The percent reductions in natural gas usage range from a consumption decrease of 6.8% to a decrease of 11.4%. Again, the estimates using the methods described above result in more savings being attributable to the educational component of the program than the Pilot II participants who did not receive the weatherization.

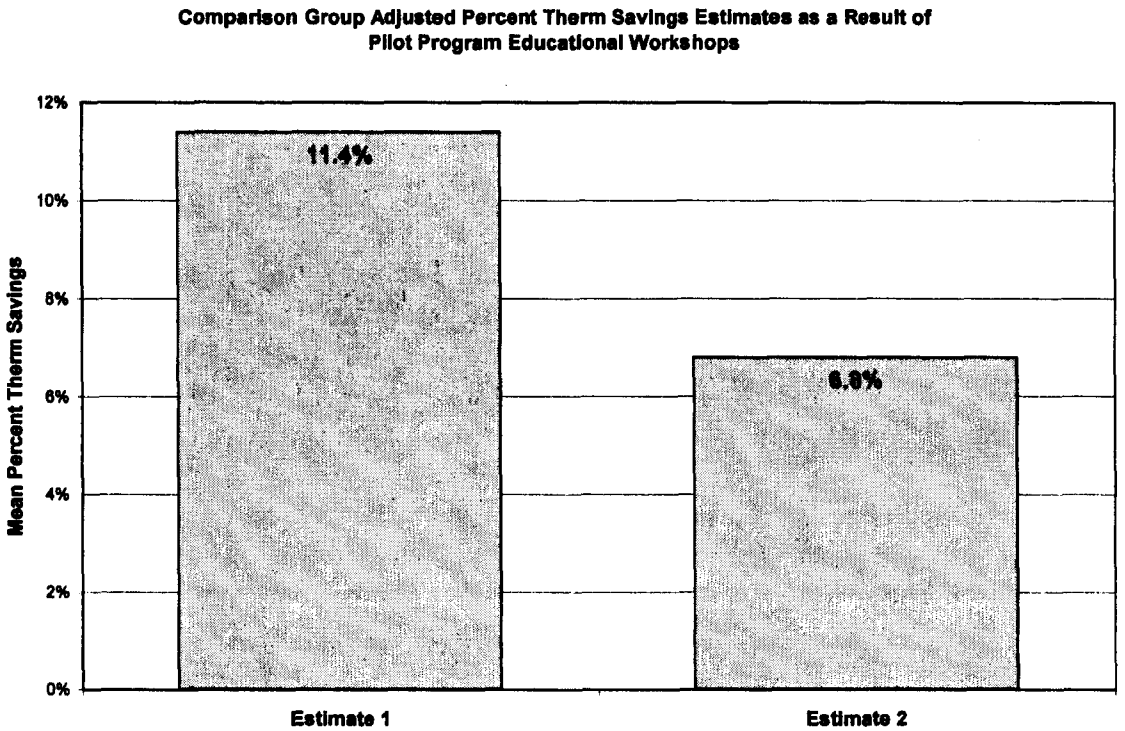

Figure 16. Therm Percent Savings Estimates

Estimate 1 used the savings from the Kentucky and Ohio weatherization participants less the savings from the Payment Plus participants who received weatherization services. Using this approach, the reduction in natural gas consumption is estimated at 11.4%. (If only those customers who decreased their consumption after Kentucky and Ohio weatherization are assessed, then this value decreases substantially, to 3.2%.)

Estimate 2 uses the mean savings of the Payment Plus II participants who went through the energy efficiency educational workshop, but did not receive weatherization measures. This approach results in a 6.8% reduction in natural gas consumption.

The average percent natural gas savings attributable to the educational component of the Payment Plus program is 9.1%.

Conclusions and Recommendations

The findings presented above indicate that weatherization program participants are consistently saving energy. The findings also show that there are additional savings if there is an expanded educational component to the program.

- Weatherization program participants save on average 181 therms and 623 kilowatt-hours per year. When looking at the program components, Tier 1 participants save 142 therms and 229 kilowatt-hours, Tier 2 participants save 194 therms and 698 kilowatt-hours, and Tier 3 participants save 217 therms and 1104 kilowatt-hours per year.

- While Weatherization program participants save an average of 623 kilowatt-hours per year, the Payment Plus participants were able to save from 2,588 to 2,813 kilowatt-hours annually, more than a 4-fold increase.

- For gas savings, Kentucky and Ohio weatherization recipients saved an average 181 therms annually while the Payment Plus participants who were weatherized saved 299 therms per year.

- Non-weatherized Payment Plus participants were also able to achieve savings of 49 therms per year as a result of the educational component.

- Half of the Payment Plus participants that were weatherized were able to save 184 therms or more annually, averaging a reduction of 18.1% in natural gas consumption.

- The educational component of the Payment Plus Pilot Program appears to be responsible for an annual savings of 1,965 – 2,813 kilowatt-hours and from 49 to 207 therms.

The results of this study indicate that the Payment Plus Program is highly successful at teaching participants energy conservation via the educational components of the program. Future Pilot Programs will need to be analyzed further to confirm this finding because of the small sample sizes used in these studies. TecMarket Works recommends that the educational component continue to be a requirement of the program and that follow up evaluations are conducted to increase the sample sizes available for these studies.

Appendix A: Modifications to the Previous Report

In August of 2004 TecMarket Works conducted an evaluation of the Payment Plus Pilot Program[1]. This previous study used a limited control group for that assessment by identifying LIHEAP customers with a $500 arrearage.

As a result of conducting an evaluation of the Ohio weatherization program (subsequent to the August 2004 report) we were able to obtain additional LIHEAP customers that could also be used to expand the more limited control group used in the August 2004 Payment Plus Pilot Program evaluation. The findings from the inclusion of the additional control group customers are incorporated into the findings in this report, therefore the energy consumption analysis results for the Payment Plus customers have slightly changed. We felt it necessary to use this expanded control group in order to gain a better understanding of the participants' energy usage.

This appendix provides a brief presentation of how the inclusion of the additional control group members influenced the previous findings presented in the August 2004 report. In the opinion of TecMarket Works, the expansion of the previous August 2004 control group increases the accuracy of the evaluation findings for the Payment Plus Pilot Program evaluation by providing a larger and more representative control group than the August 2004 control group.

The electric savings using the older August 2004 control group and the newer enhanced control group are presented in Table 1 below. The table below includes adjustments to the August 2004 control group energy savings by including the larger and more representative control group. These old values for the participants in the table are different than what was reported above in this report because there was different reliability criteria applied to the analysis. The reliability criteria used in this current study are based on non-weather correlated electric consumption rather than weather correlated consumption. The reliability criteria was changed because the electric consumption of both the participant and control group were found to not be strongly correlated to weather, and as a result the electric savings data is not weather normalized savings.

Table 1 below presents the difference between the August 2004 evaluation-reported electric savings and the current report (presented above) for Payment Plus Pilot Program Participants. The reader will note that the savings adjustments are not extensive, but do allow the evaluation to be more accurate.

[1] Evaluation of the Payment Plus Program: Results of a Process, Energy Consumption, and Arrearage Effects Evaluation, August 2004, Nick Hall and Johna Roth, TecMarket Works.

Table 1. Changes to the August 2004 Reported Energy Savings Values as a Result of the Combined Control Group

Energy Savings	Mean kWhs per Year	Mean Percent kWhs	Median kWhs per Year	Median Percent kWhs
Old Values Reported in the August 2004 Report				
Pilot I Weatherized	1868	11.4%	1874	11.2%
Pilot II Weatherized	-169	4.3%	1964	11.5%
Pilot II Not Weatherized	1375	5.0%	1256	6.3%
Old Control	571	8.1%	434	3.1%
New Values in This Report Which Uses the Expanded Control Group				
Combined Control	220	3.3%	143	2.5%
Difference	351	4.8	291	0.6

Final Report

Estimates of the Energy Impacts of the Kentucky Home Energy House Call Program

Energy Consumption Changes in Households that Received an Audit from Kentucky's Home Energy House Call Program

APPENDIX B

September 9, 2005

Prepared for

Cinergy Services, Inc.
139 East Fourth Street
Cincinnati, OH 45202

Prepared by
Johna Roth and Nick Hall

TecMarket Works
165 West Netherwood Road, Suite A, 2nd Floor
Oregon, WI 53575
Voice: (608) 835-8855
Fax: (608) 835-9490
Mail@TecMarket.net


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Executive Summary

Introduction

This report presents the results of an impact evaluation of the Home Energy House Call (HEHC) Program conducted by Cinergy Corp in the state of Kentucky. Customers in the Cinergy / ULH&P service area can request and receive an on-site energy audit of their homes. The HEHC program provides no-cost energy audits by energy specialists specifically trained in identifying ways to control energy costs in the customer's home. The specialists provide the following services during the audit:

- Analyze total home energy usage
- Checks home for air leaks
- Examines insulation levels
- Reviews appliances and heating/cooling systems

From the information collected during the audit, a detailed report identifying steps the customer can take to increase efficiency and reduce their energy bill is prepared and mailed to the customer for their review and record.

This evaluation of the energy impacts as a result of the HEHC program focuses on audits performed from August 2002 through June 2003.

Comparing the HEHC participants to a comparison group of those that did not receive the audit will provide estimates of changes in energy consumption that can be attributed to the information that the participants received as a part of their participation in the HEHC program. This report compares the energy savings by the fuel sources used for heating and cooling. Other factors, such as the square footage of the home, the year the home was built, type and year of water heater used, the number of people living in the home, and the energy service firm that performed the audit, were included in the data provided by Cinergy. This data was analyzed for savings trends. The result of this analysis is reported in Appendix A. However, because of the small sample size of the participant population once segregated into sub-groups, and the lack of strong correlation between key customer characteristics, the evaluation is unable to identify significant relationships between the amounts of energy saved beyond the program-wide savings levels for major fuel use groups. As a result, the reader is encouraged to focus on the savings in the main section of the report where the sample sizes are larger and provide for more statistical accuracy.

Summary of Findings

TecMarket Works examined all participant energy usage records for a period of one to three years before the program and for one to two years following the program (depending on record availability). However, because of data reliability issues, the energy saving analysis of the HEHC program is based on a sub-sample of the 439

customer records provided for the analysis (please see the discussion on sample size in "Energy Use Analysis and Findings").

The findings presented herein indicate that the home energy audit has resulted in decreased energy consumption in certain groups, while consumption has increased in other groups. Specifically, the HEHC program results in energy consumption reductions for heating fuels (electric or gas). Participants with electric heat reduce their electrical consumption, and those with natural gas heat reduce their therm consumption. This data indicates that the HEHC is a program that reduces heating costs.

