2007	6.8	-65.0	-35.0	-80.0
2008	8.3	-65.0	-35.0	-80.0
2009	8.1	-65.0	-35.0	-80.0
2010	8.8	-65.0	-35.0	-80.0
2011	5.9	-65.0	-35.0	-80.0
2012	4.3	-65.0	-35.0	-80.0
2013	2.1	-65.0	-35.0	-80.0
2014	-0.1	-65.0	-35.0	-80.0
2015	-0.2	-65.0	-35.0	-80.0
2016	-0.3	-65.0	-35.0	-80.0
2017	-0.3	-65.0	-35.0	-80.0
2018	-0.3	-65.0	-35.0	-80.0
2019	-0.3	-65.0	-35.0	-80.0
2020	-0.3	-65.0	-35.0	-80.0

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

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* ($ Per KWH)	
Floor Factor	=	0.000320	0.000041	- 0 -	(I) (I)
Ceiling Factor	=	0.000624	0.000068	- 0 -	(I) (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)		$ 306,288	$ 14,259	- 0 -	(D) (I)
S ©		649,080,700	261,854,100	- 0 -	(D) (D)
Adjustment Factor	$	0.000472	0.000055	- 0 -	(I) (I)

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

DATE OF ISSUE August 15, 2005 EFFECTIVE DATE September 28, 2005

ISSUED BY Errol K. Wagner
ERROL K. WAGNER DIRECTOR OF REGULATORY SERVICES FRANKFORT, KENTUCKY
NAME TITLE ADDRESS

Issued by authority of an Order of the Public Service Commission in Case No. dated

KENTUCKY POWER COMPANY — Exhibit C

DERIVATION OF 3 SECTOR SURCHARGES FOR 3 YR EXPERIMENT — PAGE 1 of 13

	RESIDENTIAL SECTOR	TOTAL YEARS 1 thru 9	YEAR 10 (2005) 1st HALF	YEAR 10 (2005) 3rd QTR	YEAR 10 (2005) 4th QTR	TOTAL
		(1)	(2)	(3)	(4)	(5)
1	CURRENT PERIOD AMOUNT TO BE RECOVERED	**$6,866,991**	$415,281	$201,436	$197,054	$7,680,762
2	CUMULATIVE (OVER)/UNDER COLLECTION	0	168,816	149,830	207,761	0
3	18 MOS. RETROACTIVE(OVER)/UNDER ADJUSTMENT	(41,824)	0	0	$0	($41,824)
4	TOTAL TO BE RECOVERED	6,825,167	584,097	351,266	404,815	7,638,938
5	TOTAL AMOUNT RECOVERED	6,646,518	434,267	0	0	$7,080,785
6	EXPECTED FUTURE RECOVERIES	0	0	143,505	306,366	$449,871
7	TRANSFER PORTION OF BALANCE FROM INDUSTRIAL	(9,833)	0	0	0	($9,833)
8	(OVER)/UNDER COLLECTION TO BE REFUNDED	$168,816	$149,830	$207,761	$98,449	$98,449
9	AMOUNT TO BE RECOVERED				**$404,815**	
10	ADJ. ESTIMATED SECTOR KWH - YEAR 10			569,466,200	649,080,700	
	SURCHARGE RANGE ($ PER KWH)					
11	FLOOR (CARRYOVER)	COL. 4, L 2 / COL. 4, L 10			0.000320	
12	MIDPOINT - proposed rate			0.000252	**0.000472**	
13	CEILING (TOTAL COST)	COL. 4, L 4 / COL. 4, L 10			0.000624	

	COMMERCIAL SECTOR	TOTAL YEARS 1 thru 9	YEAR 10 (2005) 1st HALF	YEAR 10 (2005) 3rd QTR	YEAR 10 (2005) 4th QTR	TOTAL
		(1)	(2)	(3)	(4)	(5)
14	CURRENT PERIOD AMOUNT TO BE RECOVERED	**$2,854,245**	$27,168	$10,972	$6,933	$2,899,318
15	CUMULATIVE (OVER)/UNDER COLLECTION	0	(5,565)	2,033	10,792	0
16	18 MOS. RETROACTIVE(OVER)/UNDER ADJUSTMENT	1,520	0	0	0	$1,520
17	TOTAL TO BE RECOVERED	2,855,765	21,603	13,005	17,725	2,900,838
18	TOTAL AMOUNT RECOVERED	2,858,052	19,570	0	0	$2,877,622
19	EXPECTED FUTURE RECOVERIES	0	0	2,213	14,402	$16,615
20	TRANSFER PORTION OF BALANCE FROM INDUSTRIAL	(3,278)	0	0	0	($3,278)
21	(OVER)/UNDER COLLECTION TO BE REFUNDED	($5,565)	$2,033	$10,792	$3,323	$3,323
22	AMOUNT TO BE RECOVERED				**$17,725**	
23	ADJ. ESTIMATED SECTOR KWH - YEAR 10			368,800,200	261,854,100	
	SURCHARGE RANGE ($ PER KWH)					
24	FLOOR (CARRYOVER)	COL. 4, L 15 / COL. 4, L 23			0.000041	
25	MIDPOINT - proposed rate			0.000006	**0.000055**	
26	CEILING (TOTAL COST)	COL. 4, L 17 / COL. 4, L 23			0.000068	

	INDUSTRIAL SECTOR	TOTAL YEARS 1 thru 9	YEAR 10 (2005) 1st HALF	YEAR 10 (2005) 3rd QTR	YEAR 10 (2005) 4th QTR	TOTAL
		(1)	(2)	(3)	(4)	(5)
27	CURRENT PERIOD AMOUNT TO BE RECOVERED	**$79,026**	$0	$0	$0	$79,026
28	CUMULATIVE (OVER)/UNDER COLLECTION	0	0	0	0	0
29	18 MOS. RETROACTIVE(OVER)/UNDER ADJUSTMENT	0	0	0	0	$0
30	TOTAL TO BE RECOVERED	79,026	0	0		79,026
31	TOTAL AMOUNT RECOVERED	92,137	0	0	0	$92,137
32	EXPECTED FUTURE RECOVERIES	0	0	0	0	$0
33	TRANSFER BALANCE TO RESIDENTIAL & COMMERCIAL	13,111	0	0	0	$13,111
34	(OVER)/UNDER COLLECTION TO BE REFUNDED	$0	$0	$0	$0	$0
35	AMOUNT TO BE RECOVERED				**$0**	
36	ADJ. ESTIMATED SECTOR KWH - YEAR 10			300,935,400	324,936,600	
	SURCHARGE RANGE ($ PER KWH)					
37	FLOOR (CARRYOVER)				0.000000	
38	MIDPOINT				**0.000000**	
39	CEILING (TOTAL COST) - proposed rate				0.000000	

1996

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.9B) (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

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 1997

Exhibit C
PAGE 3A of 13

YEAR 2 (1st HALF)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACT. PROGRAM	NET LOST REV/6 MOS	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL *	TOTAL EST. COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/6 MOS	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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.

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KENTUCKY POWER COMPANY

ESTIMATED SECTOR SURCHARGES FOR 3 YR PROGRAM

YEAR 2 (3rd QTR)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACT. PROGRAM COSTS	NET LOST REV/QTR (KWH/PARTIC)	TOTAL ENERGY SAVINGS KWH/QTR	NET LOST REVENUE ($/KWH)	TOTAL NET * LOST REVENUES	EFFICIENCY INCENTIVE (EX. C, PG.9B)	MAXIMIZING INCENTIVE (5% of COSTS)	TOTAL * INCENTIVE	TOTAL EST. COSTS TO BE RECOVERED
PROGRAM DESCRIPTIONS	NUMBER	NUMBER	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/QTR	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACT. PROGRAM	NET LOST REV/QTR	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL *	TOTAL EST. COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/QTR	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACT. PROGRAM	NET LOST REV/6 MOS	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL *	TOTAL EST. COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/6 MOS	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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

YEAR 3(2nd HALF)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACT.	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL EST.
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/6 MOS	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/6 MOS	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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

YEAR 4 (1st HALF)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACT.	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL EST.
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/HALF	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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

YEAR 4 (2nd HALF)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACT. PROGRAM	NET LOST REV/HALF	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL * INCENTIVE	TOTAL EST. COSTS TO BE RECOVERED
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)		
	(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	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

KENTUCKY POWER COMPANY

ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 5 (1st half)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACT.	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL EST.
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/HALF	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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

Year 2000

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 5 (2nd half)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACT.	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL EST.
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/HALF	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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

YEAR 6 (1st Half)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACT. PROGRAM	NET LOST REV/QTR	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE		TOTAL EST. COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	TOTAL * INCENTIVE	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	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

Exhibit C

ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 6 (2nd Half)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACT.	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL EST.
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/QTR	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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
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YEAR 7 (1st Half)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACTUAL	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL ACTUAL
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/HALF	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES
FOR 3 YEAR PROGRAM

Exhibit C

PAGE 8B of 13

YEAR 7 (2nd Half)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ACTUAL	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL ACTUAL
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS PER PARTICIPANT	PROGRAM	REV/QTR	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **		COSTS	(KWH/PARTIC)	KWH/HALF	($/KWH)	REVENUES	(EX. C, PG.9B)	(5% of COSTS)	INCENTIVE	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	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
TOTAL RESIDENTIAL PROGRAMS	193	1,617		$145,031		2,022,559		$62,921	$1,548	$3,949	$5,497	$213,449
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
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
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

* 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)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT	TOTAL ACTUAL PROGRAM COSTS	NET LOST REV/HALF (KWH/ PARTICIPANT)	TOTAL ENERGY SAVINGS KWH/HALF	NET LOST REVENUE ($/KWH)	TOTAL NET * LOST REVENUES	EFFICIENCY INCENTIVE (EX. C, PG.11)	MAXIMIZING INCENTIVE (5% of COSTS)	TOTAL * INCENTIVE	TOTAL ACTUAL COSTS TO BE RECOVERED
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **		COSTS								
	(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	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												Exhibit C	
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM												PAGE 9B of	13
YEAR 8 (2nd HALF)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ACTUAL PROGRAM	NET LOST REV/HALF	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/HALF	($/KWH)	REVENUES	(EX. C, PG.11)	(5% of COSTS)	INCENTIVE	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	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
TOTAL RESIDENTIAL PROGRAMS	673	1,702		$317,658		2,052,726		$63,878	$10,681	$3,364	$14,045	$395,581
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
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											Exhibit C	
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM											PAGE 10A of	13
YEAR 9 (1st HALF)	NEW	CUMULATIVE	TOTAL ESTIMATED	TOTAL ESTIMATED	NET LOST	TOTAL	NET LOST	TOTAL NET *	EFFICIENCY	MAXIMIZING		TOTAL ACTUAL
	PARTICIPANT	PARTICIPANT	PROGRAM COSTS	PROGRAM	REV/QTR	ENERGY SAVINGS	REVENUE	LOST	INCENTIVE	INCENTIVE	TOTAL *	COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/PARTIC)	KWH/ HALF	($/KWH)	REVENUES	(EX. C, PG.11)	(5% of COSTS)	INCENTIVE	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	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												
KENTUCKY POWER COMPANY											Exhibit C	
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM											PAGE 10B of	13
YEAR 9 (2nd HALF)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS PER PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	NET LOST REV/QTR	TOTAL ENERGY SAVINGS KWH/ HALF	NET LOST REVENUE	TOTAL NET * LOST REVENUES	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL * INCENTIVE	TOTAL ACTUAL COSTS TO BE RECOVERED
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **		COSTS	(KWH/PARTIC)		($/KWH)		(EX. C, PG.11)	(5% of COSTS)		
	(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	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 2005

KENTUCKY POWER COMPANY

ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

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YEAR 10 (1st Half)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ACTUAL PROGRAM COSTS	TOTAL ESTIMATED PROGRAM	NET LOST REV/QTR	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/ HALF	($/KWH)	REVENUES	(EX. C, PG.11)	(5% of COSTS)	INCENTIVE	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	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
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
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	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.**

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KENTUCKY POWER COMPANY

ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

Exhibit C
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YEAR 10 (3rd QTR)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ESTIMATED PROGRAM	NET LOST REV/QTRS	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL *	TOTAL ESTIMATED COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/ PARTICIPANT)	KWH/ QTR	($/KWH)	REVENUES	(EX. C, PG.11)	(5% of COSTS)	INCENTIVE	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	353	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	36	495	$1,208.33	$43,500	448	221,760	$0.03111	$6,899	$0	$2,175	$2,175	$52,574
- Non-All Electric	15	234	$125.00	$1,875	133	31,122	$0.03124	$972	$296	$0	$296	$3,143
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	600	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	223	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	18	223	$450.00	$8,100	572	127,556	$0.03110	$3,967	$1,426	$0	$1,426	$13,493
Mobile Home New Construction ***												
- Heat Pump	36	374	$550.00	$19,800	905	338,470	$0.03110	$10,526	$4,499	$0	$4,499	$34,825
- Air Conditioner	0	2	$0.00	$0	79	158	$0.03124	$5	$0	$0	$0	$5
Modified Energy Fitness	183	1,730	$400.00	$73,200	306	529,380	$0.03116	$16,495	$7,701	$0	$7,701	$97,396
TOTAL RESIDENTIAL PROGRAMS	288	3,058		$146,475		1,248,446		$38,864	$13,922	$2,175	$16,097	$201,436
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	24	$0.00	$0	6,641	159,384	$0.04235	$6,750	$0	$0	$0	$6,750
Smart Financing - New Building	0	14	$0.00	$0	7,051	98,714	$0.04277	$4,222	$0	$0	$0	$4,222
TOTAL COMMERCIAL PROGRAMS	0	38		$0		258,098		$10,972	$0	$0	$0	$10,972
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	3,096		$146,475		1,506,544		$49,836	$13,922	$2,175	$16,097	$212,408

* Lost revenue and efficiency incentives are based on prospective values.