Specific findings indicate that:

1. Program-wide kilowatt-hour savings were achieved only by those participants that heat their home electrically. This group saves a mean 399 kilowatt-hours per year, or 2.8% of their annual consumption.
2. Of the customers that decrease their kilowatt-hour consumption, those with electric heat and air conditioning units have the highest savings, with 2,026 kilowatt-hours per year reductions, or 10.3% of their annual consumption.
3. The HEHC program does result in a natural gas savings for homes that heat with natural gas. On average, the savings are just over 20 therms saved per year, comparison group adjusted. Those without central air reduce their consumption by 22 therms a year (3.4%), and those with central air reduce their consumption by 21 therms per year, or 2.7%.
4. Those with natural gas heat and central air conditioning remain the most stable between the pre- and post-program periods. Of this group that increased their electric consumption, they increased, on average, about 1,237 kilowatt-hours per year. This increase averaged 11.8% of their annual consumption. Those that decreased their consumption did so the least, averaging a 1,135 kilowatt-hours per year decrease, representing 11.7% of their annual consumption. About the same amount of participants increased and decreased consumption about the same amount after the program, making the average effect for this group an increase in consumption of 100 kilowatt-hours.

Evaluation Methodology

The study methodology consisted of a weather-normalized energy usage analysis to determine if participation in the Home Energy House Call (HEHC) program resulted in energy consumption changes.

Energy savings of the HEHC participants were determined by looking at the change between pre- and post-program energy usage of the participants compared to the change in usage of a comparison group of eligible customers who did not participate in the program. The Princeton Scorekeeping Method (PRISM™) software was used to conduct this analysis. The primary purpose of the PRISM™ software is to provide weather-normalized data analysis of energy use between groups of participants and a comparison or control group. A PRISM analysis was conducted on six groups of participants, four for kWh consumption, and two for therm consumption. The groups analyzed for kWh consumption are:

1. Customers with natural gas heat.
2. Customers with electric heat.
3. Customer with central air and natural gas heat.
4. Customers with electric heat and an air conditioning unit.[1]

Therm consumption was divided into two groups:

1. Customers with natural gas heat.
2. Customers with central air and natural gas heat.

The HEHC participants were matched with customers in the same service area that had not participated in the program. The identification of the comparison group was made by selecting neighbors of the participants who have been offered participation in the program, but who elected not to participate. This matching was conducted so that the comparison group would match the enrollment criteria for the participant group (neighborhood targeting) and who had similar types of homes (neighbors).

There are four comparison groups utilized in this study, all of which are from the same larger core comparison group provided by Cinergy. These comparison groups are:

1. Therm data for all customers with natural gas heat.
2. Kilowatt-hour data for customers with electric heat.
3. Kilowatt-hour data for customers with natural gas heat.
4. Kilowatt-hour data for customers with electric heat and air conditioning.

After the comparison group was selected, further cleaning was conducted to eliminate those customers that did not have sufficient data for the study and to eliminate accounts

[1] These customers were determined by kWh consumption analysis using PRISM. PRISM has a "heating and cooling" model that analyzes kWh consumption as it would fit into the home's heating and cooling needs. This group is not based on data provided by Cinergy, but by the energy consumption model's fit.

in which there was a tenant change. This cleaning left 1,545 customers out of the approximately 3,500 customers that could be used for the matched comparison group for the Home Energy House Call participants' therm savings analysis. Kilowatt-hour analysis required the use of three different comparison groups. These groups and the number of customers that remained in the study following data cleaning include:

1. Kilowatt-hour data for customers with electric heat, n=314.
2. Kilowatt-hour data for customers with natural gas heat, n=806.
3. Kilowatt-hour data for customers with electric heat and air conditioning, n=286.

All comparison group customers were randomly assigned false audit dates to establish the pre- and post-program analysis periods for the comparison group.

Participants' data was also separated into pre and post periods. Participants who were audited had their pre data begin before the audit and their post data begin two months after the audit to ensure that the customer received the audit report and had at least some time to incorporate one or more of the recommended actions that were recommended in their audit report. Data between the end of the pre-program period and the start of the post-program period is not included in the analysis.

The comparison and participant groups were analyzed to be sure that the mix of customer's energy habits were similar. The following three graphs show that the comparison group and the participant groups (for the months before the HEHC audit) were nearly identical in their energy consumption patterns.

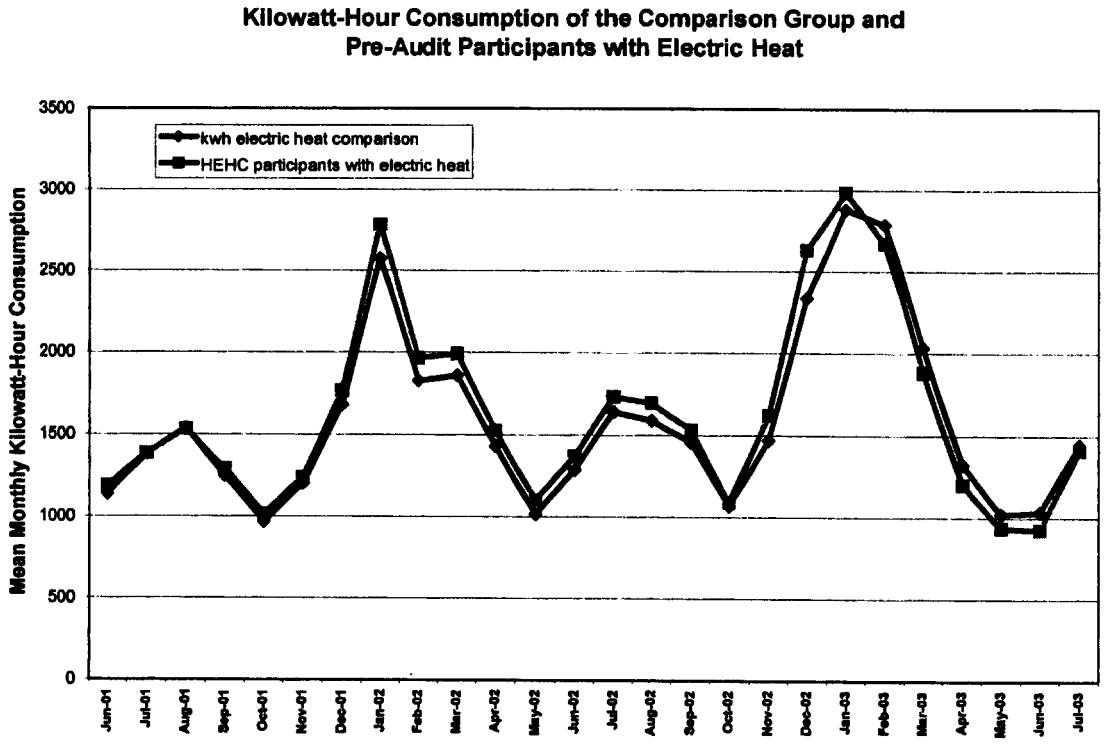


Figure 1. Kilowatt-Hour Consumption of the Comparison Group and Pre-Audit Participants with Electric Heat

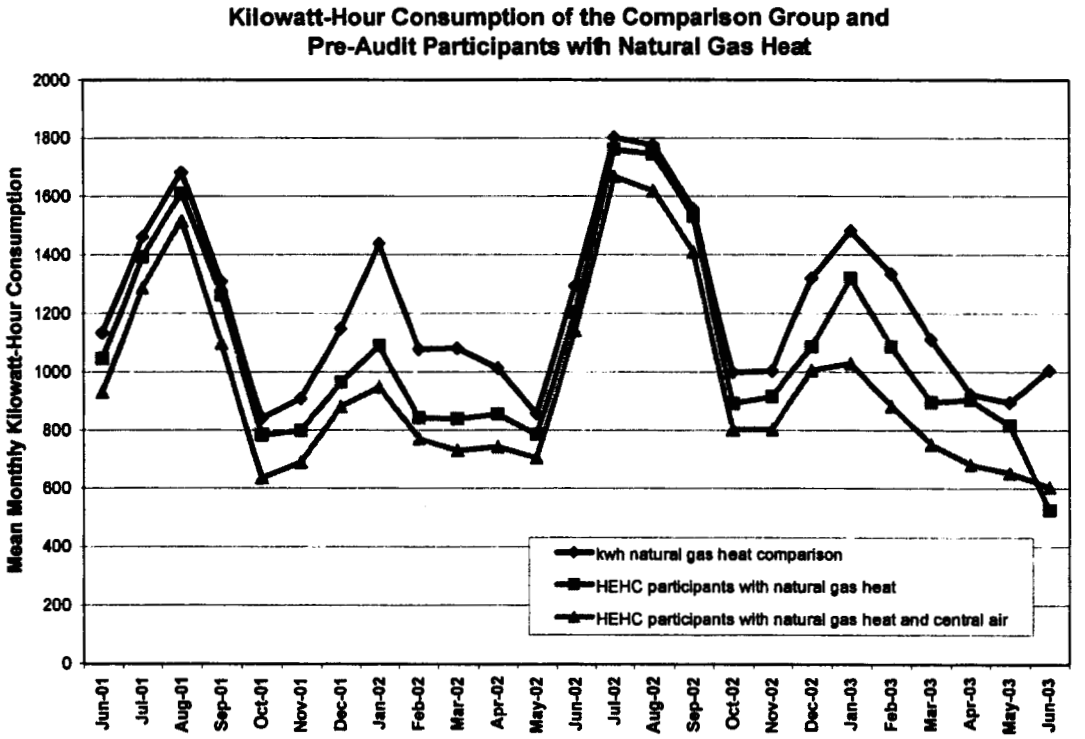


Figure 2. Kilowatt-Hour Consumption of the Comparison Group and Pre-Audit Participants with Natural Gas Heat

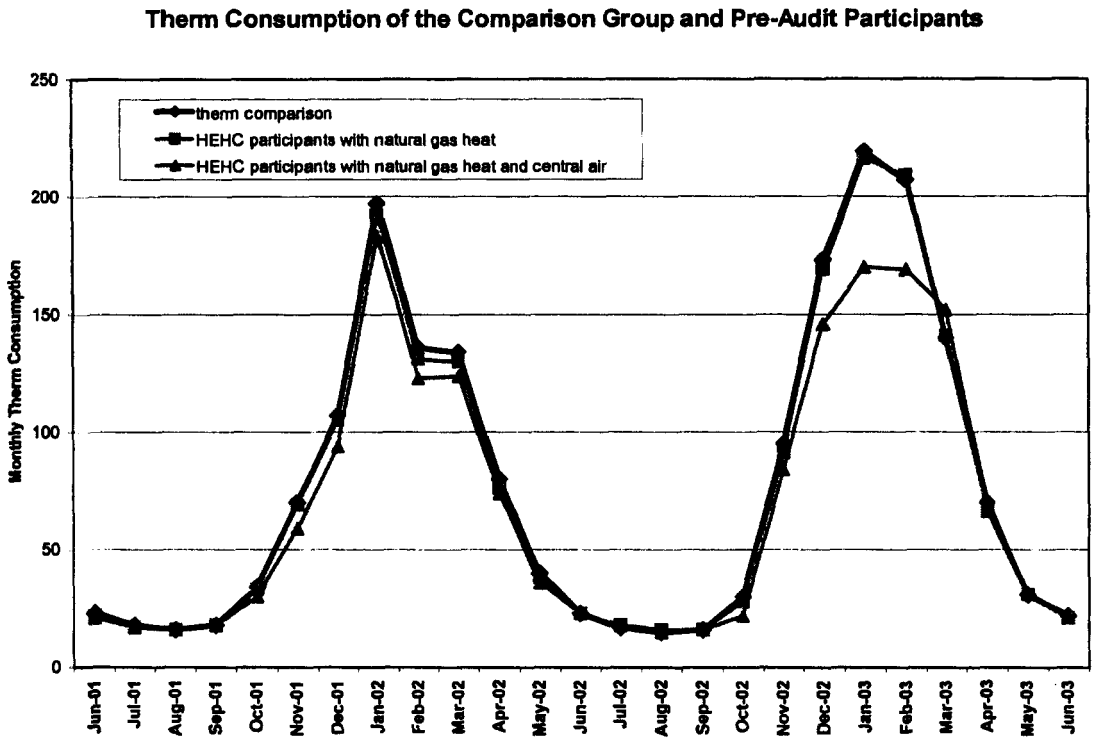


Figure 3. Therm Consumption of the Comparison Group and Pre-Audit Participants

The data that was used in this analysis was provided from Cinergy's monthly-metered account database. The data was provided in therms and kilowatt-hours per month per customer for up to three years before the program and for up to twenty-four months after the program.

This report presents the savings in kilowatt-hours of electricity and therms of natural gas. Mean savings summaries are provided for each of the groups of customers. A description of the PRISM™ software is provided below.

PRISM™ Analysis Software

Program impacts were examined using PRISM™ Advanced Version 1.0 software for Windows developed at Princeton University's Center for Energy and Environmental Studies.

PRISM™ is a commercially available analysis software package designed to estimate energy savings for heating and/or cooling loads in residential and small commercial buildings. The current Advanced Version permits users to enter and edit data from a variety of sources, to carry out sophisticated reliability checks, to eliminate cases that do not meet standards, and to display results in graphical and textual forms.

PRISM™ allows the user to estimate the change in energy consumption per heating or cooling degree-day for the periods before and after measures are installed in homes by

combining energy consumption and weather data. By subtracting the estimate of energy use per degree-day after the measures are installed from the value before the measures are installed and multiplying by an appropriate annual degree-day value, total annual normalized energy savings can be estimated.

Degree-days vary from year to year, which potentially presents a problem for deciding on a value for annual degree-days. This is especially problematic if one is trying to determine paybacks. For example, one could normalize the savings to the period preceding the installation of measures or the period after. If one selects a warm period, then savings may be too low and paybacks too long. If one selects a cool period for normalization, then the estimate of paybacks may be too high.

PRISM™ mitigates this problem by effectively averaging temperatures over a twelve-year period and providing an estimate of degree-days that is typical for the region of the study, although not one that necessarily matches the specific weather conditions in any given year. The advantage of normalizing to the PRISM™ recommended period is that the results will be consistent from study to study over a period of time. The same end can be achieved by consistently using the same user selected time frame. For this study we chose the period from January 1, 1992 through December 31, 2002, recommended by PRISM™ support.

A major feature of PRISM™ is the ability to evaluate cases against reliability criteria. The first criterion is the R^2 value (explained variance), a measure of the fit of the degree-day and energy consumption data, statistically described as the amount of variance in energy consumption explained by changes in degree-days. Energy consumption is assumed to be a linear function of degree-day. R^2 varies from 0 to 1. If R^2 is close to zero, it means that factors other than outdoor temperature are driving energy consumption. If the R^2 is close to 1 it means that outdoor temperature is almost entirely responsible for energy consumption. Outdoor temperature is usually the overriding factor in both heating and air conditioning fuel use and the goal of the weatherization program is to improve the thermal characteristics of the building shell and the fuel use rate of the heating and air conditioning systems to reduce fuel use related to outdoor temperature. The PRISM™ default for R^2 is at .7. This means that at least seventy percent of energy use is temperature dependant. If less than 70 percent of the energy used in a building is temperature related, then it becomes difficult to understand the effects of the weatherization measures and the case is dropped from the analysis. We used .7 in this study although most of the R^2 values in this study were .85 or higher. In other words, 85 percent or more of heating fuel use in this study is temperature driven. PRISM™ has a second measure of reliability which is the coefficient of variation for the normalized annual consumption (CV(NAC)). Normalized annual consumption is the amount of fuel consumed by a unit for a typical weather year. When estimating normalized annual consumption some estimates may have a very tight error band while others may have a band that is quite wide. In estimating the average consumption we want estimates of unit consumption that are very close to the actual and we want to eliminate values that may not be very close because they may cause the estimates of the average consumption for all units to vary significantly from the actual. Because the variation in the estimates of normalized annual consumption generally will be higher in homes with higher

consumption, the estimate of the variation in normalized annual consumption is divided by the estimate of normalized consumption to obtain CV(NAC). This provides a standardized measure of the variability of the normalized consumption that is comparable across homes. The PRISM™ default for CV(NAC) is 7 percent and that is the value used in this study.

Energy Use Analysis and Findings

The primary goal of the Home Energy House Call Program is to provide information customers need to help make their homes more energy efficient, and to provide it in a way that causes participants to take the recommended actions contained in their energy audit. By taking these actions the participant's home should be more energy efficient causing a decrease in their energy usage. In this analysis, we examined and compared energy usage of HEHC participants and a comparison group of non-participants over the years before and after the program.

Sample Size

The Home Energy House Call results are based on a small sample of participants that is sufficient to provide an indication of the program's effects, however is not sufficient to provide an assessment of the impacts of the program beyond general fuel-type analysis levels. The sample size for all groups used in the analysis is displayed with the analyses results and the savings range for an 80% confidence interval around the reported impacts. The reader should view these results as an indication of what the savings may be for the analysis groups as a whole with the understanding that a larger (or different) sample pulled from the population may produce somewhat different results that would be expected to fall within the 80% confidence range.

Statistical Precision

All of the analytical runs conducted in PRISM™ provide a R^2 and CV(NAC) value that indicates the strength of the results provided. The higher the R^2 value (maximum value is 1.0), and the lower the CV value, the more reliable the results are.

The customers' energy usage was processed through PRISM using pre-determined reliability criteria that needed to be met in order for the customer's usage to be included in the group being analyzed. The coefficient of variance for each customer had to be less than 7.0% in all cases. The R^2 is set at 0.0 for the analyses that did not have to regress with weather data (such as kilowatt hour usage for those with gas heat). The R^2 is set at 0.7 for analyses that is controlled by weather (such as kilowatt hour usage for those with electric heat, or therm usage for customers with natural gas heat). The number of participants whose data passed the statistical precision criteria is noted in each of the results discussions. For more information on PRISM™ and these statistics, please see the section on methodology.

Section 1: Changes in Kilowatt-Hour Consumption

The Home Energy House Call program is, in some cases, successful at helping customers reduce their electrical consumption. To draw this conclusion we examined electrical savings for several groups of customers. First, we examined program-wide electrical savings, followed by an assessment of those that increased their consumption and those that decreased their consumption.

Program-Wide Effects on Electrical Consumption

The electrical savings of the HEHC program varies depending on the group analyzed. Figure 4 shows the mean annual savings for each of the four groups examined in this analysis. Those with electric heat are the only electric energy savers. This group saved an average of almost 400 kilowatt-hours in their annual consumption, a 2.8% reduction. When the analysis is conducted to capture the electrical savings associated with those who cool their home with air conditioning, the savings drop into the negative levels, indicating an increase in electrical consumption despite the audit and report showing the customers ways in which they can achieve energy savings.

Those with natural gas heat do not achieve electric savings overall, with both groups (natural gas heat, and natural gas heating with central air) increasing electrical consumption. However, those with central air conditioning increase their consumption by substantially less (100 kwh/yr, or 0.6%) than those without central air (563 kwh/yr, or 4.5%). The following graphics report the average annual electric savings and the average percent savings for each of the groups analyzed, along with the 80% confidence range of the savings achieved.