** Cumulative participants include a reduction for the cumulative participants as of **09/30/2002.**

*** Participants since **07/01/2002.**

Year 2005

KENTUCKY POWER COMPANY
ESTIMATED SECTOR SURCHARGES FOR 3 YEAR PROGRAM

YEAR 10 (4th QTR)	NEW PARTICIPANT	CUMULATIVE PARTICIPANT	TOTAL ESTIMATED PROGRAM COSTS	TOTAL ESTIMATED PROGRAM	NET LOST REV/QTRS	TOTAL ENERGY SAVINGS	NET LOST REVENUE	TOTAL NET * LOST	EFFICIENCY INCENTIVE	MAXIMIZING INCENTIVE	TOTAL *	TOTAL ESTIMATED COSTS TO BE
PROGRAM DESCRIPTIONS	NUMBER	NUMBER **	PER PARTICIPANT	COSTS	(KWH/ PARTICIPANT)	KWH/ QTR	($/KWH)	REVENUES	(EX. C, PG.11)	(5% of COSTS)	INCENTIVE	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	353	0	$0.03112	$0	$0	$0	$0	$0
Targeted Energy Efficiency												
- All Electric	36	487	$1,069.44	$38,500	448	218,176	$0.03111	$6,787	$0	$1,925	$1,925	$47,212
- Non-All Electric	15	239	$125.00	$1,875	133	31,787	$0.03124	$993	$296	$0	$296	$3,164
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	600	0	$0.03114	$0	$0	$0	$0	$0
- Non Resistance Heat	0	0	$0.00	$0	223	0	$0.03116	$0	$0	$0	$0	$0
High - Efficiency Heat Pump												
- Mobile Home	18	218	$450.00	$8,100	572	124,696	$0.03110	$3,878	$1,426	$0	$1,426	$13,404
Mobile Home New Construction ***												
- Heat Pump	36	381	$550.00	$19,800	905	344,805	$0.03110	$10,723	$4,499	$0	$4,499	$35,022
- Air Conditioner	0	2	$0.00	$0	79	158	$0.03124	$5	$0	$0	$0	$5
Modified Energy Fitness	181	1,912	$400.00	$72,400	306	585,072	$0.03116	$18,231	$7,616	$0	$7,616	$98,247
TOTAL RESIDENTIAL PROGRAMS	286	3,239		$140,675		1,304,694		$40,617	$13,837	$1,925	$15,762	$197,054
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	15	$0.00	$0	6,641	99,615	$0.04235	$4,219	$0	$0	$0	$4,219
Smart Financing - New Building	0	9	$0.00	$0	7,051	63,459	$0.04277	$2,714	$0	$0	$0	$2,714
TOTAL COMMERCIAL PROGRAMS	0	24		$0		163,074		$6,933	$0	$0	$0	$6,933
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	286	3,263		$140,675		1,467,768		$47,550	$13,837	$1,925	$15,762	$203,987

* 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 **10/01/2002.**

KENTUCKY POWER COMPANY

DERIVATION FOR 3 YEAR DSM EXPERIMENT

CALCULATION OF EFFICIENCY INCENTIVE

Exhibit C
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PROGRAM DESCRIPTIONS	EFFICIENCY INCENTIVE $ / PARTICIPANT					NUMBER OF NEW PARTICIPANTS																			
						YEAR 1	YEAR 2		YEAR 3		YEAR 4		YEAR 5		YEAR 6		YEAR 7		YEAR 8		YEAR 9		YEAR 10		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
	INITIAL VALUES	PROSP VALUES	1999 VALUES	2002/ 2003 VALUES	2005		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	3rd qtr	4th qtr
RESIDENTIAL PROGRAMS																									
Energy Fitness	$78.22	$20.78	$33.89	$33.89	$33.89	552	273	689	544	448	306	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Targeted Energy Efficiency																									
- All Electric	$0.00	$0.00	$0.00	$0.00	$0.00	223	118	175	122	131	75	66	66	99	62	88	63	76	100	69	72	72	88	36	36
- Non-All Electric	$9.71	$1.66	$5.02	$4.28	$19.73	74	26	93	24	42	12	8	28	21	18	46	32	13	7	69	10	10	57	15	15
Compact Fluorescent Bulb	$1.58	n/a	n/a	n/a	n/a	269	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	$19.73	$7.22	$44.19	$44.19	$44.19	539	123	220	21	108	99	140	38	25	23	30	1	0	0	0	0	0	0	0	0
- Non Resistance Heat	$16.69	$29.11	n/a	n/a	n/a	527	124	186	26	64	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High - Efficiency Heat Pump																									
- Mobile Home	$38.86	$32.50	$84.21	$28.92	$79.20	356	109	127	66	173	101	134	45	43	53	47	43	43	34	29	41	41	34	18	18
Mobile Home New Construction ***																									
- Heat Pump	n/a	n/a	$44.42	$4.06	$124.96	0	0	0	0	33	98	123	101	94	83	92	57	61	46	64	68	68	67	36	36
- Air Conditioner				$0.41	$0.41														0	1	1	1	0	0	0
Modified Energy Fitness				$21.06	$42.08														101	441	334	334	371	183	181
TOTAL RESIDENTIAL PROGRAMS																									
*** Participants since 09/01/98																									
COMMERCIAL PROGRAMS																									
Smart Audit - Class 1	$0.00	n/a	n/a	n/a	n/a	91	243	169	204	178	186	188	144	159	134	131	125	0	0	0	0	0	0	0	0
- Class 2	$0.00	n/a	n/a	n/a	n/a	5	11	26	28	9	16	21	8	29	28	5	8	0	0	0	0	0	0	0	0
Smart Financing - Existing Building	$506.34	$813.28	$232.54	$232.54	$232.54	1	0	11	8	29	6	25	16	24	15	15	7	25	0	0	0	0	0	0	0
Smart Financing - New Building	$50.33	$28.76	$262.33	$262.33	$262.33	0	1	0	1	5	3	8	4	0	8	18	5	16	0	0	0	0	0	0	0
TOTAL COMMERCIAL PROGRAMS																									
INDUSTRIAL PROGRAMS - (w/Est. Opt-Outs Removed)																									
Smart Audit - Class 1	$0.00	n/a	n/a	n/a	n/a	15	9	21	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Audit - Class 2	$0.00	n/a	n/a	n/a	n/a	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Financing - General	$178.65	$382.80	n/a	n/a	n/a	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smart Financing - Compressed Air System	$4,850.21	$4,048.80	n/a	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL PROGRAMS																									
ANNUAL SHARED SAVINGS ($)																									

KENTUCKY POWER COMPANY
DERIVATION FOR 3 YEAR DSM EXPERIMENT
CALCULATION OF EFFICIENCY INCENTIVE

Exhibit C
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PROGRAM DESCRIPTIONS	YEAR 1	YEAR 2		YEAR 3		YEAR 4		YEAR 5		YEAR 6		YEAR 7		YEAR 8		YEAR 9		YEAR 10		
	ANNUAL SHARED SAVINGS ($)																			
	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)
	(1)X(6)	(1)X(7)	(2)X(8)	(2)X(9)	(2)X(10)	(3)X(11)	(3)X(12)	(3)X(13)	(3)X(14)	(3)X(15)	(3)X(16)	(4)X(17)	(4)X(18)	(4)X(19)	(4)X(20)	(4)X(21)	(4)X(22)	(5)X(23)	(5)X(24)	(5)X(25)
		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	3rd qtr	4th qtr
RESIDENTIAL PROGRAMS																				
Energy Fitness	$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
Targeted Energy Efficiency																				
- All Electric	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
- Non-All Electric	$719	$252	$154	$40	$70	$60	$40	$141	$105	$90	$231	$137	$56	$30	$295	$43	$43	$1,125	$296	$296
Compact Fluorescent Bulb	$425	$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	$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
- Non Resistance Heat	$8,796	$2,070	$5,414	$757	$1,863	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
High - Efficiency Heat Pump																				
- Mobile Home	$13,834	$4,236	$4,128	$2,145	$5,623	$8,505	$11,284	$3,789	$3,621	$4,463	$3,958	$1,244	$1,244	$983	$839	$1,186	$1,186	$2,693	$1,426	$1,426
Mobile Home New Construction ***																				
- Heat Pump	$0	$0	$0	$0	$0	$4,353	$5,464	$4,486	$4,175	$3,687	$4,087	$231	$248	$187	$260	$276	$276	$8,372	$4,499	$4,499
- Air Conditioner														$0	$0	$0	$0	$0	$0	$0
Modified Energy Fitness														$2,127	$9,287	$7,034	$7,034	$15,612	$7,701	$7,616
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	$1,548	$3,327	$10,681	$8,539	$8,539	$27,802	$13,922	$13,837
*** 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
- Class 2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Smart Financing - Existing Building	$506	$0	$8,946	$6,506	$23,585	$1,395	$5,814	$3,721	$5,581	$3,488	$3,488	$1,628	$5,814	$0	$0	$0	$0	$0	$0	$0
Smart Financing - New Building	$0	$50	$0	$29	$144	$787	$2,099	$1,049	$0	$2,099	$4,722	$1,312	$4,197	$0	$0	$0	$0	$0	$0	$0
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	$10,011	$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
Smart Audit - Class 2	$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	$383	$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
TOTAL INDUSTRIAL PROGRAMS	$0	$0	$0	$0	$383	$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	$11,559	$3,327	$10,681	$8,539	$8,539	$27,802	$13,922	$13,837

KENTUCKY POWER COMPANY | Exhibit C
FORECAST OF 2005 KENTUCKY RETAIL ENERGY SALES IN KWH | PAGE 13 of 13
FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL SECTORS

PROGRAM YR 10 - 2005

LINE NO.	YEAR	RESIDENTIAL SECTOR	COMMERCIAL SECTOR	INDUSTRIAL SECTOR
1	TOTAL ULTIMATE SALES (KWH)*	2,490,600,000	1,369,200,000	3,219,300,000
2	LESS NON-METERED **	14,943,600	8,215,200	19,315,800
3	TOTAL ESTIMATED RETAIL KWH SALES	2,475,656,400	1,360,984,800	3,199,984,200
4	LESS OPT - OUT CUSTOMERS KWH	0	0	2,059,689,192
5	KWH BEFORE LOST REVENUE IMPACTS	2,475,656,400	1,360,984,800	1,140,295,008
6	LESS LOST REVENUE IMPACTS	11,420,681	1,496,550	0
7	ADJUSTED KWH BY SECTOR	2,464,235,719	1,359,488,250	1,140,295,008
8	LINE 7/LINE 1	98.9%	99.3%	35.4%

LINE NO.	PROGRAM YR 10 (3rd QTR)	RESIDENTIAL SECTOR	COMMERCIAL SECTOR	INDUSTRIAL SECTOR
9	TOTAL ULTIMATE SALES (KWH)*	575,800,000	371,400,000	850,100,000
10	LINE 8	98.9%	99.3%	35.4%
11	ADJUSTED KWH BY SECTOR	569,466,200	368,800,200	300,935,400

LINE NO.	PROGRAM YR 10 (4th QTR)	RESIDENTIAL SECTOR	COMMERCIAL SECTOR	INDUSTRIAL SECTOR
12	TOTAL ULTIMATE SALES (KWH)*	656,300,000	263,700,000	917,900,000
13	LINE 8	98.9%	99.3%	35.4%
14	ADJUSTED KWH BY SECTOR	649,080,700	261,854,100	324,936,600

* SOURCE: 2005 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 2004.

AMERICAN ELECTRIC POWER - KENTUCKY

Demand Side Management

Status Report

As of June 30, 2005

INDEX

PAGE	DESCRIPTION
1	Definitions
3	Summary Information (All Programs)
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20	Mobile Home New Construction
23	Modified Energy Fitness Program
	Commercial Programs
26	Smart Audit
29	Smart Incentive
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32	Smart Audit
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DEFINITIONS

1) YTD Costs	- Year-to-Date costs recorded January 1, 2005 through June 30, 2005.
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, 2005.
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, 2005. The Residential, Commercial, and Industrial total 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 for 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, and June 30, 2005 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 1/1/05 to 06/30/05 are calculated using the revised values contained in Schedule C of the 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 ½ the new participants for the current month, plus the cumulative participants from 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.

AMERICAN ELECTRIC POWER - KENTUCKY
SUMMARY INFORMATION (ALL PROGRAMS)
AS OF JUNE 30, 2005

DESCRIPTION	YTD	PTD
Total Revenue Collected	$453,837	$10,050,544
Total Program Costs	310,137	6,913,971
Total Lost Revenues	99,629	2,743,444
Total Efficiency/ Maximizing Incentive	32,683	544,992
Total DSM Costs As Of June 30, 2005	$442,449	$10,202,407

DESCRIPTION	YTD	PTD
Actual In-Place Energy Savings:	277,528 kWh	206,964,248 kWh
w/ T&D Line Losses:	305,281 kWh	227,660,673 kWh
Total kW Reductions:		
Winter	459	14,878
w/ T&D Line Losses:	509	16,515
Summer	66	3,494
w/T&D Line Losses:	73	3,878

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	Energy Fitness
PARTICIPANT DEFINITION:	Number of Households
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January - June, 2005

2005														
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**YTD**	**PTD**
New Participants	0	0	0	0	0	0							0	2,812

Impacts

Estimated in Place Energy (kWh) Savings		**Anticipated Peak Demand (kW) Reduction**			
YTD	**PTD**	**YTD**		**PTD**	
		Summer	**Winter**	**Summer**	**Winter**
0	32,049,263	0	0	441	1,932

AMERICAN ELECTRIC POWER - KENTUCKY

Energy Fitness	
Reporting Period:	January - June, 2005

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

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

COMMENTS:

This program was discontinued May 14, 1999.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	Targeted Energy Efficiency
PARTICIPANT DEFINITION:	Number of Households
CUSTOMER SECTOR:	Residential - Low Income
REPORTING PERIOD:	January - June, 2005

2005

Participants	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	PTD
All Electric	3	12	13	13	14	33							88	1,782
Non All Electric	2	5	10	24	5	11							57	652

Impacts

Estimated in Place Energy (kWh) Savings		Anticipated Peak Demand (kW) Reduction			
		YTD		PTD	
YTD	PTD	Summer	Winter	Summer	Winter
49,388	43,524,868	12	47	502	2,274

AMERICAN ELECTRIC POWER - KENTUCKY

Targeted Energy Efficiency	
Reporting Period:	January - June, 2005

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	11,489.00	0.00	198,988.00
Equipment/Vendor:	89,395.00	0.00	1,840,618.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	0.00	0.00	0.00
Other Costs:	288.00	0.00	8,767.00
Total Program Costs:	101,172.00	0.00	2,048,373.00
Lost Revenues:	15,114.00	1,944.00	392,857.00
Efficiency Incentive:	1,125.00	184.00	4,080.00
Maximizing Incentives:	4,881.00	0.00	98,478.00
Total Costs:	122,292.00	2,128.00	2,543,788.00

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

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 $85,834 for all-electric homes and $3,561 for non-all-electric homes.

The YTD Estimated in Place Energy (kWh) Savings for the all-electric participants and non-all-electric participants is 41,888 and 7,500 respectively.

The YTD Anticipated Peak Demand (kW) Reduction summer/winter for all-electric and non-all-electric participants is 8/42 and 4/5 respectively.

The YTD Lost Revenue for all-electric participants and non-all-electric participants is $13,296 and $1,818 respectively.

The YTD Efficiency Incentive for non-all-electric participants is $1,125 and the Maximizing Incentive for all-electric participants is $4,881.