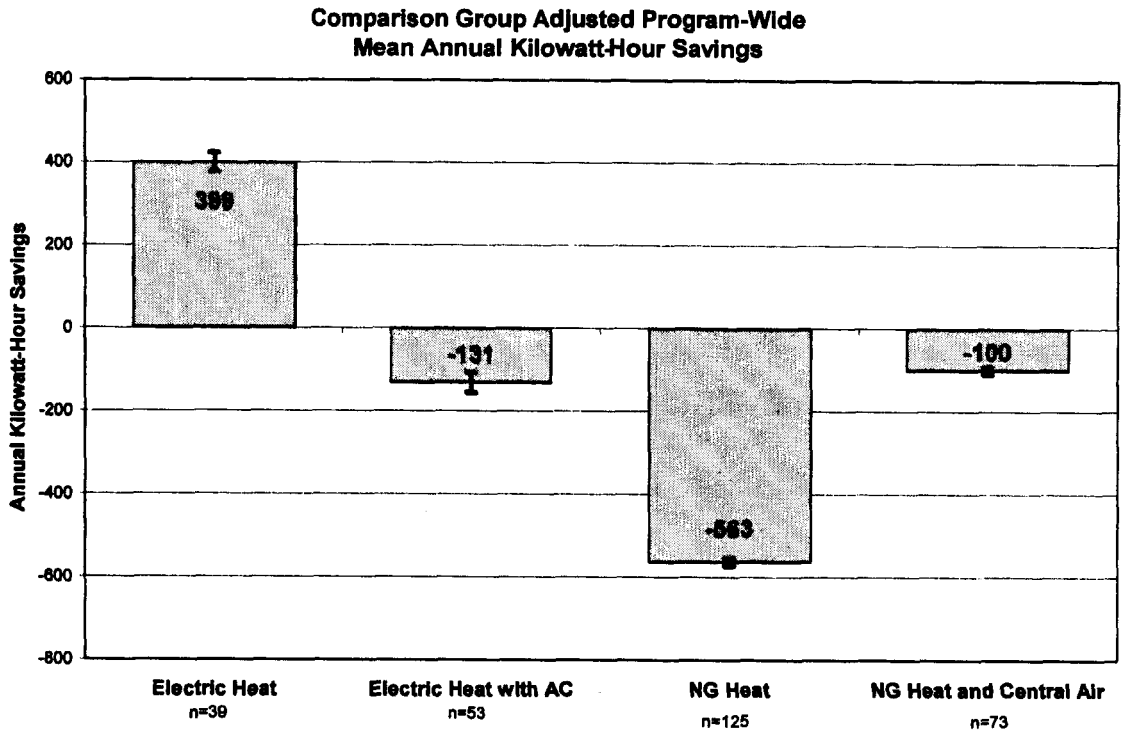


Figure 4. Comparison Group Adjusted Program-Wide Mean Annual Kilowatt-Hour Savings

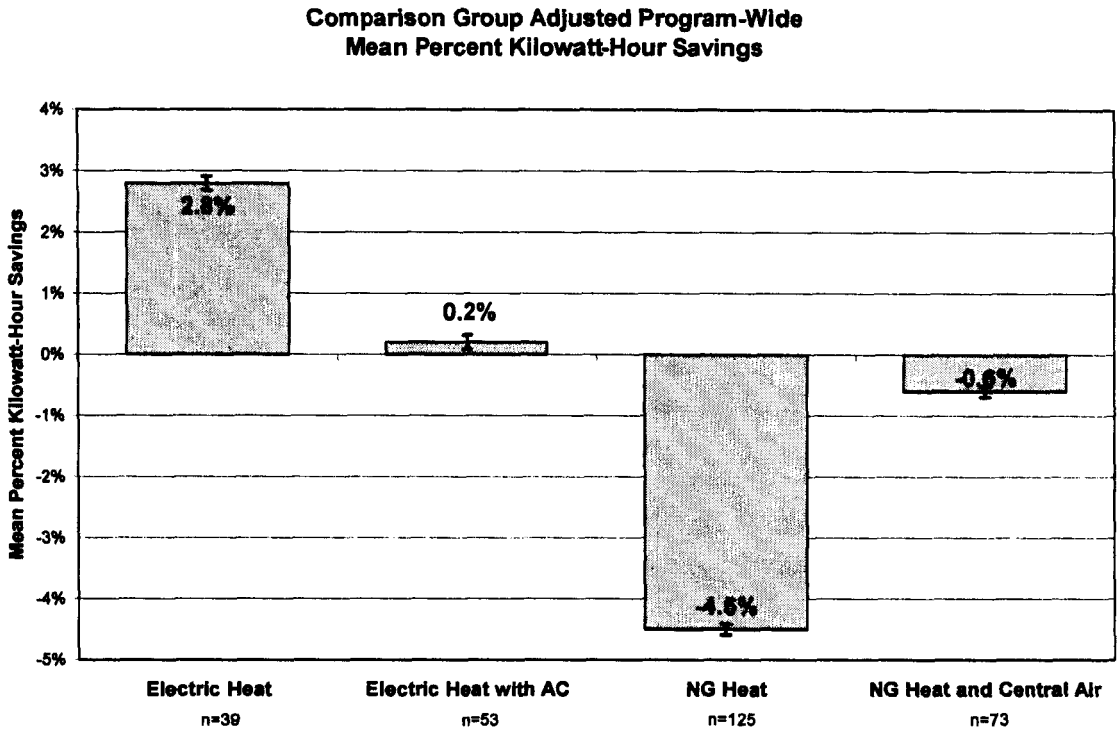


Figure 5. Comparison Group Adjusted Program-Wide Percent Kilowatt-Hour Savings

To provide additional perspectives to these findings we segregated the groups into increasers and decreasers and examined the changes for those that decreased their consumption and those that increased consumption during the post-program period.

Increasing or Decreasing Electrical Consumption: A Breakdown

Because this program relies on the customer to implement measures that would decrease their energy consumption, there is the realistic assumption that some of the homes will not heed the advice offered to them within the study period, despite the fact that they requested the audit be conducted. Many things can result in lack of savings during the study period: lack of time or money needed to take the actions, lack of interest at a level needed to rapidly take the recommended actions, lack of a belief that the actions will save enough energy, lack of a belief that taking the actions will result in a lower utility bill, among other reasons. Likewise, there are reasons for increased consumption, including adding more energy consuming equipment, more people living in the home, adoption of behaviors that use more energy, and/or changes in economic status of the occupants. In this analysis we do not have behavior or use condition information, and as a result we are not able to classify participants or comparison group members into action / behavior categories for additional analysis. However, in this section, we break apart the four categories of homes in the kilowatt-hour analysis findings section and report the number of homes increasing their electrical consumption and by how much they increase their consumtion. Likewise, we report the same metrics for those that decreased their

consumption. Table 1 shows that in all groups, except for the group of customers with electric heat, more than half of the participants increased their electrical consumption following receipt of the audit report.

Table 1. Percent of Customers Increasing or Decreasing Electrical Consumption After the HEHC Audit

	Total	Percent Increasing	Percent Decreasing
Electric Heat	39	43.6%	56.4%
Electric Heat with AC	53	60.4%	39.6%
NG Heat	125	61.6%	38.4%
NG Heat and Central Air	73	52.1%	47.9%

By dividing these groups into "increasers" and "decreasers," we can assess the energy savings of those that made some changes in their homes or behavioral patterns that resulted in savings, presumably as a result of the audit and subsequent report. The findings also mean that the lack of overall savings shown in some of these groups is the result of a slight majority of participants that increase their consumption enough to hide the true energy savings of those that do make physical or behavioral changes to decrease their kilowatt-hour consumption. This is important to consider because it may mean that while the audit helps the customer save energy, in many cases the increase in consumption may offset the achieved savings. In this case, the HEHC program may be saving energy that results in a slower increase in consumption than what would have occurred without the program. Of course, without the behavioral information to know what is occurring in the participant's homes, it remains just as likely that the participants in the non-electric heating groups are increasing their consumption after their participation in the HEHC program. Certainly the HEHC report may be more important to those customers who have electric heat and have the greatest need for the energy savings strategies included in the HEHC report.

Participants That Decrease Their Electrical Consumption

As indicated above, those with electric heat reduced their kilowatt-hour consumption the most, however when only those that decrease consumption are considered, it is the group with both electric heat and air conditioning that save the most, just over 2,000 kwh/yr, or 10.3% of their annual consumption, when they make the effort to conserve. Those with natural gas heat that reduce their consumption also have substantial reductions of over 1,000 kilowatt-hours per year (which is a reduction of just under 12%). However, this savings is offset by the participants that increase their consumption.

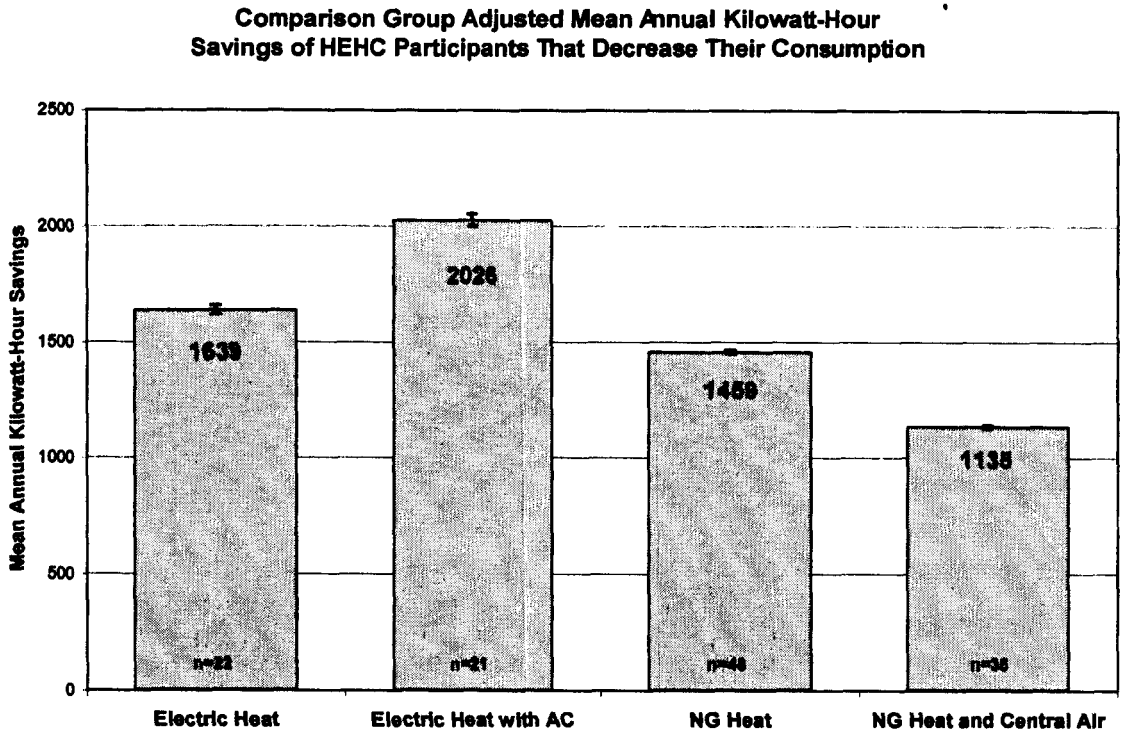


Figure 6. Comparison Group Adjusted Mean Annual Kilowatt-Hour Savings of HEHC Participants That Decrease Their Consumption