The projected participant and budgetary level for 2006 has been revised to reflect what the Collaborative believes to be reasonably achievable goals. The projected participant and budgetary level is 150 all-electric homes, 75 non-all-electric homes, and $195,000 respectively.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	Compact Fluorescent Bulb
PARTICIPANT DEFINITION:	Number of Bulbs Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January - June, 2005

2005														
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**YTD**	**PTD**
New Participants	0	0	0	0	0	0							0	269

Impacts

Estimated in Place Energy (kWh) Savings		**Anticipated Peak Demand (kW) Reduction**			
YTD	**PTD**	**YTD**		**PTD**	
		Summer	**Winter**	**Summer**	**Winter**
0	172,353	0	0	3	3

AMERICAN ELECTRIC POWER - KENTUCKY

Compact Fluorescent Bulb	
Reporting Period:	January -June, 2005

Costs			
Description	Year-To-Date	RetroactiveAdjustment	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

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

COMMENTS:

This program was discontinued December 31, 1996.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	High Efficiency Heat Pumps - Retrofit
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January - June, 2005

2005

Participant	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	PTD
Resistance	0	0	0	0	0	0							0	1,367
Non-Resistance	0	0	0	0	0	0							0	929

Impacts

Actual in Place Energy (kWh) Savings		Anticipated Peak Demand (kW) Reduction			
YTD	PTD	YTD		PTD	
		Summer	Winter	Summer	Winter
0	35,211,254	0	0	851	2,995

AMERICAN ELECTRIC POWER - KENTUCKY

High Efficiency Heat Pumps - Retrofit	
Reporting Period:	January - June, 2005

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

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

COMMENTS:

This program was discontinued December 31, 2001.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION	
PROGRAM:	Mobile Home High Efficiency Heat Pumps
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January - June, 2005

2005														
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**YTD**	**PTD**
New Participants	6	3	4	2	7	12							34	1,524

Impacts					
Estimated in Place Energy (kWh) Savings		**Anticipated Peak Demand (kW) Reduction**			
YTD	**PTD**	**YTD**		**PTD**	
		Summer	**Winter**	**Summer**	**Winter**
19,719	29,289,563	3	58	201	2,820

AMERICAN ELECTRIC POWER - KENTUCKY

Mobile Home High Efficiency Heat Pumps	
Reporting Period:	January - June, 2005

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	4,197.00	0.00	45,492.00
Equipment/Vendor:	1,650.00	0.00	18,005.00
Promotional:	0.00	0.00	0.00
Customer Incentives:	13,200.00	0.00	684,300.00
Other Costs:	0.00	0.00	1,167.00
Total Program Costs:	19,047.00	0.00	748,964.00
Lost Revenues:	8,226.00	5,820.00	350,853.00
Efficiency Incentive:	2,693.00	18,331.00	93,436.00
Maximizing Incentive:	0.00	0.00	0.00
Total Costs:	29,966.00	24,151.00	1,193,253.00

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

COMMENTS:

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

The projected participant and budgetary level for 2006 has been revised to reflect what the Collaborative believes to be reasonably achievable goals. The projected participant and budgetary level is 100 and $50,000 respectively.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	Mobile Home New Construction
PARTICIPANT DEFINITION:	Number of Units Installed
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January - June, 2005

2005

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	PTD
Heat Pump	17	7	9	12	10	12							67	1,057
Air Conditioner	0	0	0	0	0	0							0	2

Impacts

Estimated in Place Energy (kWh) Savings		Anticipated Peak Demand (kW) Reduction			
YTD	PTD	YTD		PTD	
		Summer	Winter	Summer	Winter
76,776	22,001,294	9	181	137	2,861

AMERICAN ELECTRIC POWER - KENTUCKY

Mobile Home New Construction	
Reporting Period:	January - June, 2005

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	4,195.00	0.00	29.414.00
Equipment/Vendor:	3,300.00	0.00	67,213.00
Promotional:	0.00	0.00	3,939.00
Customer Incentives:	33,500.00	0.00	537,150.00
Other Costs:	200.00	0.00	3,416.00
Total Program Costs:	41,195.00	0.00	641,132.00
Lost Revenues:	20,871.00	0.00	284,252.00
Efficiency Incentive:	8,372.00	0.00	36,110.00
Maximizing Incentive:	0.00	0.00	2,580.00
Total Costs:	70,438.00	0.00	964,074.00

COMMENTS:

The Collaborative has devised and implemented a plan working 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 Collaborative is requesting Commission approval to discontinue the incentive for the installation of high efficiency air-conditioning at the end of the 2005 calendar year due to lower than expected participation levels and the revised federal energy efficiency standards that are scheduled to go into effect on January 23, 2006.

On April 14, 2005, the Department of Energy's Office of Hearing and Appeals (OHA) granted Nordyne's application for exception relief from the 2006 13.0 SEER requirement for split system air-conditioners of the 3 to 5 ton capacity. The OHA granted Nordyne's application which in effect would permit a 12.0 SEER air-conditioning system to be installed in HUD-Code homes until January 1, 2010. Only Nordyne 12.0 air-conditioning systems will be allowed to be installed in HUD-Code homes. Since 70% of the manufactured housing dealers use Nordyne equipment, this exception eliminates any possibility of upgrading air-conditioning systems next year. Therefore, the Collaborative is recommending the measure for high efficiency air-conditioning be discontinued December 31, 2005.

The projected participant and budgetary level for 2006 has been revised to reflect what the Collaborative believes to be reasonably achievable goals. The projected participant and budgetary level is 150 heat pumps and $ 87,500 respectively.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION	
PROGRAM:	Modified Energy Fitness
PARTICIPANT DEFINITION:	Number of Households
CUSTOMER SECTOR:	Residential
REPORTING PERIOD:	January - June, 2005

2005														
	Jan.	**Feb.**	**Mar.**	**Apr.**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**YTD**	**PTD**
New Participants	84	94	11	84	87	11							371	1,638

Impacts					
Estimated in Place Energy (kWh) Savings		**Anticipated Peak Demand (kW) Reduction**			
YTD	**PTD**	**YTD**		**PTD**	
		Summer	**Winter**	**Summer**	**Winter**
159,398	3,557,407	49	223	218	984

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

Modified Energy Fitness	
Reporting Period:	January - June, 2005

Costs			
Description	Year-To-Date	Retroactive Adjustment	Program-To-Date
Total Evaluation	22,747.00	0.00	25,750.00
Equipment/Vendor:	125,976.00	0.00	602,937.00
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:	148,723.00	0.00	628,687.00
Lost Revenues:	28,250.00	0.00	108,315.00
Efficiency Incentive:	15,612.00	0.00	42,294.00
Maximizing Incentive:	0.00	0.00	0.00
Total Costs:	192,585.00	0.00	779,296.00

AMERICAN ELECTRIC POWER

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.

The Collaborative is requesting Commission approval to increase annual participation levels to 1,000 per year due to the customer's overwhelming endorsement of the program.With the current backlog of customers, the Company and the implementation contractor (Honeywell, DMC Services) both agree that the annual achievement of 1,000 energy audits is feasible.

The projected participant and budgetary levels for 2006 have been revised to reflect what the Collaborative believes to be reasonable achievable goals. The projected participant and budgetary level is 1,000 and $405,000 respectively.

AMERICAN ELECTRIC POWER - KENTUCKY

PROGRAM INFORMATION	
PROGRAM:	Smart Audit - Commercial
PARTICIPANT DEFINITION:	Number of Audits
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January - June, 2005

2005														
Participant	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**YTD**	**PTD**
Class I	0	0	0	0	0	0							0	1,952
Class II	0	0	0	0	0	0							0	194

Impacts					
Estimated in Place Energy (kWh) Savings		**Anticipated Peak Demand (kW) Reduction**			
YTD	**PTD**	**YTD**		**PTD**	
		Summer	**Winter**	**Summer**	**Winter**
n/a	n/a	n/a	n/a	n/a	n/a

AMERICAN ELECTRIC POWER - KENTUCKY

Smart Audit - Commercial	
Reporting Period:	January - June, 2005

Costs			
Description	Year-To-Date	Retroactive 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

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

COMMENTS:

This program was discontinued December 31, 2002.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	Smart Incentive - Commercial
PARTICIPANT DEFINITION:	Number of Incentives
CUSTOMER SECTOR:	Commercial
REPORTING PERIOD:	January - June, 2005

2005

Participant	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	PTD
Existing Building	0	0	0	0	0	0							0	182
New Building	0	0	0	0	0	0							0	69

Impacts

Estimated in Place Energy (kWh) Savings		Anticipated Peak Demand (kW) Reduction			
YTD	PTD	YTD		PTD	
		Summer	Winter	Summer	Winter
0	61,757,956	0	0	1,519	2,640

AMERICAN ELECTRIC POWER - KENTUCKY

Smart Incentive - Commercial	
Reporting Period:	January - June, 2005

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:	27,168.00	442.00	873,573.00
Efficiency Incentive:	0.00	1,078.00	88,039.00
Maximizing Incentive:	0.00	0.00	281.00
Total Costs:	27,168.00	1,520.00	1,527,719.00

AMERICAN ELECTRIC POWER - KENTUCKY

AEP
AMERICAN ELECTRIC POWER

COMMENTS:

This program was discontinued December 31, 2002.

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

PROGRAM INFORMATION

PROGRAM:	Smart Audit - Industrial
PARTICIPANT DEFINITION:	Number of Audits
CUSTOMER SECTOR:	Industrial
REPORTING PERIOD:	January - June, 2005

2005

Participant	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	PTD
Class I	0	0	0	0	0	0							0	60
Class II	0	0	0	0	0	0							0	4

Impacts

Estimated in Place Energy (kWh) Savings		Anticipated Peak Demand (kW) Reduction			
YTD	PTD	YTD		PTD	
		Summer	Winter	Summer	Winter
n/a	n/a	n/a	n/a	n/a	n/a

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Smart Audit - Industrial	
Reporting Period:	January - June, 2005

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

AMERICAN ELECTRIC POWER - KENTUCKY

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COMMENTS:

This program was discontinued December 31, 1998.

AMERICAN ELECTRIC POWER - KENTUCKY

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PROGRAM INFORMATION

PROGRAM:	Smart Incentive - Industrial
PARTICIPANT DEFINITION:	Number of Incentives
CUSTOMER SECTOR:	Industrial
REPORTING PERIOD:	January - June, 2005

2005

Participant	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	YTD	PTD
General	0	0	0	0	0	0							0	1
Compressed Air	0	0	0	0	0	0							0	0

Impacts

Estimated in Place Energy (kWh) Savings		Anticipated Peak Demand (kW) Reduction			
YTD	PTD	YTD		PTD	
		Summer	Winter	Summer	Winter
0	96,715	0	0	6	6

AMERICAN ELECTRIC POWER - KENTUCKY

Smart Incentive - Industrial	
Reporting Period:	January - June, 2005

Description	Costs		
	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

AMERICAN ELECTRIC POWER - KENTUCKY

AMERICAN ELECTRIC POWER

COMMENTS:

This program was discontinued December 31, 1998.

KENTUCKY POWER COMPANY
TARGETED ENERGY EFFICIENCY PROGRAM
2003-2004 LOAD IMPACT EVALUATION REPORT

Final Report

July 7, 2005

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KENTUCKY POWER COMPANY
TARGETED ENERGY EFFICIENCY PROGRAM
2003-2004 LOAD IMPACT EVALUATION REPORT

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KENTUCKY POWER COMPANY
TARGETED ENERGY EFFICIENCY PROGRAM
2003-2004 LOAD IMPACT EVALUATION REPORT

E Executive Summary

This report presents the Kentucky Power Company ('KPCo') Targeted Energy Efficiency Program ('TEE Program'). The TEE Program is designed to perform energy audits, provide energy education to all households, perform blower door tests and install extensive weatherization and energy conservation measures to low income customers living within the KPCo service territory. The TEE Program is a "piggyback" program leveraging the resources of five not-for-profit agencies that provide weatherization services to low-income customers via the existing Weatherization Assistance Program. This program is offered to electric heat and non-electric heat customers. The load impact evaluation method examined the changes in customer bills to determine the program's impact.

The primary objective of this evaluation was to quantify the savings for the 2003-2004 program years. Two critical components to the success of meeting the evaluation objective are the research design and the evaluation methodology. The research design allows the results from the evaluation to meet its evaluation objectives i.e., allowing the results of the program to be determined and applicable to the improvement of the TEE Program. The evaluation methodology operationalizes the research design. The research design contributes to the development of valid conclusions. In turn, the results may be generalized for use in other applications.

This evaluation quantified the change in electric consumption that is a result of the program. In the case of heating system replacements, it was found that some participant's energy consumption actually increased for those participants where the existing heating system was inoperative or its operation was severely restricted. When this condition exists, customers often turn to alternative fuels (i.e., kerosene, space heaters, wood, etc.) to maintain comfort, these alternative fuels can sometimes pose a safety hazard. When a heating system was not in operation or not economically feasible to repair, that heating system was replaced. Accordingly, this replacement would cause an increase in electric consumption, while increasing the participant's comfort and safety. To illustrate this effect, an additional analysis was performed to quantify the savings of customers that did not have their heating system replaced.

Based on this analysis **it can be concluded that the TEE program significantly reduced electric consumption.** The best estimates of savings, by program component, are:

- For the all-electric participants, the average savings were 1,792 kWh/year per participant. This is an 8% reduction from the pre-installation NAC.

- For the all-electric participants who had their heating system replaced, the average savings was 2,372 kWh/year per participant. This is a 10% reduction from the pre-installation NAC.
- For the all-electric participants who did not have their heating system replaced, the average savings were 1,605 kWh/year per participant. This is a 8% reduction from the pre-installation NAC.
- For the base load participants, the average savings were 553 kWh/year per participant. This is a 3% reduction from the pre-installation NAC.

The total program annual energy savings, based on 488 participants, was estimated to be 678 MWH.

KENTUCKY POWER COMPANY
TARGETED ENERGY EFFICIENCY PROGRAM
2003-2004 LOAD IMPACT EVALUATION REPORT

1 Introduction

This report presents the Kentucky Power Company ('KPCo') Targeted Energy Efficiency Program ('TEE Program'). The TEE Program is designed to perform energy audits, provide energy education to all households, perform blower door tests and install extensive weatherization and energy conservation measures to low income customers living within the KPCo service territory. The TEE Program is a "piggyback" program leveraging the resources of five not-for-profit agencies that provide weatherization services to low-income customers via the existing Weatherization Assistance Program. This program is offered to electric heat and non-electric heat customers. The load impact evaluation method examined the changes in customer bills to determine the program's impact.

The primary objective of this evaluation was to quantify the savings for the 2003-2004 program year. Two critical components to the success of meeting the evaluation objective are the research design and the evaluation methodology. The research design allows the results from the evaluation to meet its evaluation objectives i.e., allowing the results of the program to be determined and applicable to the improvement of the TEE Program. The evaluation methodology operationalizes the research design. The research design contributes to the development of valid conclusions. In turn, the results may be generalized for use in other applications.

1.1 Research Design

The evaluation's research design was chosen to serve as a foundation for the continued monitoring of the program. In addition to quantifying program impacts, the initial research design enables KPCo to continue to build the capability to perform evaluations, and establish baseline information for future program designs.

The research design chosen for the TEE Program is a time-series comparison/cross sectional design. This research design essentially determines the program impacts by examining the change in participant's usage patterns over time. Comparing a representative control group's change in usage over a similar time period further refines the impact estimate. This experimental design helps to reduce any potential bias in the results.

The time series/cross sectional design achieves internal and external validity. Internal validity means the evaluation is conducted in a manner such that the results isolate the impact of the activity being studied. When other factors are not recognized, the changes attributed to the program may be the result of other phenomena. For example, if the experiment does not recognize the effect of a participant's demographic or end-use characteristics, the change in usage could be explained by the impact of the implementation of the program or, alternatively, by the change in lifestyle of the

participant. A research design can help achieve external validity by ensuring that the results are representative of a larger population of interest, allowing for the findings to be generalized. For example, for the TEE Program, the information determined by the 2003-2004 participants and the corresponding control group permits the evaluation to represent the total program impacts.

1.2 Evaluation Methodology

The evaluation methodology used billing data to determine the impact of the program using the maximum number of 2003-2004 participants and a representative group of non-participants. This initial analysis determines energy impacts, while minimizing the uncertainty associated with the estimate.

A systematic and comprehensive approach using billing analysis was used to determine the program energy impacts. The approach consists of a variety of methods ranging from a simplistic comparison approach to more complex regression techniques.

Specifically, the evaluation consisted of the following four steps:

1) Development of the participant billing information,
2) Development of a representative control group,
3) Temperature normalization of billing information, and
4) The quantification of the energy impacts.

In each of the subsequent sections of this report, the approach and the results of the analysis are presented.