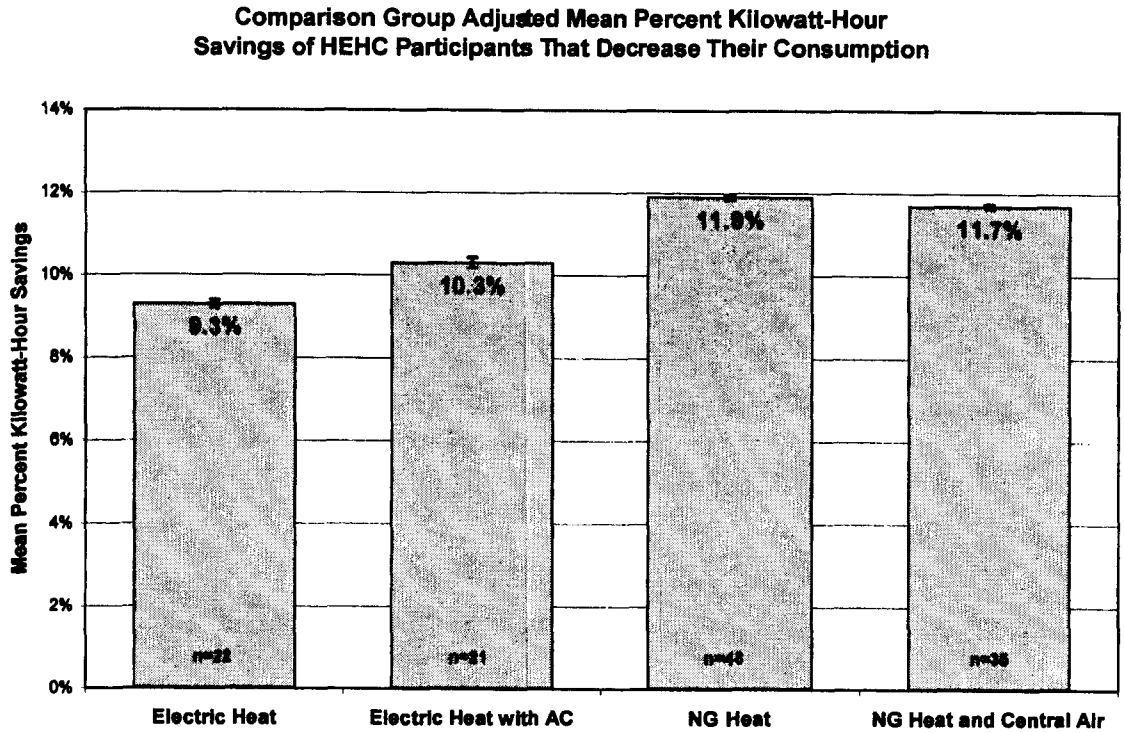


Figure 7. Comparison Group Adjusted Mean Percent Kilowatt-Hour Savings of HEHC Participants That Decrease Their Consumption

Participants That Increase Their Electrical Consumption

Figure 8 below shows the mean annual kilowatt-hour increases in consumption for those participants that increased their energy. Those with natural gas heat have higher increases than those without central air, increasing by 1,823 kilowatt-hours per year (or 14.7%) without central air, while those with central air that increase their consumption only do so by 1,237 (or 11.8%).

Participants with electric heat that increase their consumption do not increase as much as those with natural gas heat. Electric heated home (that increase) increase by 1,248 mean kilowatt-hours per year, a 6.1% increase in consumption. Those with air conditioning units increase slightly more, by 1,582 kilowatt-hours per year, or 6.8%.

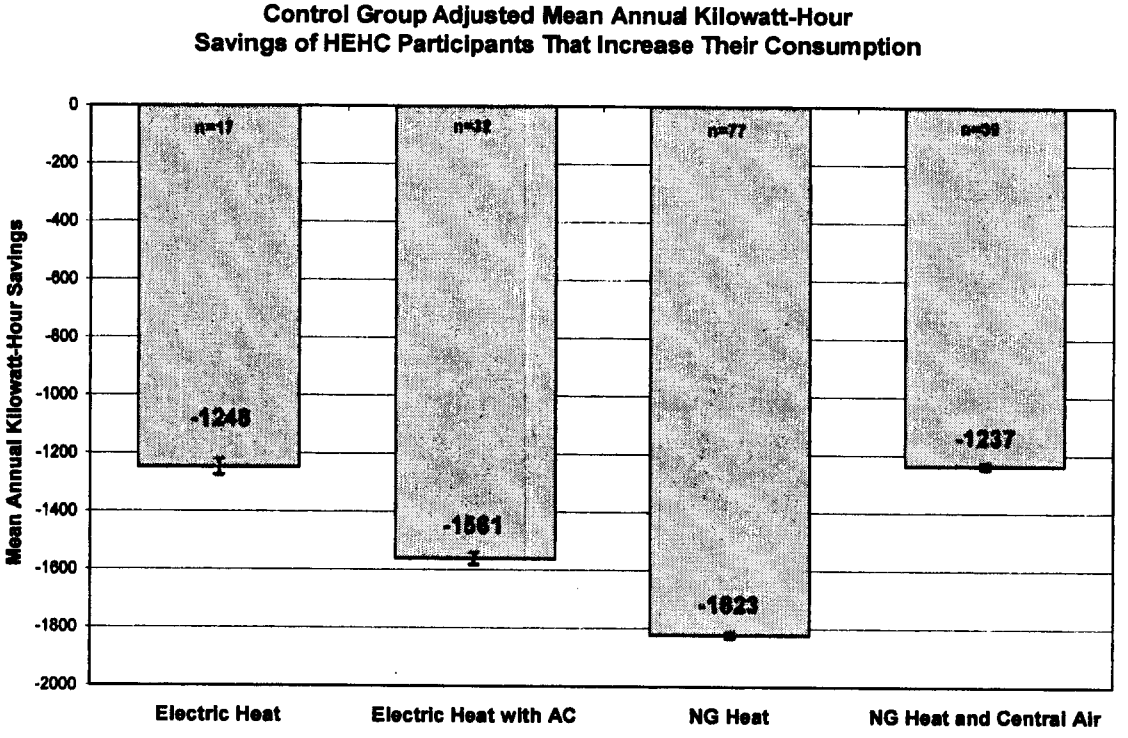


Figure 8. Comparison Group Adjusted Mean Annual Kilowatt-Hour Savings of HEHC Participants That Increase Their Consumption

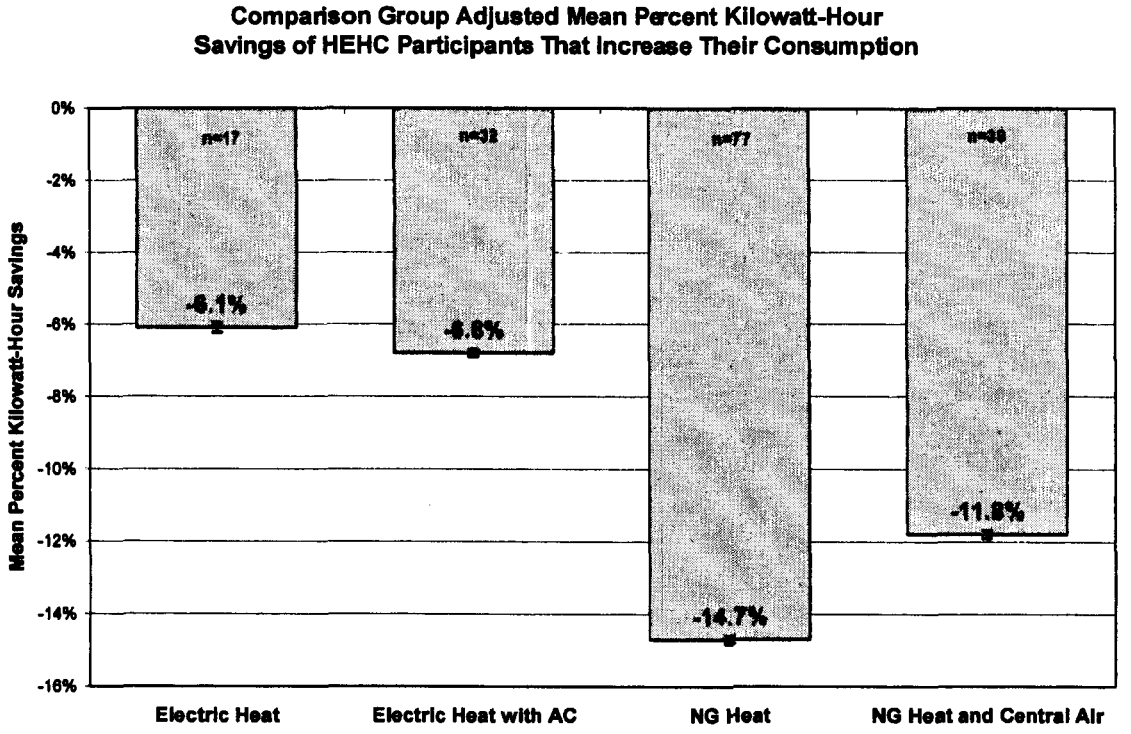


Figure 9. Comparison Group Adjusted Mean Percent Kilowatt-Hour Savings of HEHC Participants That Increase Their Consumption

Section 2: Changes in Therm Consumption

In this section we report how those with natural gas heat changed their consumption after the HEHC audit and report. Customers with electric heat are not in this section, because they have little therm consumption to change, if any. (These would be customers with natural gas water heaters, of which there were too few to analyze.)

Program-Wide Effects on Therm Consumption

As demonstrated in Figure 10 below, there is no statistical difference in natural gas savings between natural gas heating participants based on whether they have central air conditioning. Both groups reduce their therm consumption by just over 20 therms per year (after being adjusted for the comparison group.) This represents an overall reduction of 3.4% for those with natural gas heating, and 2.7% for those with natural gas heating and central air.

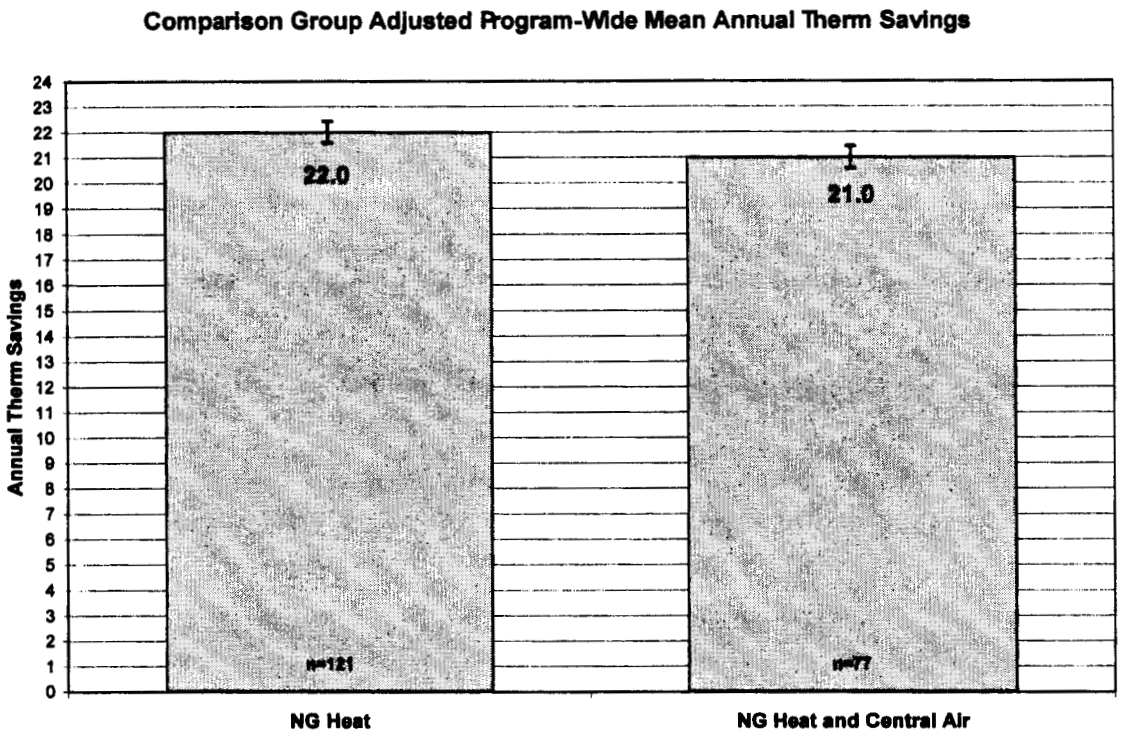


Figure 10. Comparison Group Adjusted Program-Wide Mean Annual Therm Savings

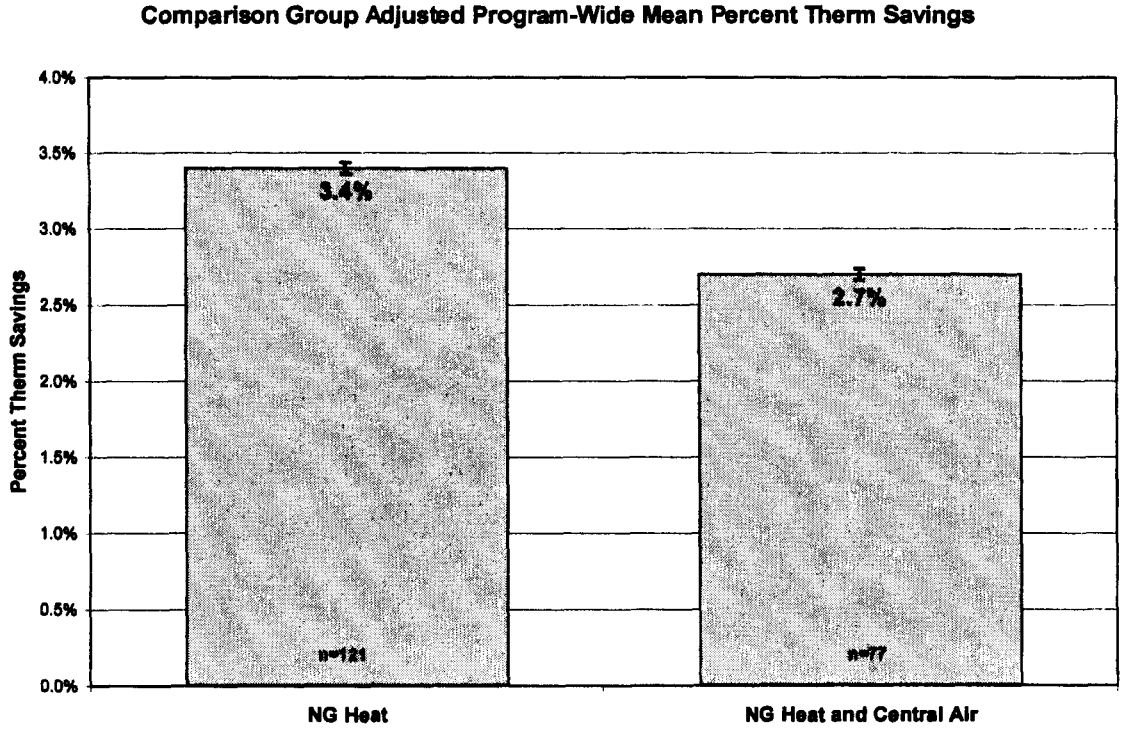


Figure 11. Comparison Group Adjusted Program-Wide Mean Percent Therm Savings

Increasing or Decreasing Therm Consumption: A Breakdown

As reported in the kilowatt-hour analysis, the majority of those with natural gas heat increased their electrical consumption. However, more than 60% of the HEHC participants with natural gas heat decreased their therm consumption after receiving the audit report.

Table 2. Percent of Customers Increasing or Decreasing Therm Consumption After the HEHC Audit

	Total	Percent Increasing	Percent Decreasing
NG Heat	125	38.8%	61.2%
NG Heat and Central Air	73	36.4%	63.6%

Participants That Decrease Their Therm Consumption

When we separate the increasers from the decreasers, we see a slight difference between those with central air and those without. Those without central air save a mean 86 therms per year after the audit (9.6%), while those with central air conditioning save a mean of 75 therms per year after the audit (7.9%).

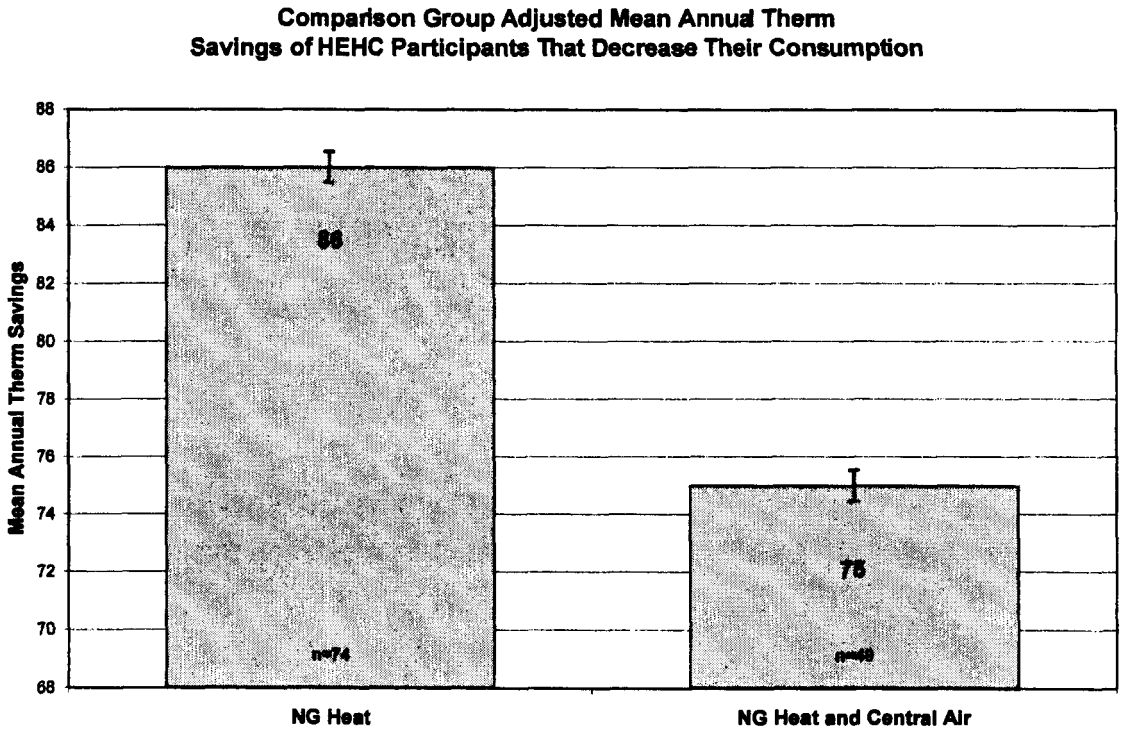


Figure 12. Comparison Group Adjusted Mean Annual Therm Savings of HEHC Participants That Decrease Their Consumption

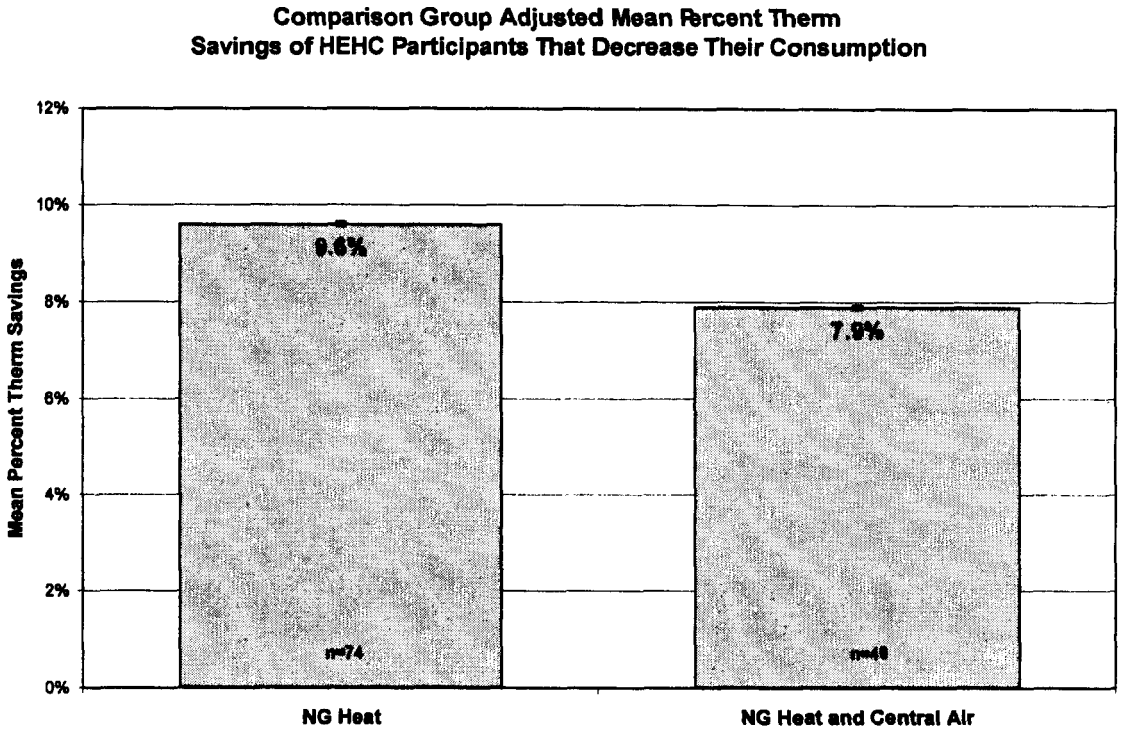


Figure 13. Comparison Group Adjusted Mean Percent Therm Savings of HEHC Participants That Decrease Their Consumption

Participants That Increase Their Therm Consumption

In the next analysis, we looked at only those customers that increased their therm consumption after the audit. Those without central air increase their therm consumption by a mean 77 therms per year (or 7.5%), and those with central air increase their consumption by a mean 67 therms per year (6.6%).