2 The Participants

Billing analysis requires that sufficient billing information is available to establish consumption trends in both the pre-installation and post-installation periods. This section presents the development of the participant group consumption analysis. For a discussion of the methodology to develop the participant group, see Appendix A.

From program tracking records (i.e., the WX Data Collection Forms), it was determined that there were 488 participants. Using these accounts, KPCo gathered the appropriate billing data from the Marketing and Customer Service System (MACSS). As noted above, billing information from MACSS was available for 215 customers of the 488 participants from the tracking system information.

The initial step in developing the participant information was to examine every individual read for each of the participants with billing records. When the information from a particular billing record appeared to be incongruent, that record was edited or eliminated from the analysis.

After the individual reads were examined, the participant data was split into pre- and post-installation periods. The next editing step checked the participant accounts to verify that there was enough data in each period to be accurately analyzed. At the end of the

editing of the participant billing data a total of 207[1] customers were available for the billing analysis.

Number of Participants	488	
Pre Annualized Usage (kWh)	19,980	
	Pct	**Number**
House Type		
Combination (Mobile/Modular/Site)	2%	9
Mobile	60%	291
Site-Built	39%	188
Electric Primary Heat	67%	327
Heating System Replaced		
Yes:	16%	80
		-
Electric Furnace	86%	69
Heat Pump	9%	7
Wall Unit	5%	4

Table 1 - Particpant Information

Table 1 presents information about the participant population. As this table shows, the participant group consists of more customers that live in mobile homes, and have electric heat.

3 The Control Group

The primary purpose of the TEE Program billing analysis is to determine the program's effects on electricity consumption. One of the challenges in the analysis is that residential energy consumption can be significantly affected by a variety of variables such as changes in weather, activity, demographics, building shell, etc. One of the most efficient methods for controlling these confounding effects is the establishment of a representative "control" group of non-program participants.

For the TEE Program evaluation, a systematic method for determining a representative control group was used. A detailed presentation of the methodology used to develop the control group is presented in Appendix A. This section presents the results of the development of the control group.

For the TEE Program KPCo provided a file with billing information for 12,805 customers. These customers were designated the "Control Group Pool". From this pool, all known participants were eliminated.

Next, the participant group was examined to establish matching criteria. The criteria that was determined to partition the participant group into homogeneous groups was based on

[1] The majority of customers eliminated from the analysis were a result of insufficient post-program data.

annualized usage, pseudo-January load Factor, and pseudo-July load factor. Seven strata were defined. Table 2 shows the definition of the seven strata, and some descriptive population statistics for each stratum. This table shows that over half of the participants are in the more than 50 kWh/day, less than 80% January load factor strata.

Strata Definition			Participants			
Average usage Per Day (kWh)	Jan Load Factor	Jul Load Factor	Distribution	Average usage Per Day (kWh)	Average Pseudo Jan Load Factor	Average Pseudo Jul Load Factor
Less than 50	Less than 80%	Less Than 130%	13%	41.08	67%	105%
More Than 50	Less than 80%	Less Than 130%	24%	67.45	64%	106%
Less than 50	More Than 80%	Less Than 130%	19%	35.64	111%	83%
More Than 50	More Than 80%	Less Than 130%	9%	63.51	104%	88%
Less than 50	Less than 80%	More Than 130%	11%	40.82	57%	187%
More Than 50	Less than 80%	More Than 130%	22%	66.72	58%	168%
More Than 50	More Than 80%	More Than 130%	2%	62.78	173%	316%

Table 2 - Strata Definitions For Control Group Matching

The control group pool customers were compared to the TEE Program participants based on annual usage within the strata. Based on the above methodology, up to three control group members were selected for each participant.

Table 3 shows the control group for each program. At the end of the selection and editing process, the control group consisted of 621 customers. Table 4 shows a comparison of the pre-installation period annualized usage between the participants and the control group. This table demonstrates how well the control group selection process worked. Based on average usage per day within the load factor strata, the control group closely matches the participant group. Based on this comparison, the control group was accepted and promoted to the later stages of the analysis.

Strata Definition			Control Group			
Average usage Per Day (kWh)	Jan Load Factor	Jul Load Factor	Distribution	Average usage Per Day (kWh)	Average Pseudo Jan Load Factor	Average Pseudo Jul Load Factor
Less than 50	Less than 80%	Less Than 130%	12%	41.51	66%	106%
More Than 50	Less than 80%	Less Than 130%	24%	67.62	66%	107%
Less than 50	More Than 80%	Less Than 130%	19%	35.60	156%	82%
More Than 50	More Than 80%	Less Than 130%	9%	63.18	102%	90%
Less than 50	Less than 80%	More Than 130%	12%	41.03	56%	204%
More Than 50	Less than 80%	More Than 130%	22%	66.51	58%	176%
More Than 50	More Than 80%	More Than 130%	2%	63.52	112%	164%

Table 3 - Selected Control Group, By Selection Strata

Statistic	Participants	Control Group
N	215	621
Minimum	18.42	18.16
25th Percentile	41.65	41.64
Median	52.72	52.90
Mean	54.74	55.59
75th Percentile	66.01	65.85
Maximum	103.82	103.91

Table 4 - Comparison of Pre-Installation Period Average Daily Usage

4 Temperature Normalization of Billing Information

One of the most important steps in the assessment of the effect of the TEE Program is the pre-installation to the post-installation comparison of energy usage. By controlling for other non-program influences, such as weather, the program's effects can be isolated and quantified. This normalization methodology is presented in Appendix A. This section presents the results of the temperature normalization procedure.

The temperature normalization procedure described in Appendix A presented an enormous computing challenge. For the electric consumption models, heating degree-days based on reference temperatures from 50^0F to 75^0F, and cooling degree-days based on reference temperatures from 60^0F to 75^0F were examined. The wide variety of reference temperatures meant that thousands of models were considered for each customer to determine the optimal models.

To capture accurate temperatures, information from the Ashland, Hazard, and Pikeville, Kentucky weather stations were used. The daily mean of these stations were chosen to be representative of the average daily temperature for the TEE Program participants.

Table 5 shows the distribution of the actual to model predicted usage for the most recent 12 months of data in each period. The participants predicted mean usage is usually within 0.2% of the actual mean. This supports the conclusion that the models are performing well within each period. The comparison of annualized usage between groups for each period also supports the conclusion that the control group is well matched to the participant group.

	Participants		Control Group	
	Pre	Post	Pre	Post
Actual Average Annualized Usage	20,293	18,351	20,203	19,008
Predicted Average Annualized Usage	20,271	18,354	20,187	18,972
Actual Median Annualized Usage	19,946	17,439	19,488	18,570
Predicted Median Annualized Usage	19,930	17,434	19,616	18,516

Table 5 - Distribution of Actual and Predicted Electric Usage

The normal temperatures used in this analysis are 18-year average daily temperatures. The average normal temperatures are presented in Table 6.

Month	Ashland	Hazard	Pikeville	Average
Jan	33	36	35	34
Feb	37	40	39	38
Mar	43	45	44	44
Apr	53	55	54	54
May	63	64	63	63
Jun	72	71	71	71
Jul	76	75	75	75
Aug	74	74	73	73
Sep	66	67	66	66
Oct	55	56	55	55
Nov	44	45	45	45
Dec	36	38	37	37

Table 6 - Average Normal Daily Temperatures

Using normal temperatures the Normalized Annual Consumption (NAC) was calculated for each period for each group. Table 7 shows the NAC for each period. The mean and median consumption is decreased for the participant group from the pre-installation to the post installation period. The Control group shows a modest increase in the mean and median consumption for the pre to post period. The comparison of the NAC between groups, for each period does however demonstrate that the control group is well matched to the participant group.

	Participants		Control Group	
	Pre	Post	Pre	Post
Mean	19,123	18,813	18,967	19,473
Median	18,473	18,147	18,588	18,817

Table 7 - Distribution of Electric NACs

5 The Energy Impacts

To fully investigate the effects of the program, several different analytical methods were used. These methods ranged from a simplistic comparison approach to a more complex regression technique. As expected, the estimates of savings should remain relatively stable from method to method. The more complex methods were expected to produce

"better" estimates. This section presents the methodology to estimate the energy savings for the TEE Program.

In the evaluation of the TEE Program, the following two different methods were used. First, the energy impact was determined using an Augmented Comparison Method (PRISM). The second approach was a Regression Approach. Appendix A contains a detailed discussion of the methodology used to quantify the energy impacts. This section presents the results of that analysis.

One of KPCo's objectives was to establish savings estimates for subsets of the participant population, the electric heat participants and the base load participants. Accordingly, the analysis will be presented for these groups.

Participant Type	Number of Customers	Percent Of Population	Annualized Pre-Installation Usage (kWh)
Electric	330	77%	22,086
Base Load	158	37%	16,619

Table 8 - Participant Distribution

Table 8 shows the distribution of participants. As this table shows, the program was dominated by electric heating customers.

5.1 The Augmented Comparison Approach Results

For the net savings, the average control group pre- and post installation usage were used. Table 9 shows the mean savings by program component.

	Electric Heat	Electric Heat	Electric Heat Total	Base Load	Program Total
Heating System	Replaced	Not Replaced			
Pre Installation NAC (kWh)	20,091	20,900	20,703	15,891	19,142
Mean Savings (kWh)	(369)	1,575	1,102	375	866
Pct Savings	-2%	8%	5%	2%	5%

Table 9 - Comparison of the Net Savings, By Component

Table 9 shows a mean savings for the electric heat customers of 1,102 kWh/year. This is a 5% reduction from the pre-installation NAC. This table also shows that the base load customers had a mean savings of 375 kWh/year. This is a 2% reduction from the pre-installation NAC. The tables also illustrate the unique impacts of electric heat customers that had a heating system replacement as compared to electric heating customers that did not have a heating system replacement.

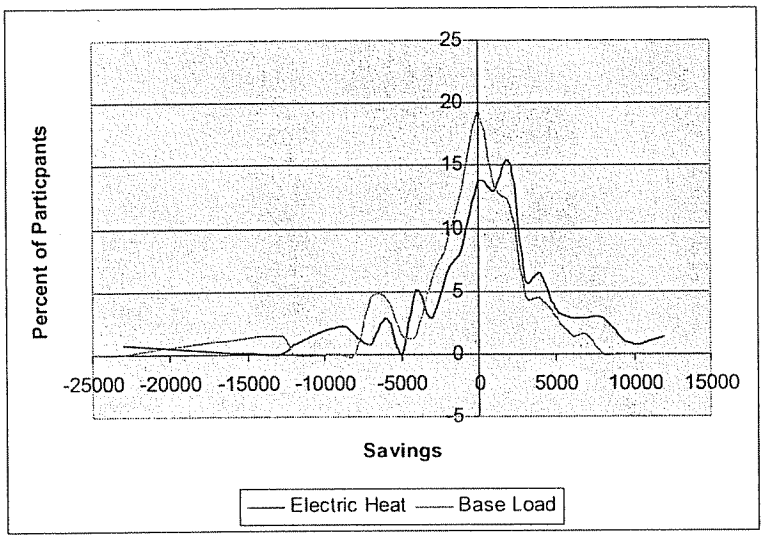


Figure 1 - Distribution of PRISM Savings

Figure 1 shows a comparison of the distribution of the PRISM savings estimates, for each participant type. This is typical of the distribution of savings generated by PRISM analysis. The distribution is essentially a *normal* (i.e., bell-shaped) curve, with most of the estimates falling around the center point or mean. The tails of the distribution are symmetrical. The large confidence intervals are exemplified by the large spread in values shown in this figure. Interestingly, about 43% of the participants showed a predicted *increase* in usage from the pre-installation to the post-installation period. This may be due in part to the heating system replacement[2] feature of the program.

Some conclusions can be drawn from the augmented comparison approach. Although the results can be refined, it is clear from this initial analysis that the TEE Program has effected the electric consumption of the participants. In addition, the initial estimates can be considered a substantial amount of energy savings.

The variability of the savings estimates produced by this method is quite large. To produce a more precise estimate of savings, the regression approach was implemented.

5.2 The Regression Approach Analysis Results

The regression analysis was implemented using the four-step approach described in Appendix A. Unfortunately, there was not engineering estimates of savings available for the individual customers to incorporate into the model.

[2] It was determined that the inclusion of heating system replacements and heating repair work does not necessarily increase the program's electric energy savings benefits. The justification for this is that a repaired heating system would lead to increased reliance as the primary heating source. Similarly, the installation of a new heating system can also lead to higher customer consumption, if alternative heating fuels were used or if the customer chose to increase their comfort level.

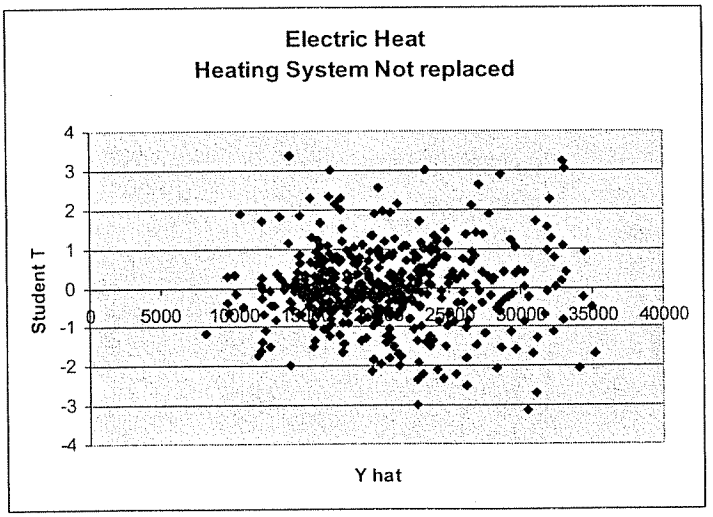
The initial analysis step was to build a simple regression model. As noted above, no engineering estimates of savings were available to this analysis. Accordingly, the analysis was performed using a participation indicator variable.

Heating System	Electric Heat Replaced	Electric Heat Not Replaced	Electric Heat Total	Base Load	Program Total
Pre Installation NAC (kWh)	20,091	20,900	20,703	15,891	19,142
Mean Savings (kWh)	(506)	1,802	1,241	228	912
Pct Savings	-3%	9%	6%	1%	5%

Table 10 - Average Savings Estimates From Simple Model

Table 10 shows the average savings estimates from the simple model. The savings estimates shown in this table are not statistically different from the PRISM results. However, the estimates are much less variable. The savings for the average electric heat participant were 1,241 kWh/year. This is a 6% reduction from the pre-installation NAC. The savings estimate for the base load participants 228 kWh/year. This is a 1% reduction from the pre-installation NAC.

One of the fundamental regression assumptions is that the standard error of the error terms (or residuals) has a constant variance across the range of predicted values. When the residuals are related to the predicted values, the model is said to be *heteroscedastic*. Heteroscedasticity is a violation of the basic regression assumptions that could lead to mis-specification of the mathematical relationships. Specifically, as a result of the residual standard error being related to the size of a customer's usage, heteroscedasticity will mis-estimate the confidence interval around the estimates. Heteroscedasticity is common in cross sectional models such as the Simple Model discussed above.