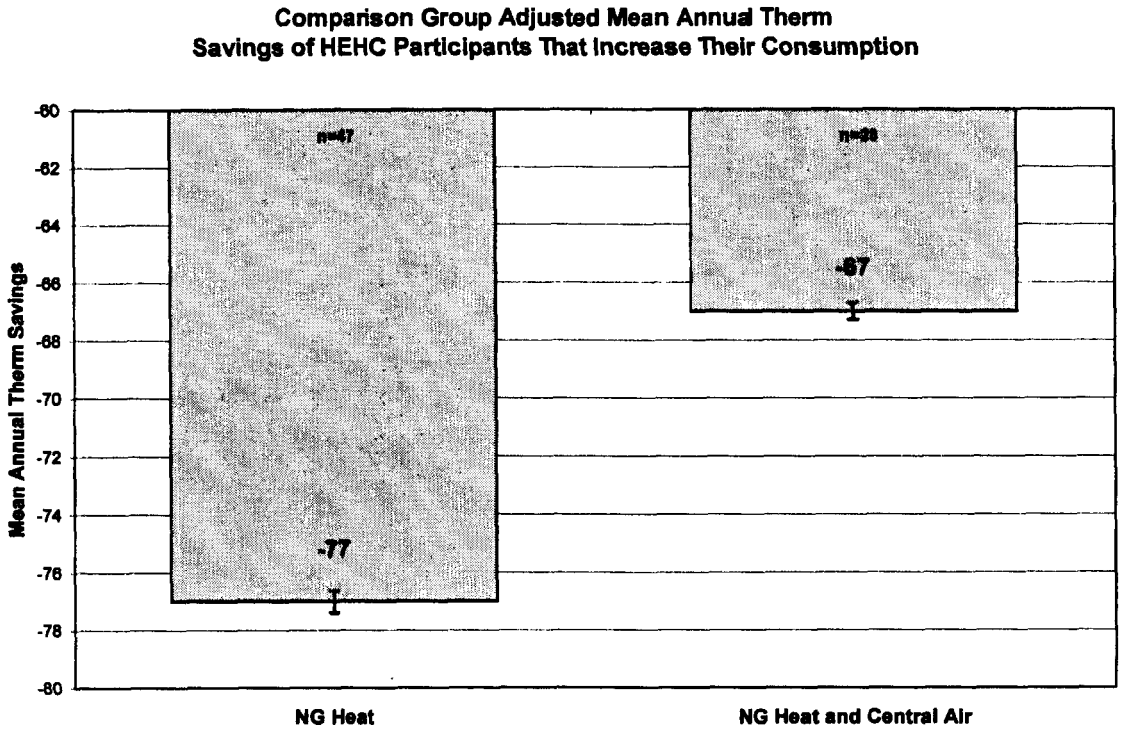


Figure 14. Comparison Group Adjusted Mean Annual Therm Savings of HEHC Participants That Increase Their Consumption

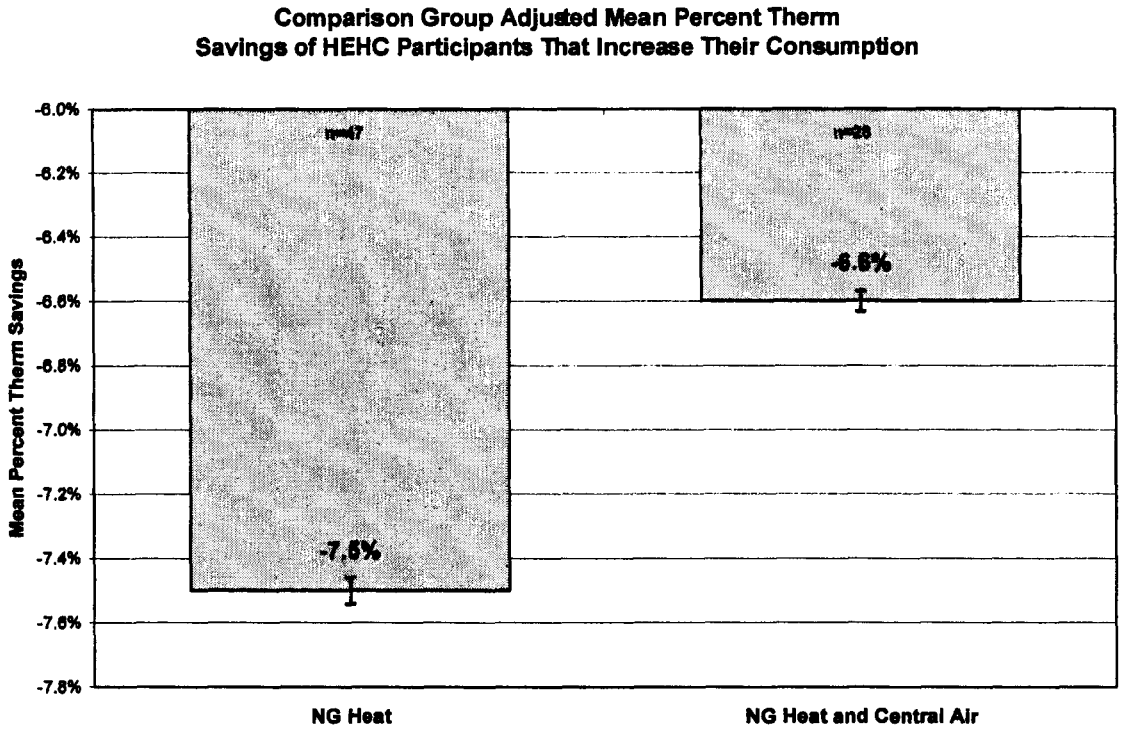


Figure 15. Comparison Group Adjusted Mean Percent Therm Savings of HEHC Participants That Increase Their Consumption

Study Conclusions

The findings presented herein indicate that the home energy audit has resulted in decreased energy consumption in certain groups, while consumption has increased in other groups. Specifically, the HEHC program results in energy consumption reductions for heating fuels (electric or gas). Participants with electric heat reduce their electrical consumption, and those with natural gas heat reduce their therm consumption. This data indicates that the HEHC is a program that reduces heating costs.

Specific findings indicate that:

1. Program-wide kilowatt-hour savings were achieved only by those participants that heat their home electrically. This group saves a mean 399 kilowatt-hours per year, or 2.8% of their annual consumption.
2. Of the customers that decrease their kilowatt-hour consumption, those with electric heat and air conditioning units have the highest savings, with 2,026 kilowatt-hours per year reductions, or 10.3% of their annual consumption.
3. The HEHC program does result in a natural gas savings for homes that heat with natural gas. On average, the savings are just over 20 therms saved per year, comparison group adjusted. Those without central air reduce their consumption by 22 therms a year (3.4%), and those with central air reduce their consumption by 21 therms per year, or 2.7%.
4. Those with natural gas heat and central air conditioning remain the most stable between the pre- and post-program periods. Of this group that increased their electric consumption, they increased, on average, about 1,237 kilowatt-hours per year. This increase averaged 11.8% of their annual consumption. Those that decreased their consumption did so the least, averaging a 1,135 kilowatt-hours per year decrease, representing 11.7% of their annual consumption. About the same amount of participants increased and decreased consumption about the same amount after the program, making the average effect for this group an increase in consumption of 100 kilowatt-hours.

The results of this study indicate that the Home Energy House Call program is successful at helping save heating costs. In summary, participants that heat with natural gas save natural gas and those that heat with electricity save electricity. However, this study utilizes relatively small sample sizes for this analysis, and we cannot guarantee that the customers analyzed represent the population of the HEHC program. Further analysis should be done on more customers, with a sampling strategy that better reflects the population as a whole.

Appendix A: Other Findings

In addition to the findings presented in the main body of this report, TecMarket Works also looked at the differences in savings by the square footage of the home, the year the home was built, type and age of water heater used, the number of people living in the home, and the energy service firms performing the audit. However, splitting the participant groups into these small categories reveals only speculative findings due to the low sample size. Therefore, only when trends were spotted are these findings presented in this report. The reader is cautioned about the sample size and reminded that the results presented are only possible indications of trends. Further analysis on a larger group of participants would need to be conducted to reach any conclusions, definitive or otherwise. These findings are reported below.

Square Footage of the Home

Results for the kilowatt-hour analysis by area of conditioned spaced produced sporadic results that do not seem to follow any clear trend. However, the therm consumption seems to decrease as the home gets larger, with two anomalies in the larger homes analyzed.