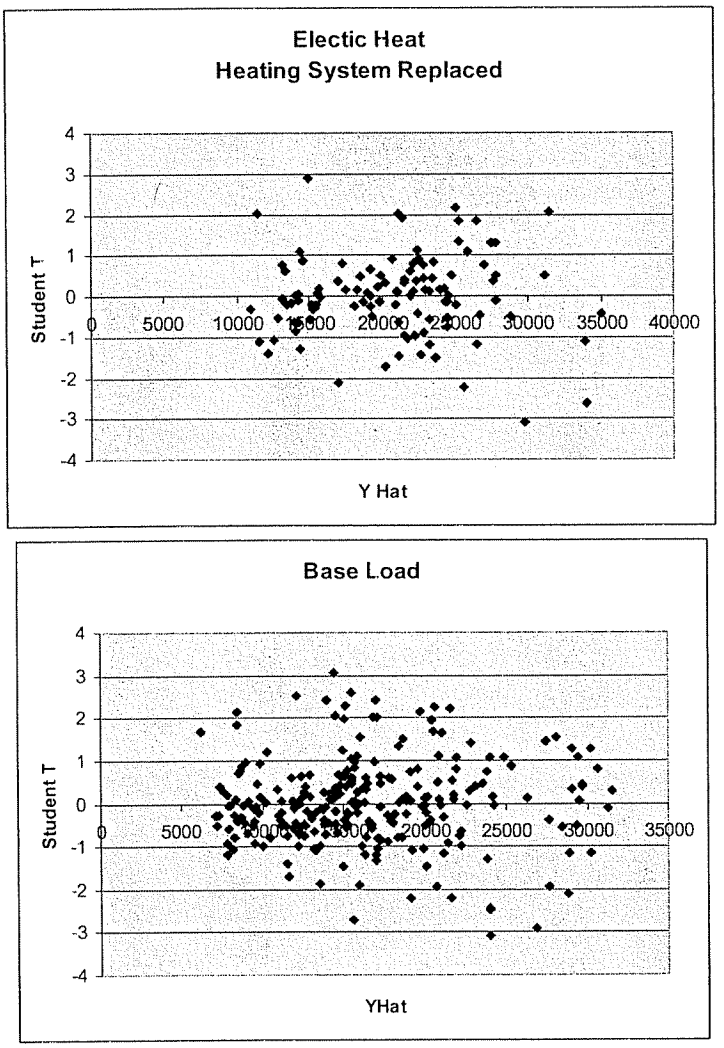


Figure 2 - Residual Plots

Figure 2 shows the residual plots of the error terms to the pre-installation NAC. In these figures, the residual for each participant and control group member is plotted on the vertical axis and that customer's pre-installation NAC is plotted on the horizontal axis. These figures do not strongly suggest that as the pre-installation NAC increases as does the variance (i.e., the spread) of the residuals, which would be typical of a heteroscedastic relationship.

When heteroscedasticity is present, the ordinary least squares (OLS) regression approach to establishing the relationship between the dependent variable, and the independent variables may be inappropriate. Accordingly, a WLS approach was applied to see what, if any effect that heteroscedastic was influencing the analysis. The initial WLS analysis was performed using the Simple Model described above. Families of weights based on the standardized geometric mean, raised to the gamma power were developed. In order to determine the optimal gamma, the Simple model was calculated for each of the weights. The model that minimized the mean squared error was chosen as the optimal model.

Heating System	Electric Heat Replaced	Electric Heat Not Replaced	Electric Heat Total	Base Load	Program Total
Pre Installation NAC (kWh)	20,091	20,900	20,703	15,891	19,142
Mean Savings (kWh)	(467)	1,605	1,101	553	923
Pct Savings	-2%	8%	5%	3%	5%

Table 11 - WLS Savings Estimates

Based on the WLS regression technique, the average savings were estimated. Table 11 shows the average savings estimates from the WLS model. Again, the savings estimates shown in this table are not statistically different from the PRISM results. However, the estimates are much less variable. The savings for the electric heating participants were 1,101 kWh/year per customer. This is a 5% reduction from the pre-installation NAC. The savings estimate for the base load customers was 553 kWh/year. This is 3% reduction from the pre-installation NAC.

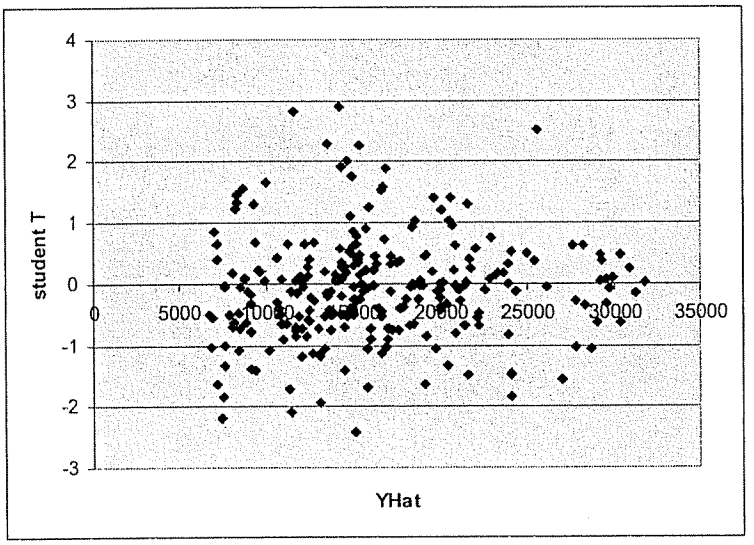


Figure 3 - Residual Plot-Weighted Least Squares Results

Figure 3 shows the residual plots for the WLS model. These plots show that the WLS approach has addressed the heteroscedasticity inherent in the data. Accordingly, it is appropriate to use WLS.

5.3 Analysis of the Effects of Heating System Replacement Measure

The inclusion of heating system replacements and heating repair work does not necessarily increase the program's electric energy savings benefits. The justification for this is that a repaired heating system would lead to increased reliance as the primary

heating source. Similarly, the installation of a new heating system, may lead to higher customer consumption when alternative heating fuels were used, or the customer chose to increase their comfort level.

To investigate these hypotheses, the analysis of the 2003 program specifically was designed to determine the savings estimates for the electric heat customers that had a heating system replacement, and for the electric heat customers that did not have a heating replacement.

Twenty four (80) of the 2003 electric heat participants had a heat pump installed as their heating system replacement. Table 11 shows that the normalized savings reduction in bills for heating replacement customers was -467 kWh. However, the average reduction in bills for the non-heating replacement customers was 1,605 kWh. Accordingly, this suggests that the heating system replacement component of the program may decrease electric savings for the average participant receiving this measure.

Intuitively, the replacement of a heating system with a high efficiency heat pump would reduce the post-installation bills. However, the program implementers did report that many of the systems that were being replaced were inoperable. Accordingly, this would lead to an increase in post-installation bills and would not allow billing analysis to accurately determine the savings.

Accordingly, in 2002 an engineering analysis was performed to determine the expected savings of the installation of a heat pump, rather than a standard efficiency electric furnace. The methodology to estimate the savings can be found in Appendix A. The estimate assumed a heat pump installed in a 944 square foot home use 1,902 kWh annually less than a home with a standard efficiency furnace.

To leverage the engineering estimates of savings into the analysis, individual estimates of non-heating system replacement savings were made for each of the sites that had heat pump replacement engineering estimates of savings. This model estimate and the engineering estimate of savings were added together to determine an estimate of saving for each of these sites. For the heat pump replacement participants the average site total savings was 2,372 kWh/year.

To estimate the savings for all heating replacement customers, an assumption was made that the effect that was estimated for the heat pump participants was applicable to the other heating replacement customers. Accordingly, an adjustment factor was developed based on the heat pump participants to adjust the pre-NAC for all heating replacement customers.

Heating System	Electric Heat Replaced	Electric Heat Not Replaced	Electric Heat Total	Base Load	Program Total
Pre Installation NAC (kWh)	22,930	20,900	21,393	15,891	19,608
Mean Savings (kWh)	2,372	1,605	1,792	553	1,390
Pct Savings	10%	8%	8%	3%	7%

Table 12 - Restated Savings Estimates Incorporating Engineering Estimates

Table 12 presents the savings estimates incorporating the engineering estimate of the installation of a heat pump, plus the estimate of all other measures. This table shows that the estimate of savings for electric heat customers would be 1,792 kWh/Year. The average program participant savings is estimated at 1,390 kWh/year.

5.4 Summary of Analysis Results

Figure 4 shows a comparison of the savings estimates. Among the estimates based on billing analysis alone, the various procedures produced a range of point estimates of savings. However, the differences cannot be considered statistically significant. Among these estimates, the choice of the estimate that produces the most accurate estimate of program impact can be analytically determined. This "best" estimate of savings was determined by a review of the process to develop the estimates. The Augmented Comparison Approach (PRISM) produces unnecessarily large confidence intervals. The Simple Regression Approach produces valid estimates of savings, but violates some fundamental regression assumptions. The WLS regression model does not violate the basic regression assumptions, and contains only statistically significant variables. Therefore, the results based on this latter approach are used to define the most accurate estimate of savings.

However, as discussed in Section 5.3, the analysis of billing data alone obfuscates the full program impacts of customers that had non-functional or poorly functioning space conditioning systems. Accordingly, it is appropriate to incorporate additional information to obtain a more accurate estimate of program impacts.

Incorporating engineering estimates of savings with estimates of savings generated by the regression analysis provides the most accurate indication of program impact. The average program participant savings is estimated at 1,390 kWh/year.

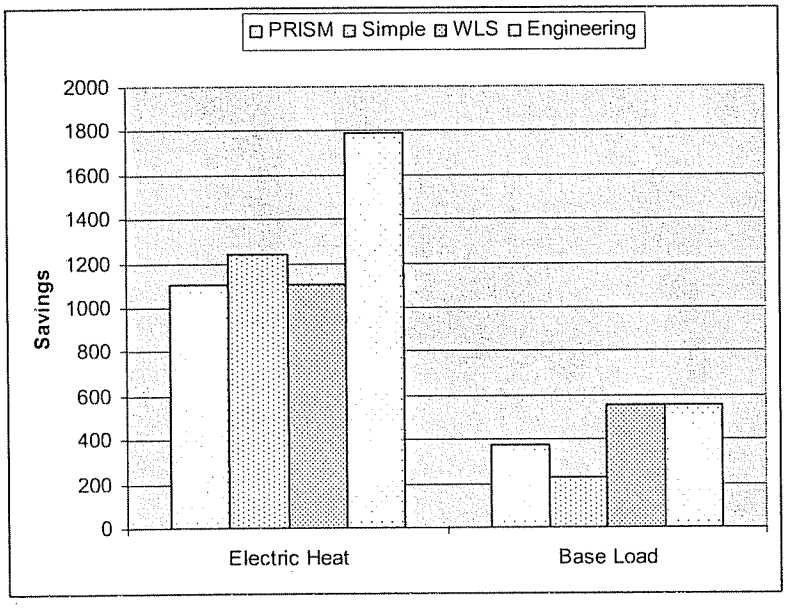


Figure 4 - Comparison of Savings Estimates

To determine the total annual impact of the program, the average per customer savings for each group (i.e., electric heat and base load) were multiplied by the number of customers in that group. Based on this analysis shows that, in total, the 2003-2004 TEE Program will save 678 MWH/year.

Appendix A Methodology

Methodology to Develop the Participant Analysis Group

The first step in the analysis of the TEE Program was to identify all participants that could contribute to the analysis. To this end, KPCo constructed a data set of all known participants' electric usage history. This data set contained information for 488 participants.

Once the billing data set was constructed it was examined, consisting of the following three steps:

- Merge billing data with site specific information.
- The first step eliminated records with unusually long or short number of days, bills with large or zero consumption, or any bill that was not within two years of the completion date.
- The next step limited the analysis to customers that had sufficient information during the pre and post installation periods. This included at least 275 days in each period, which consisted of at least 9 billing periods of information, having a minimum of 2 summer billing periods and 2 winter billing periods.

Methodology to Develop the Control Group

The Control Group for the TEE Program was developed following a four-step algorithm:

1. An appropriate pool of potential control group customers was established,
2. Criterion was developed to match control group pool customers to participants,
3. Known participants were eliminated from the control group pool, and
4. The control group pool customers were compared to each participant. Based on the established criteria, the best Control Group pool matches were selected.

Each of these steps is explained in detail below.

Step 1: The Establishment of a Control Group Pool

In order to develop a control group for the TEE Program, KPCo selected a large sample of LIHEAP customers. The customers in the Control Group Pool were examined, and if necessary, edited. This examination was consistent with the editing procedure applied to the participants.

Step 2: The Establishment of Control Group Matching Criteria

Based on the available information, criteria to match Control Group customers to specific participants were established. These criteria were based on annualized 2003 usage, as defined by Equation 1, pseudo summer load factor[3] and pseudo winter load factor, as defined by Equation 2.

[3] Typically a 'load factor' will describe a peak demand in relationship to an average demand for a period. Since demand information was not available, a proxy variable, the pseudo load factor, was used. The pseudo load factor describes the relationship between the average annual daily use and the average daily usage during the peak month.

$$AU = \frac{(\Sigma U_i)*365}{(\Sigma D_i)}$$

Where;

AU	=	Annualized Usage
U_i	=	Monthly Billed Consumption
D_i	=	Monthly Days in the Cycle

Equation 1 - The Calculation of Annualized Usage

$$LF = \frac{kWh_a}{(kWh_m)*12}$$

Where:

kWh_a	=	Annualized kWh
kWh_m	=	Peak Month Usage.

The pseudo summer load factor was based on the July bill. For the pseudo winter load factor, the monthly peak month usage was based on the January bill.

Equation 2 - The Calculation of Pseudo Load Factor

Step 3: Eliminating Known Participants

After the initial edits, any known current TEE Program participants were eliminated from the control group pool. This was done by matching the current participants against the Control Group Pool database.

Step 4: The Establishment of the Control Group

During this step, each control group pool customer was compared to each participant. For each control group pool customer within a given strata, the relative deviation in annualized usage was calculated using Equation 3.

$$ARD = \left(\frac{|U_c - U_p|}{U_p} \right) * 100$$

Where;

ARD = Absolute Relative Deviation
U_c = Annualized Usage for Potential Control Group Member
U_p = Annualized Usage for Participant

Equation 3 - The Determination of the Absolute Relative Deviation

For each participant, the ten control group pool customers with the smallest absolute relative deviation in the annualized usage was chosen for each participant. These ten control group matches were then examined further.

Based on the matching of the program participants, each selected control group member was assigned an installation date. This information was used to split the customers in the control group into pre- and post installation periods that are consistent with that of their matched participant.

Next, each member of the control group was checked to confirm that they had enough pre-installation and post installation billing data to be analyzed. This editing process was consistent with that applied to the participant group.

The best control group match was always chosen, and up to two others were chosen if the annual usage relative deviation was less than 10%. These customers were designated the Control Group.

The Control Group was chosen *with replacement*. Selecting a sample with replacement allows a customer to have the potential of being designated a Control Group member for more than one participant.

Temperature Normalization Methodology

The temperature normalization procedure used for this analysis is the *Princeton Scorekeeping Model* (PRISM) algorithm. Through years of experience, RLW has taken the fundamental concept of the PRISM methodology and refined it to produce more accurate estimates of normalized annual consumption (NAC).

The PRISM algorithm develops a mathematical model that represents the temperature to energy consumption relationship. The standard, Heating-Only version of this model is shown in Equation 4.

$$U_i = \alpha + \beta * DD_i(\tau) + e_i$$

Where;

U_i = average daily consumption in interval i.
$DD_i(\tau)$ = average degree days in interval i, based on reference temperature τ.
α,β = parameters to be estimated to minimize e.
e = a random error term.

Equation 4 - The PRISM Heating Only Model

The PRISM model reflects that a customer's energy usage is equal to some base level α, and a linear function between a reference temperature τ, and the outside temperature. The constant proportionality, β, represents a customer's effective heat-loss or heat-gain rate.

PRISM recognizes that each customer has unique space conditioning operating characteristics. To capture these unique space-conditioning characteristics, PRISM examines a range of heating and cooling reference temperatures. The model chosen to represent a customer's energy use is the model that best linearizes the relationship between usage and degree-days. For each customer, an optimal model based on a unique reference temperature (τ) is identified by the minimum mean squared error (MSE) of the regression.

Once the optimal parameters have been established, normalized annual consumption is estimated using Equation 5.

$$NAC=365*\alpha+\beta*DD_o(\tau)$$

Where:

DD_o is the number of degree days expected in a typical year.

Equation 5 - Determination of Normalized Annual Consumption (NAC) [4]

When this model is applied to a home's heating characteristics, it is referred to as the *heating only model* (HOM). When this model is applied to a home's cooling characteristics, it is referred to as the *cooling only model* (COM).

For the analysis of electric consumption data, it was not known whether or not the participants or control group members had significant space conditioning load. Therefore, the first adaptation of the PRISM methodology was to consider a *heating and cooling model* (HCM), along with the standard PRISM *heating only* or *cooling only models*. The expansion of the standard PRISM approach to consider heating and cooling loads is calculated using Equation 6.

[4] For a more comprehensive technical discussion of PRISM, see Impact Evaluation of Demand-Side Management Programs, Volume 1: A Guide to Current Practice, EPRI Report CU-7178,V1, pages 5-6.

$$U_i = \beta_0 + \beta_1 * HDD_i(\tau_1) + \beta_2 * CDD_i(\tau_2) + e_i$$

Where:

U_i	=	The electric usage during cycle i.
$HDD_i(\tau_1)$	=	The heating degree days based on reference temperature τ_1, during cycle i.
$CDD_i(\tau_2)$	=	The cooling degree days based on reference temperature τ_2, during cycle i.
β_i	=	The coefficients to be estimated to minimize the error term.
e_i	=	The error in predicting U.

Equation 6 - PRISM Heating and Cooling Model

As with the standard PRISM procedure, the optimal heating and cooling model is determined by calculating the regression models assuming various reference temperature values (τ_1 and τ_2). Expected annual degree-days are applied to the optimal model to calculate a normalized annual consumption (NAC). The results of the model can be interpreted as:

- β_0 is an estimate of the average base load for a cycle;
- β_1 represents the heating slope, or the increase in electric usage for each incremental increase in heating degree days; and,
- β_2 represent the cooling slope, or the increase in electric usage for each incremental increase in cooling degree-days.

The standard PRISM approach uses usage and degree-day data on a billing cycle basis. However, the data has an inherent variability associated with the varying lengths of billing cycles. For the estimation of the heating and cooling slopes (β_1, and β_2) the effects of the varying lengths of the billing cycle are mitigated. This is a result of the number of degree-days being directly correlated to the number of days in the cycle. However, the estimates of base load (β_0) reflects the average base load per cycle and does not account for the days in the cycle. In effect, this estimate infers the base load will be β_0, regardless of the length of the cycle. Since base load usage is a function of time, this result may introduce a slight bias into the calculation. To eliminate this bias, the augmented PRISM approach uses usage per day as the dependent variable, and expresses the degree days on a per day basis.

The PRISM methodology assumes that there is a linear relationship between usage and temperature. However, if the assumption is not valid, it could lead to a violation of a basic regression assumption (i.e., the error terms are uncorrelated). To avoid any bias, two additional terms was considered in developing individual customer electric models. These terms are heating degree-days squared, and cooling degree-days squared. The incorporation of these variables result in Equation 7.

$$U_i = \beta_0 + \beta_1 * HDD_i(\tau_1) + \beta_2 * (HDD_i(\tau_1))^2 + \beta_3 * CDD_i(\tau_2) + \beta_4 * (CDD_i(\tau_2))^2 + e_i$$

Equation 7 - Electric PRISM Model, with Second Order Terms Incorporated

Alternative models, with different numbers of independent variables, introduce a challenge to choosing an optimal model. The standard PRISM approach relies on the maximization of R^2 to indicate the optimal model. However, in building mathematical regression models, the R^2 statistic has a tendency to increase as the number of independent variables increases. Therefore, when comparing models with different numbers of regressors, the maximum R^2 criteria may not lead to choosing the optimal model between alternative models. To avoid this possibility, an alternative method to determine the optimal model was used. The minimization of the mean squared error of the residuals (MS_E) is a good alternative. The MS_E accounts for the decrease in the degrees of freedom when an additional regressor is added to the equation. Therefore, the model that minimized the MS_E was chosen as the optimal model to represent the temperature versus usage relationship.

Lastly, in an effort to obtain the most accurate models possible, a system of re-analyzing poor performing models was developed. A "poor performing model" is defined as one that produced a low R^2 statistic.

The determination of the optimal model used a four-step approach. These steps are:

1) The optimal models are determined using all available data.
2) If the optimal model produced in Step 1 has a poor R^2, the usage data point with the largest prediction error was omitted. Using this trimmed and edited data set the models were re-estimated.
3) Choosing the optimal model for each customer from the first two steps, the customers with poor R^2 are again identified. For these customers, the usage data was limited to the most recent year of information. Using this trimmed data set, the models were re-estimated.
4) The models developed for each customer in each of the first three steps are compared. The optimal model (i.e., the model that minimizes RMSE) was chosen.

Normal temperatures were applied to the optimal models generated by this algorithm. The estimates produced are the Normalized Annual Consumption (NAC) for each period.

Energy Impact Analysis Methodology

In the evaluation of the TEE Program, the following two different methods were used. First, the energy impact was determined using an Augmented Comparison Method (PRISM). The second approach was a Regression Approach. This section discusses the methodology used to determine the energy impacts of the TEE Program.

The Augmented Comparison Approach

An augmented comparison approach controls for weather and other factors using a representative control group and simple equations. After the normalization of the participant and control group bills (see Temperature Normalization Methodology), the difference between the pre-program and post-program NACs were used to determine the raw energy savings that can be attributed to the program. The determination of energy savings is calculated using Equation 8.

$$S_{raw}=NAC_{Pre\text{-}Program} - NAC_{Post\text{-}Program}$$

Equation 8 - The Augmented Comparison Approach Determination of Gross Savings

To account for exogenous influences, the raw savings expressed in can be adjusted by using a representative control group. If it is assumed that the same outside influences are affecting both the control and participant groups, then the adjustment will yield an estimate of energy savings that are isolated from all other influences. Determining the pre- and post-program NACs for both the participant and control groups makes this adjustment. The estimated savings are calculated by adjusting the participant results by the Control Group results. This adjustment is shown in Equation 9.

$$S_{adjusted} = NAC_{pre-program}(P_i) * \frac{NAC_{Post-Program}(C_i)}{NAC_{Pre-Program}(C_i)} - NAC_{post\,Program}(P_i)$$

Where:

C_i = The average of control group members associated with participant *i*.
P_i = Participant *i*.

Equation 9 - The Augmented Comparison Approach, Determination of Net Savings

While this method is simple, it can obscure real program effects and usually produces a high variability around the estimate.

The Regression Approach

The regression approach was performed using a comprehensive and systematic approach. This approach, presented below, has been applied with great success to the analysis of conservation programs.

The regression approach consisted of four steps that result in the selection of an optimal model that accurately quantifies the program impact. This sub-section describes the four steps of the regression approach.

Step 1: The Simple Model

During this step an initial regression model is developed using ordinary least squares ("OLS"). This simple model determined the effect of *one* important change variable (i.e., the participation indicator variable status, or the participants engineering estimate of savings) on energy savings *while controlling for all other changes*. The basic form of this model is shown in Equation 10.

$$NAC_{post,i} = \beta_0 + \beta_1 NAC_{Pre,i} + \beta_2 P_i + \varepsilon_i$$

Where:

$NAC_{post,i}$ = Post Installation Normalized Annualized Consumption for customer i
$NAC_{pre,i}$ = Pre Installation Normalized Annualized Consumption for customer i
P_i = Participation Indicator Variable or Engineering Estimate of Savings
ε_i = Prediction error

Equation 10 - The Simple Regression Model

Step 2: Regression Diagnostics

As a result of the residual standard deviation related to the size of the customer's energy usage, one regression assumption most often violated is that the standard deviation of the error terms, (or "residuals") is not constant across the range of predicted values. When the standard deviation residuals are related to the predicted values, the model is said to be "heteroscedastic." Heteroscedasticity can often be detected in cross sectional models used to analyze program impacts. During this step, verification that the regression assumptions are valid is performed. If the initial regression model is found to be "heteroscedastic" further regression analyses are performed. These analyses are performed using a weighted least squares ("WLS") approach.

Step 3: Weighted Least Squares

As discussed above, one of the fundamental regression assumptions is that the standard deviation of the error terms (or residuals) has a constant variance across the range of predicted values. When the residuals are related to the predicted values, the model is said to be heteroscedastic. Heteroscedasticity is a violation of one of the basic regression assumptions and could result in the miss-specification of mathematical relationships. As a result of the residual standard deviation being related to the size of the customer's energy usage, heteroscedasticity is often detected in cross sectional models used to analyze program impact.

When heteroscedasticity is present, an ordinary least squares (OLS) approach to establishing the relationship between the dependent and independent variables may be inappropriate. An OLS approach that does not correct for the heteroscedastic relationship of its residuals will yield confidence intervals[5] that are misleading. More specifically, when heteroscedasticity is present, the

[5] Even though it is the best possible estimate given the data, it is unlikely that the point estimate will exactly equal the true, unknown parameter being estimated. Accordingly, instead of using a single value to

OLS regression coefficients are unbiased estimates of the true parameters, but they are subject to greater statistical variation than the appropriate estimates. Moreover, the standard errors produced by the OLS regression analysis are biased estimates of the true standard deviations of the regression coefficients.

Weighted least squares (WLS) is one approach to correct for heteroscedasticity in regression analysis. According to econometric theory, the advantages of WLS are:

a) Under a properly specified heteroscedastic model, WLS yields the best linear unbiased estimates of the true parameters and,
b) WLS gives an unbiased estimate of the variance of the estimators, providing appropriate confidence intervals and p-values.

In other words, WLS provides the most reliable estimate of savings and an accurate measure of the resulting reliability. The theory of WLS depends on a correct specification of the heteroscedasticity. The theory assumes that a positive-valued variable can be specified, say z, such that the residual standard deviation is proportional to z. Usually, z is taken to be some measure of size (for example, the pre-retrofit NAC consumption).

The benefits of WLS depend on the correct choice of z. Therefore, it is useful to have a way of comparing alternative candidates for z. If it can be confirmed that heteroscedasticity is present, the following procedure[6] is employed:

1. Postulate a family of possible candidates for z. In the following analysis, the regression has been estimated assuming that the residual standard deviation is proportional to pre-retrofit NAC dampened by raising this variable to some power between 0 and 1. This variable will be termed $(NAC_{Pre})^{\gamma}$, where $\gamma \geq 0$. Here the exponent, gamma, is an unknown parameter that creates a family of candidate choices of z.

2. For each candidate of z, geometrically standardize z by dividing each value of z by the geometric mean of the n sample values of z. The geometric mean is the n^{th} root of the product of the n values of z.

3. Fit the regression model using WLS with each geometrically standardized z, and calculate the root mean square error (RMSE) of each regression model.

---

estimate the true, unknown value, it is common to use a set of values or a *confidence interval*. A confidence interval is a range of values between which we can define a statistical probability, based on the estimate variability that the true value will fall. Generally, the higher the probability, the wider the confidence interval. Usually, the confidence interval is stated in terms of the probability that the true value will fall within plus or minus the interval around the point estimate. For example, given a 90% confidence level (the probability), the true mean will fall within ± 5% of the estimated mean.

[6] The justification for this approach is from the statistical theory of maximum likelihood estimation. Although the WLS is different, the mathematical derivation of the methodology is the same as used by Box and Cox in their paper An Analysis of Transformations, (Journal of the Royal Statistical Society, Series B, 1964). A good summary of the approach is given in the text *Econometrics*, by G.S. Maddala, McGraw-Hill, 1977, pp. 315-317. J. Kmenta gives a similar methodology in Elements of Econometrics, to deal with autoregression in time series analysis.

4. Minimize the RMSE to find the best choice of z and use this particular WLS regression to obtain the best estimate of savings.

During this step, a residual analysis is performed. If heteroscedasticity is suspected, the models are estimated using WLS.

Step 4: Calculation of Energy Savings

The final step in the analysis estimates the energy savings by using the resultant models.

Engineering Estimate of Heating Replacement Methodology

For electric furnace to heat pump conversions, the engineering estimate of savings is based on the ASHRAE simplified energy formula method[7].

First the heat loss is calculated using the following formula:

$$HL = UA(T_i - T_o)$$

Where:

HL	= the component heat loss, Btu/hr
U	= the overall heat transfer coefficient, Btu/(hr-ft^2-^{0}F)
A	= the area of the component, ft^2
T_i	= the indoor temperature, ^{0}F
T_o	= the outdoor temperature, ^{0}F

The building heat loss (HL) is then input into the following formulas:

$$\text{Annual Electric Furnace}_{kWh} = \frac{(24 \text{ X HL X HDD X } C_d)}{(\text{Ti-To}) \text{ X } 3{,}413}$$

$$\text{Annual Heat Pump}_{kWh} = \frac{(24 \text{ X HL X HDD})}{((\text{Ti-To}) \text{ X } 1000 \text{ X HSPF})}$$

Where:

HDD	= 4,555 (mean average of Ashland and Williamsburg)
C_d	= 0.65
(Ti-To)	= 70 ^{0}F (assumption)
HSPF	= Heating Seasonal Performance Factor (@47 ^{0}F)

Savings for the heat pump retrofit is determined by the following formula:

$$\text{Savings}_{kWh} = \text{Electric Furnace}_{kWh} - \text{Heat Pump}_{kWh}$$

[7] ASHRAE Handbook, 1993 Fundamentals, Chapter 22, Table 10.

Appendix B Temperature Normalization Results Details

The original simple model approach (i.e., Step 1, all available data) was the most accurate for each group and used for this evaluation. None of the periods were improved by the alternative methods listed in (Steps 2 and 3).

As detailed in Appendix A Temperature Normalization Methodology, four variables were considered for the electric models. Heating and cooling degree-days were considered. Figure 5 shows that for the participants, models that featured the heating and cooling PRISM models were chosen nearly 70% of the time. The distribution of the type of models is fairly consistent from period to period and within customer groups. This suggests the models are stable across time and that the control group is well matched to the participant group.

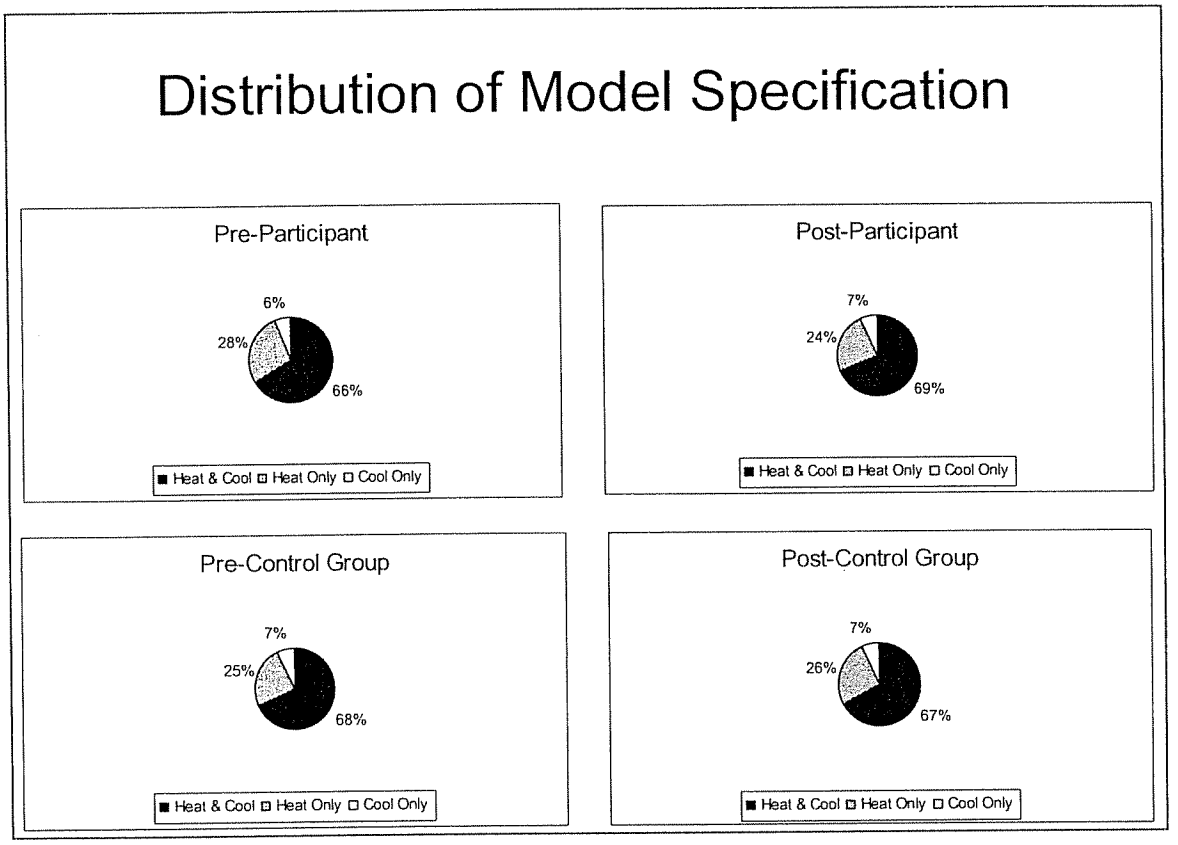


Figure 5 – Distribution of Model Specification

Table 13 compares the distribution of set points for the degree-day variables. For the participants, the median heating degree-day reference point was 61°F in the pre- and 60°F in the post-installation periods. For the control group, the median heating degree-day reference point was 60°F in the pre-and 60°F in the post-installation period. For the participants, the median cooling degree-day reference point was 68°F in the pre- and 67°F

in the post-installation periods. For the control group, the median cooling degree-day reference point was 67°F in the pre-and 67°F in the post-installation period. The distribution points of both groups are strikingly similar. This reinforces the conclusion that the models are stable across time and that the control group is well matched to the participant group.

	Heating Degree Day Reference Temperatures			
	Pre-Installation		Post-Installation	
Statistics	Participant	Control Group	Participant	Control Group
Maximum	74	74	74	74
75th Percentile	65	64	64	64
Median	61	60	60	60
Mean	60	60	60	59
25th Percentile	54	54	55	54
Minimum	50	50	50	50
	Cooling Degree Day Reference Temperatures			
	Pre-Installation		Post-Installation	
Statistics	Participant	Control Group	Participant	Control Group
Maximum	75	75	75	75
75th Percentile	71	71	73	71
Median	68	67	67	67
Mean	67	67	68	67
25th Percentile	64	63	64	62
Minimum	60	60	60	60

Table 13 – Distribution of Degree-Day Set Points

Table 14 shows the distribution of the R^2 statistics. For the participants and the control group, about half the models had R^2 over 90%. Again, the distribution of R^2 for each group in each period is very similar, supporting the conclusion that the models are stable across time and that the control group is well matched to the participant group.

	Pre-Installation		Post-Installation	
Statistics	Participant	Control Group	Participant	Control Group
Maximum	100%	100%	100%	100%
75th Percentile	95%	96%	98%	97%
Median	88%	90%	91%	93%
Mean	76%	80%	79%	87%
25th Percentile	61%	73%	69%	84%
Minimum	2%	0%	1%	0%

Table 14 – Distribution of R-Squared Statistics for the Electric Models

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2004 TARGETED ENERGY EFFICIENCY PROGRAM

2004 ENGINEERING ESTIMATION

Final Report

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KENTUCKY POWER COMPANY
TARGETED ENERGY EFFICIENCY PROGRAM
2004 ENGINEERING EVALUATION

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1 Introduction

This report presents the 2004 Engineering Evaluation of Kentucky Power Company ('KPCo') Targeted Energy Efficiency Program ('TEE Program'). The TEE Program is designed to perform energy audits, provide energy education to all households, perform blower door tests and install extensive weatherization and energy conservation measures to low income customers living within the KPCo service territory. The TEE Program is a "piggyback" program leveraging the resources of five not-for-profit agencies including:

1. Big Sandy Community Action Agency
2. Gateway Community Action Council
3. LKLP Community Action Council
4. Middle Kentucky River Area Development Council
5. Northeast Kentucky Area Development Council

These five agencies provide weatherization services to low-income customers via the existing Weatherization Assistance Program. This program is offered to electric heat and non-electric heat customers.

The primary objective of this evaluation was to quantify the savings for the 2004 program year. For this evaluation, engineering estimation was used to estimate 2004 program impacts. Engineering calculations provide energy savings estimates at the measure, project, and program levels.

Simple accounting of program activity from a tracking system typically represents the first level of impact evaluation for DSM programs. To enhance the accounting approach, engineering estimates can be developed through using the information contained in the program's tracking information. Engineering analyses offer reliable means for estimating program impacts at very low costs.

For the engineering analysis component of the evaluation, individual estimates were developed based on the information contained in the data collection forms recorded at the time of measure installation.

The engineering analysis was performed by major end-use measure category. These categories included:

1. Lighting measures
   - CFL Light bulbs
2. Air infiltration measures,
3. Insulation measures
   - Attic Insulation
   - Wall Insulation
   - Floor Insulation
4. Heating system replacements,
5. Domestic hot water measures
   - Low-flow showerhead installation
   - Hot water heater tank wrap installation
   - Hot water heater temperature reduction

- Hot water pipe insulation

6. Water bed covers.

The following sections discuss the engineering estimation approach for each measure and provide estimates of savings based on information contained in the data collection forms. It is important to note that no interactive savings effects are calculated.

2 Lighting Savings

The engineering estimation of annual lighting energy savings is as follows:

$$\text{Annual kWh savings} = (\Delta\text{Watts} \times \text{Hours}) / 1000$$

This algorithm is a straightforward and simple calculation, with the proper inputs for the wattage reduction and hours of use taken from the data collection forms.

2.1 Tracking Estimate of Savings for Lighting

Lighting measures were installed in 81 base load and 161 electric heat participants. An additional bulb was installed in all of the base load and electric heat participants. The average wattage reduction was calculated to be 62.4 watts for the first bulb and 61.6 watts for the second bulb. The average hours of use for the first bulb was estimated to be 8.4 hours and 7.6 hours for the second bulb. This yields an average savings of 200 kWh for the first bulb and 176 kWh for the second bulb. In aggregate, the total annual savings associated with lighting measures were calculated to be 90,871 kWh. This yields overall average savings per participant of 376 kWh.

Table 1 shows the lighting tracking estimates of savings for installations done in 2004 through the TEE Program.

Customer Type	Average Wattage Reduction Bulb 1	Average Daily Hours of Use Bulb 1	Average Wattage Reduction Bulb 2	Average Daily Hours of Use Bulb 2	Total Savings for CFL Installations (kWh)	Average Savings Per Customer for CFL Installations (kWh)
Electric Heat	62.7	9.0	62.0	7.9	64,524	401
Non-Electric Heat	61.7	7.3	60.6	7.0	26,347	325
Combined	62.4	8.4	61.6	7.6	90,871	376

Table 1: Lighting Savings Estimates

3 Air Sealing

To develop the engineering savings associated with air sealing measures we calculate the reduction in heat loss, in BTU/hr, due to infiltration using the following equation:

$$H_L = V \times \Delta T \times C_P$$

In this equation, V is the volume of outdoor air entering the building in cubic feet per hour, Δ T is an assumed temperature difference of 70 °F between the inside and outside of the heated space, and C_p is the specific heat of air which is 0.018 BTU/ft^3-°F. The result is applied to the following equation to calculate the kWh savings per year:

Electric Resistance Heating Systems:

$$\text{Annual kWh} = \frac{H_L \text{ X HDD X } C_D \text{ X 24}}{3{,}413}$$

In this equation, HDD is the amount of heating degree-days, which varies by location. C_D is an empirical correction factor for the degree-day estimate, H_L is the building heat loss, and 24 hrs/day and 3413 BTU/kWh are conversion factors.

Assumptions:

HDD = 4,555 (Avg. mean of Ashland and Williamsburg)
C_D = 0.65 (from ASHRAE Handbook 1985 Fundamentals)

3.1 Tracking Estimate of Savings for Air Sealing

Infiltration measures were installed in 156 of the electric heat participant homes. In aggregate, the total annual energy savings associated with sealing measures were calculated to be 269,260 kWh. This yields overall average savings of 1,726 kWh per tracking system participant.

4 Insulation

To calculate the engineering estimate of savings associated with insulation measures we use the reduction of heat loss, in kWh per year, due to insulation:

Electric Resistance Heating Systems:

$$\text{Annual kWh} = \left(\frac{1}{R_{old}} - \frac{1}{R_{new}}\right) \text{X} \frac{\text{HDD X } C_D \text{ X A X 24}}{3413}.$$

In this equation, R_{old} and R_{new} are the total thermal resistance values, or R-values, for the surface in question both before and after the installation of the insulation. HDD is the amount of heating degree days, C_D is an empirical correction factor for the degree day estimate, A is the surface area, and 24 hrs/day and 3413 BTU/kWh are conversion factors.

Assumptions:

HDD = 4,555 (Avg. mean of Ashland and Williamsburg)
C_D = 0.65 (from ASHRAE Handbook 1985 Fundamentals)

4.1 Tracking Estimate of Savings for Insulation Measures

Approximately 170,838 ft^2 of insulation was installed in the electric participant homes, 81,840 ft^2 in the floor, 3,241 ft^2 in walls, and 85,757 ft^2 in the attic area. In aggregate, the total annual energy savings associated with insulation measures were calculated to be 481,591 kWh. Average

savings per participant for attic areas were 1,973 kWh, walls were 1,924 kWh, and floors were 3,107 kWh.

Table 2 shows the insulated area square footage and savings estimates for the attic, wall and floor insulation measures that were installed in 2004 through the TEE program.

Area	Insulated Area (ft^2)	Total Savings (kWh)	Average Savings Per Home (kWh)
Attic	85,757	183,455	1,973
Walls	3,241	15,396	1,924
Floors	81,840	282,740	3,107
Total	170,838	481,591	3,391

Table 2: Insulation Savings Estimates

5 Domestic Hot Water

5.1 Water Heater Tank Wrap

Engineering estimates for the water heater tank wrap are based on the reduction of heat loss through the walls of the water heater. Standby losses are calculated using the heat transfer coefficient (U-value) of the tank before and after the installation of the insulating wrap, the outer surface area of the tank, and the temperature difference between the water and the outside of the tank. Also, water heater recovery efficiency is incorporated into the equation resulting in the following form:

$$TWSavings = \frac{(U_{pre} - U_{post}) \times (T_{hw} - T_{env}) \times tnkarea \times 8760}{EFF_r \times 3413}$$

Where:

TWSavings = annual energy savings due to tank wrap installation in kWh;
U_{pre} = U-value of tank wall prior to wrap (Btu / hr-ft²-°F);
U_{post} = U-value of tank wall after installation of wrap (Btu / hr-ft²-°F);
T_{hw} = measured hot water temperature in °F;
T_{env} = average annual temperature outside of the tank,
58 °F if in unconditioned space,
72°F if in conditioned space;
tnkarea = insulated surface area of tank in ft²;
8760 = number of hours per year;
EFF_r = water heater recovery efficiency,
.98 for electric water heaters,
1.8 for heat pump water heaters;
3413 = conversion factor Btu/kWh.

5.1.1 Tracking Estimate Savings for Tank Wraps

An insulation tank wrap was installed on 30 base load and 111 electric heat participants'. In aggregate, the total annual energy savings associated with tank wrap installations were calculated

to be 15,668 kWh. This yields overall average savings per tracking system participant of 111 kWh.

5.2 Hot Water Temperature Turndown

RLW estimates this measure's savings by combining two of the model elements previously described to estimate annual hot water usage in the home and annual standby losses from the hot water heater before and after temperature turndown. The difference between these two estimates provides the savings value from our analysis.

Annual hot water usage for each household is estimated using the LBL model described for the pipe insulation measure presented below. This method predicts average daily hot water usage by household, based on the number of occupants, the age distribution of the occupants, the hot water using appliances present in the home, and whether or not the occupants pay for their hot water usage. Since this model contained hot water temperature as a term in the equation, it is applied twice using the temperature before and after turndown to derive an estimate of daily (and annual) hot water usage in the household.

Annual energy use due to standby losses is calculated using the equation utilized to estimate savings for the water heater tank wrap measure, but using the difference in temperature values associated with the temperature turndown instead of the difference in U-value associated with the tank wrap.

The resulting equation used to estimate savings from the temperature turndown measure is as follows:

$$TTSavings = \frac{1}{EFF_r \times 3413} \times \left\{ \begin{array}{l} \left\{ 365 \times M_w \times Cp_w \times \left[\begin{array}{l} (HWUse_{bt} \times (T_{bt} - T_{cw})) \\ -(HWUse_{at} - (T_{at} - T_{cw})) \end{array} \right] \right\} \\ + \{U_{\tan k} \times tnkarea \times 8760 \times (T_{bt} - T_{at})\} \end{array} \right\}$$

Where:

TTSavings	= annual energy savings due to hot water temperature turndown in kWh;
EFFr	= water heater recovery efficiency, .98 for electric water heaters, 1.8 for heat pump water heaters;
3413	= conversion factor Btu/kWh;
365	= 365 days per year;
M_w	= mass of water, or 8.33 lbm/gallon;
Cp_w	= specific heat of water, or 1.0 Btu/lbm. °F;
$HWUse_{bt}$	= daily hot water use before temperature turndown in gallons;
$HWUse_{at}$	= daily hot water use after temperature turndown in gallons;
T_{bt}	= hot water temperature before turndown in °F;
T_{at}	= hot water temperature after turndown in °F;
T_{cw}	= average water heater inlet, or cold water temperature, (55 °F);
U_{tank}	= hot water tank U-value (Btu/hr. ft². °F);
tnkarea	= surface area of tank in ft².

5.2.1 Tracking Estimate of Savings for Hot Water Temperature Reduction

The hot water temperature was turned down in 17 base load and 56 electric heat participants. The average temperature reduction was 5.6°F. In aggregate, the total annual energy savings

associated with hot water temperature reduction were calculated to be 39,969 kWh. This yields overall average savings per participant of 548 kWh.

5.3 Low-Flow Showerheads

RLW applies a formula that accounts for the number of showers per day, shower duration, flow reduction, and the temperature difference between the supply water temperature and the estimated shower temperature for the summer and winter periods. This formula is shown below:

$$SHSavings = \sum_{seas} \frac{Shwrd \times NShwrs \times Wk_{seas} \times 7 \times \Delta flow \times M_w \times Cp_w \times \Delta T \times HWPct_{seas}}{EFF_r \times 3413}$$

Where:

SHSavings	= annual Energy Savings due to low flow showerheads in kWh;
seas	= season of the year (summer and winter);
Shwrd	= shower duration in minutes per shower, or 7.4[1];
NShwrs	= number of showers per day, equal to the number of occupants above age 6;
Wk_{seas}	= number of weeks per season equal to 26 each for summer and winter;
7	= number of days per week;
Δflow	= change in flow due to showerhead installation in gallons/minute, or 0.7[1];
M_w	= mass of water, or 8.33 lbm/gallon;
Cp_w	= specific heat of water, or 1.0 Btu/lbm. °F;
ΔT	= temperature difference between hot water and cold water (T_{hw} – 55 °F) with T_{hw} as measured on site;
HWPct	= percentage of shower water which is hot water by season (shown below);
EFFr	= water Heater Recovery Efficiency, .98 for electric water heaters, 1.8 for heat pump water heaters;
3413	= conversion factor Btu/kWh.

$$HWPct_{seas} = \frac{T_{shower,seas} - T_{cw}}{T_{hw} - T_{cw}}$$

Where:

$T_{shower,seas}$	= shower temperature per season, 110 °F for the winter, 100 °F for the summer;
T_{cw}	= cold water temperature, or 55 °F;
T_{hw}	= hot water temperature (measured) °F.

If T_{hw} as measured < T_{shower}, then HWPct = 1

[1] From ACEEE *1994 Summer Study on Energy Efficiency in Buildings*, p. 8.91

5.3.1 Tracking Estimate of Savings for Low-Flow Showerheads

Low-Flow showerheads were installed at a total of 57 base load and 156 electric heat participant households. In aggregate, the total annual energy savings associated with low-flow showerhead installations were estimated to be 191,815 kWh. This yields overall average savings per participant of 901 kWh.

5.4 Pipe Insulation

RLW employs a model which predicts average daily hot water usage by household, based on the number of occupants, the age distribution of the occupants, the hot water using appliances present in the home, and whether or not the occupants pay for their hot water usage. This model was obtained from recent work conducted at LBL[2] and can be applied using actual data for individual homes gathered from the program tracking data and from the on-site visits. The model used is the simplified equation presented in the LBL report and is employed as follows:

$$HWuse = F_{pay} \times F_{sr} \times \left\{ \begin{array}{l} -1.78 + .9744 \times Nocc + 6.3933 \times age1 + 10.5178 \times age2 \\ +15.3052 \times age3 - 0.1277 \times T_{hw} + 0.1437 \times tnkvol \\ -0.1794 \times T_{cw} + 0.5115 \times T_{oa} + 10.2191 \times Occd \\ -dwp\left(0.692 \times Nocc + 1.335 \times \sqrt{Nocc}\right) \\ -cwp\left(1.1688 \times Nocc + 4.7737 \times \sqrt{Nocc}\right) \end{array} \right\}$$

Where:

HWuse	= average daily hot water usage (gallons/day);
F_{pay}	= 1.0 if customer pays for their hot water, 1.3625 if not;
F_{sr}	= 0.3790 if senior only household (all occupants above age 65), 1.0 if not;
Nocc	= total number of occupants in the home;
age1	= number of preschool children (0-5 yrs);
age2	= number of primary and jr. high school age children (6-13 yrs);
age3	= number of high school age children and adults (14 yrs and over);
T_{hw}	= hot water temperature in °F;
tnkvol	= water heater tank size in gallons;
T_{cw}	= average water heater inlet, or cold water temperature, (55 °F);
T_{oa}	= average annual outdoor air temperature, (°F), average value of 58 °F used, based on typical year weather data for the KPCo service areas;
Occd	= presence of adults at home during the day, 1 if yes, 0 if no;
dwp	= presence of dishwasher in the home, 0 if yes, 1 if no;
cwp	= presence of clothes washer in the home, 0 if yes, 1 if no.

To estimate the savings due to the addition of pipe insulation, additional information is needed regarding the size and length of the insulated hot water piping and the flow rate in the pipe. The information on the pipe size and length can be obtained from the tracking and on-site data. The

[2] Modeling Patterns of Hot Water Use in Households, J. Lutz, et. al., Lawrence Berkeley Laboratory, LBL-37 05, November, 1996.

flow rate in the pipes is assumed to be 2.0 gallons per minute, which is then used to calculate the number of hours per year that the hot water is flowing in the pipes as follows:

$$Hours = \frac{HWuse \times 365}{gpm \times 60}$$

Where:

Hours	= hours per year that hot water flows in the pipe;
gpm	= hot water flow rate in the pipe, (2 gallons/minute);
365	= 365 days per year;
60	= 60 minutes per hour.

The number of hours is used in conjunction with the insulation properties and the difference in temperature between the hot water and the surroundings to calculate the annual savings, using the following formula:

$$PISavings = \frac{IPL \times Hours}{EFF_r \times 3413} \times \left(16 - \frac{k_{ins} \times OA_{ins} \times (T_{hw} - T_{env})}{OR_{ins} \times \ln\left(\frac{OR_{ins}}{IR_{ins}}\right)} \right)$$

Where:

PISavings	= annual energy savings due to pipe insulation in kWh;
IPL	= insulated pipe length in feet;
16	= typical heat loss per foot of un-insulated copper pipe, Btu/hr. ft;
K_{ins}	= thermal conductivity of rubber rigid foamed insulation used to insulate the pipe, (.215 Btu . in/hr . ft^2 . °F)[3];
OA_{ins}	= outside surface area of the pipe insulation per foot of pipe length in ft^2;
T_{hw}	= measured hot water temperature in °F;
T_{env}	= annual average temperature outside of the pipe, 58 °F if in unconditioned space, 72°F if in conditioned space;
OR_{ins}	= outside radius of the insulation in inches;
IR_{ins}	= inside radius of the insulation (outside radius of the hot water pipe) in inches;
EFFr	= water heater recovery efficiency, .98 for electric water heaters, 1.8 for heat pump water heaters;
3413	= conversion factor Btu/kWh.

This number is then doubled to account for the standby losses.

5.4.1 Tracking Estimate of Savings for Pipe Insulation

The formula above was used to obtain pipe insulation savings estimates. Pipe insulation was installed on 404 linear feet for base load and 1,282 feet for electric heat participants. In aggregate, the total energy savings associated with pipe insulation installation for the tracking

[3] *ASHRAE Handbook, 1993 Fundamentals*, Chapter 22, Table 10.

system were calculated to be 1,494 kWh, or 0.9 kWh per linear foot of insulation. This yields overall average savings per participant of 8.6 kWh.

Table 3 shows the number of participants and savings estimates for the domestic hot water measures that were installed in 2004 through the TEE program.

Hot Water Measure	# of Baseload Participants	# Electric Heat Participants	Total Baseload Savings (kWh)	Average Baseload Savings (kWh)	Total Electric Heat Savings (kWh)	Average Electric Heat Savings (kWh)	Total Measure Savings (kWh)	Average Measure Savings (kWh)
Hot Water Tank Wrap	30	111	3,450	115	12,218	110	15,668	111
Temp. Reduction	17	56	11,219	660	28,749	513	39,969	548
Low-Flow Showerhead	57	156	51,331	901	140,484	901	191,815	901
Pipe Insulation	41	132	372	9	1,122	8	1,494	9
Total Water Savings			66,372	1,054	182,573	1,087	248,945	

Table 3: Water Savings Measures Estimates

6 Heat Pump Installations

For electric furnace to heat pump conversions, the engineering estimate of savings is based on the ASHRAE simplified energy formula method.

First the heat loss is calculated using the following formula:

$$HL = UA(T_i - T_o)$$

Where:

HL = the component heat loss, Btu/hr
U = the overall heat transfer coefficient, Btu/(hr-ft^2-^{0}F)
A = the area of the component, ft^2
T_i = the indoor temperature, ^{0}F
T_o = the outdoor temperature, ^{0}F

The building heat loss (HL) is then input into the following formulas:

$$\text{Annual Electric Furnace}_{kWh} = \frac{(24 \text{ X HL X HDD X } C_d)}{(\text{Ti-To}) \text{ X } 3{,}413}$$

$$\text{Annual Heat Pump}_{kWh} = \frac{(24 \text{ X HL X HDD})}{((\text{Ti-To}) \text{ X } 1000 \text{ X HSPF})}$$

Where:

HDD	= 4,555 (mean average of Ashland and Williamsburg)
C_d	= 0.65
(Ti-To)	= 70 ^{0}F (assumption)
HSPF	= Heating Seasonal Performance Factor (@47 ^{0}F)

Savings for the heat pump retrofit is determined by the following formula:

$$Savings_{kWh} = Electric\ Furnace_{kWh} - Heat\ Pump_{kWh}$$

6.1.1 Tracking Estimate of Savings for Heat Pump Installations

The formulas above were used to determine heat pump savings estimates. There were twenty-five 2004 participants that received a new heat pump unit. Based on the assumption that these heat pumps have taken the place of electric furnaces the total annual energy savings associated with heat pump installations was calculated to be 47,173 kWh, for an average of 1,887 kWh per installed heat pump.

7 Waterbed Covers

For waterbed covers, the engineering estimate can be based on a savings fraction of 65% of total waterbed heater energy use, using an average Unit Energy Consumption (UEC) based on the size of the water bed.[4,5] Estimates of savings per waterbed size category are shown in Table 4.

Waterbed Size	UEC w/o foam cover kWh/yr	Savings Fraction (%))	UEC w/ foam cover kWh/yr	Estimated Savings kWh/yr
Single-Small	700	65%	245	455
Queen-Medium	850	65%	298	553
King-Large	1,000	65%	350	650

Table 4: Waterbed Cover Savings Estimates

7.1 Tracking Estimate of Savings for Waterbed Covers

During 2004 no waterbed covers were installed.

8 Engineering Summary

Table 5 presents the total estimated annual kWh savings by measure type for the 2004 TEE Program participants. Table 6 shows that floor insulation had the single largest energy savings impact for the average home, followed by attic insulation, sidewall insulation, heat pump units, air sealing measures, domestic hot water measures, and compact fluorescent lamps.

[4] Waterbed Foam Mattresses: The Ultimate Payback, Jeff D. Newburn, Affordable Comfort Conference, Mar, 94.
[5] Waterbed Heating: Uncovering energy Savings in the Bedroom: Ted Rieger, Home Energy, Sep/Oct, 94.

Using the engineering algorithms mentioned in this report, the tracking system calculated estimated total yearly kWh reduction for the 2004 TEE program as 1,137,840 kWh. The impact for Electric Heat customers is estimated to be 1,045,121 kWh. The estimated impact for Non-Electric Heat customers is estimated to be 92,719 kWh.

The average estimated savings for tracking system Non-Electric Heat customers were estimated to be 1,145 kWh/year/household, and savings for Electric Heat participants were estimated to be 6,491 kWh/year/household.

It is important to remember that engineering estimates of savings are historically higher than billing energy estimates. The engineering formulas in many cases overestimate actual savings. Many factors can contribute to this phenomenon; higher reported water use by the customer, customer specific behavior patterns, absence of snapback and persistence effects, and the lack of interactive effects for multiple measure installations (which may significantly decrease savings).

Measure Type	Electric Heat Tracking Total Savings (kWh)	Non-Electric Heat Tracking Total Savings (kWh)
CFL	64,524	26,347
Air Sealing Measures	269,260	na
Attic insulation	183,455	na
Sidewall insulation	15,396	na
Floor insulation	282,740	na
Water Heater Tank Wrap	12,218	3,450
Hot Water Temperature Reduction	28,749	11,219
Low-Flow Showerheads	140,484	51,331
Pipe Insulation	1,122	372
Heat Pumps	47,173	na
Waterbed Covers	0	0
TOTAL	1,045,121	92,719
Average per Customer	6,491	1,145

Table 5: Estimated Total Annual kWh Savings by Measure Type

Table 6 presents the average kWh savings by measure estimates.

Measure Type	Electric Heat Tracking Savings/Measure (kWh)	Non-Electric Heat Tracking Savings/Measure (kWh)
CFL (per site)	401	325
Air Sealing Measures (per home)	1,726	na
Attic insulation (per home avg.)	1,973	na
Sidewall insulation (per home avg.)	1,924	na
Floor insulation (per home avg.)	3,107	na
Water Heater Tank Wrap (per wrap)	110	115
Hot Water Temperature Reduction	513	660
Low-Flow Showerhead	901	901
Pipe Insulation (per linear foot)	0.88	0.92
Heat Pumps	1,887	na
Waterbed Cover	na	na

Table 6: Estimated Average kWh Savings by Measure Type

9 Cost Effectiveness Estimates

RLW analyzed the distribution of TEE Program costs by measure and agency, based on electronic data. The average cost per home was $970.41 for all-electric homes and $62.79 for baseload (non all-electric) homes.

9.1 Simple Payback Period

One of the most commonly used cost analysis methodologies is the Simple Payback Period (SPP) analysis. The SPP determines the number of years required to recover an initial investment through project returns. The simple payback is determined by taking the initial cost and dividing it by the annual savings. The formula is:

$$SPP = (\text{Initial cost}) / (\text{Annual savings})$$

For the 2004 TEE Program the following information was used for the SPP analysis:

All-Electric Homes

Customer cost per kWh	$0.0544
Average KPCo cost to weatherize an all-electric home	$970.41
Average annual kWh savings per all-electric home	6,491 kWh
Average annual cost savings per all-electric home	$353.11/year
Simple Payback Period (SPP) for all-electric home	2.75 years

Baseload Homes

Customer cost per kWh	$0.0544
Average KPCo cost to weatherize a baseload home	$62.79
Average annual kWh savings per baseload home	1,145 kWh
Average annual cost savings per baseload home	$62.29/year
Simple Payback Period (SPP) for baseload home	1.01 years

9.2 Benefit Cost Ratio

A benefit/cost ratio (BCR), also know as a savings investment ratio (SIR), calculates the present worth of all benefits, then calculates the present worth of all costs, and takes the ratio of the two sums.

The calculations required for the benefit cost ratio of the 2004 TEE Program are as follows:

*Assuming a measure life of 10 years.

All-Electric Homes

Present worth of annual savings	$= \$353.114(P/A_{10,10}) = \$353.11(6.1446) = \$2,169.72$
Total project cost per home	$= \$970.41$
Benefit/cost ratio	$= \$2,169.72 / \$970.41 = 2.24$

Baseload Homes

Present worth of annual savings	$= \$62.29(P/A_{10,10}) = \$62.29(6.1446) = \$382.75$
Total project cost per home	$= \$62.79$
Benefit/cost ratio	$= \$382.75 / \$62.79 = 6.10$