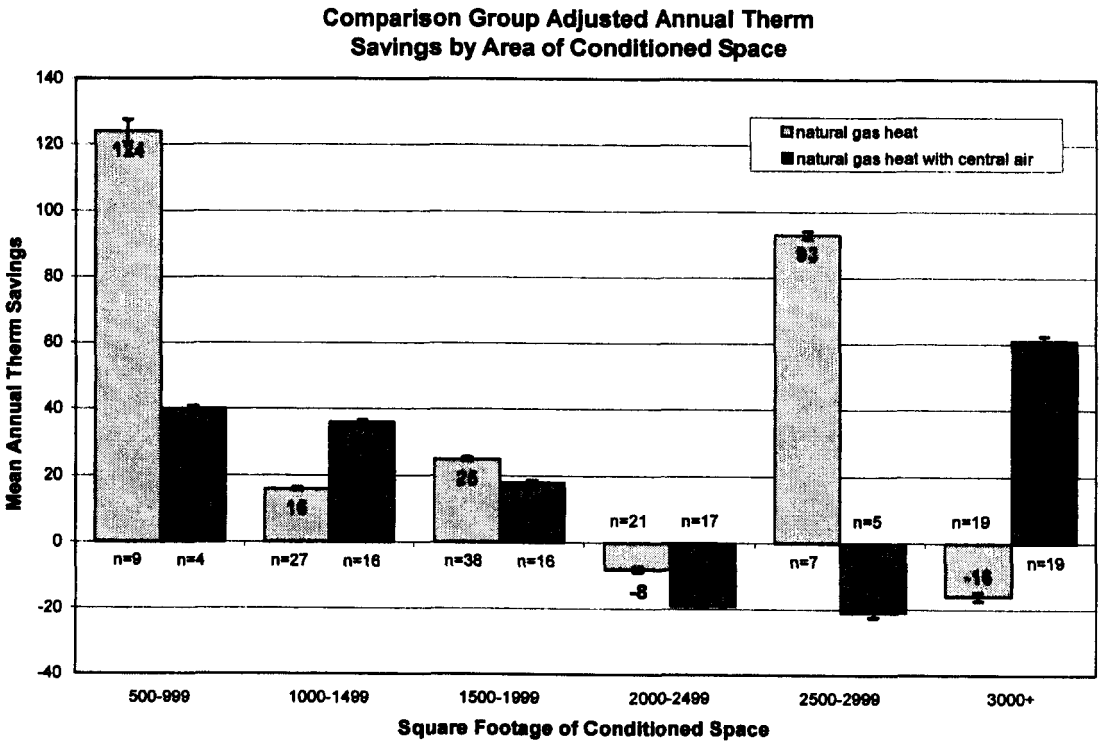


Figure 16. Comparison Group Adjusted Annual Therm Savings by Area of Conditioned Space

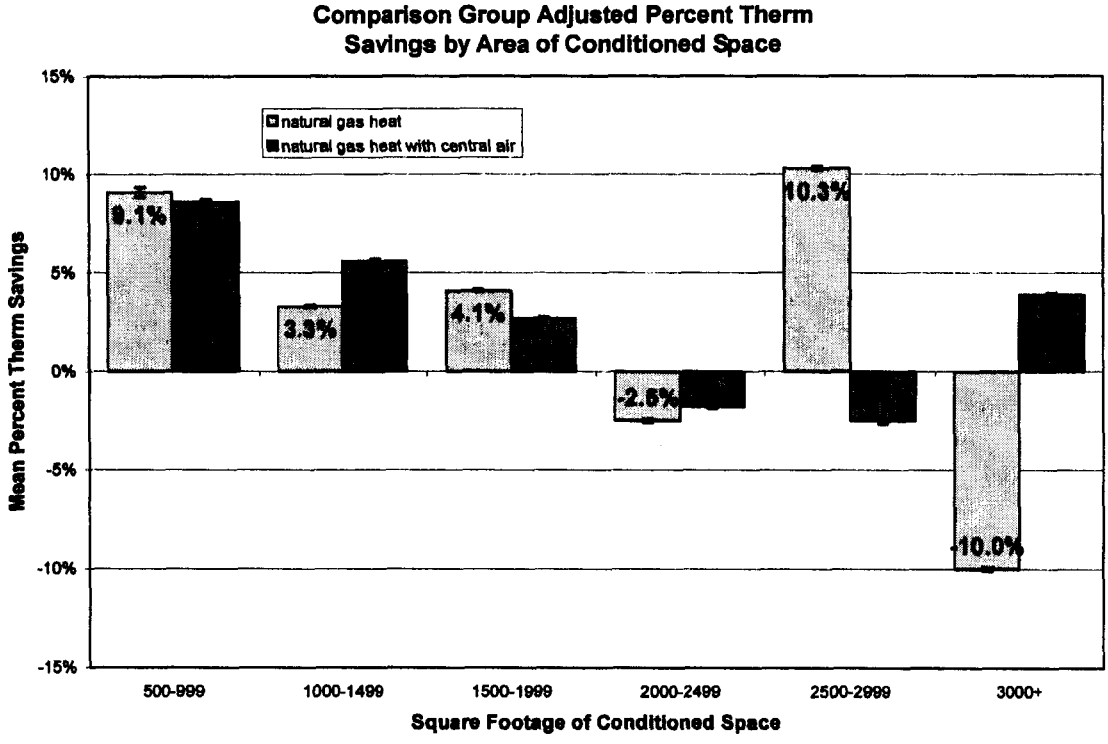


Figure 17. Comparison Group Adjusted Percent Therm Savings by Area of Conditioned Space

Vintage of Home

When we looked at the energy savings by the age of the home, the therm consumption did not reveal any probable trends. However, it seems that the owners of the newer homes increased their consumption more than those living in older homes for those with electric heat and air conditioning, and those with natural gas heat. This may indicate that those that can afford newer homes do not view the savings of conserving electricity as significantly or important as others, and therefore are less likely to not make physical or behavioral changes to decrease their electrical consumption.

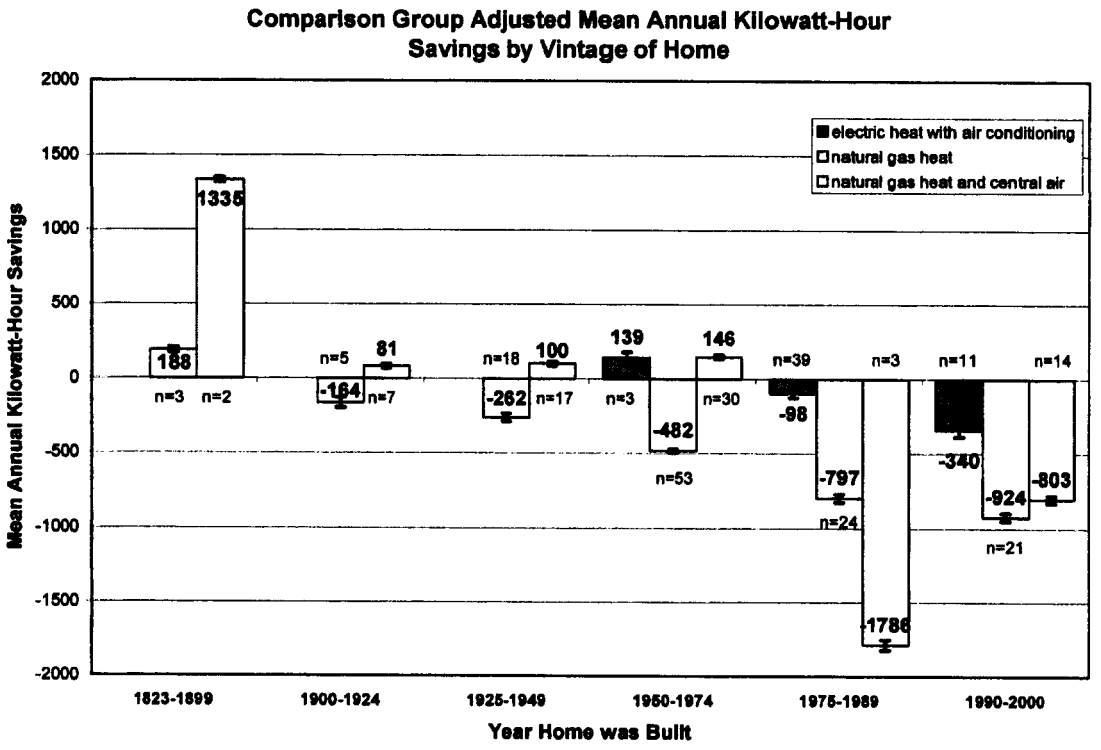


Figure 18. Comparison Group Adjusted Mean Annual Kilowatt-Hour Savings by Vintage of Home

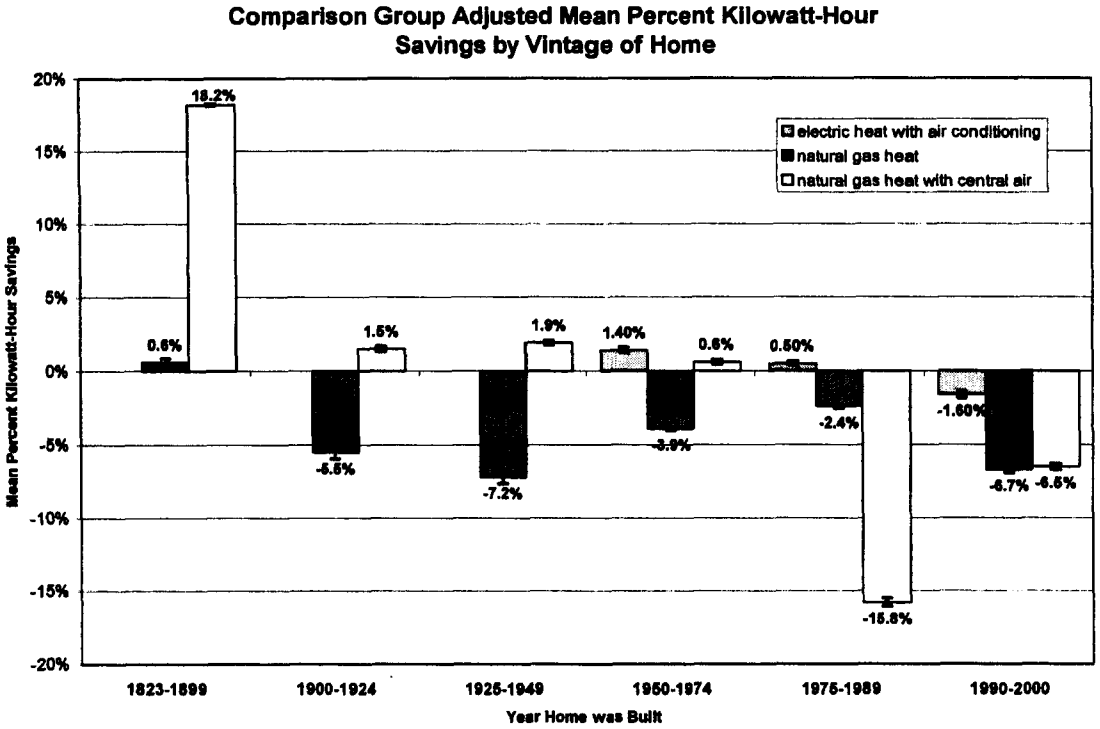


Figure 19. Comparison Group Adjusted Mean Percent Kilowatt-Hour Savings by Vintage of Home

Type and Age of Water Heater

The type and age of a home's water heater does not have an impact on energy savings. However, the water heater temperature setting was recorded during many of the audits. The water heater temperature settings are shown in Figure 20 below. An analysis of the water heater temperature data compared to the age of the installed water heater shows no relationship, suggesting factory water heater settings are almost always changed by the individual who installs or uses the heater. While not important to this study, this finding suggests that programs that focus on changing the manufacturer's temperature setting to a lower temperature have little influence on the temperatures of the installed water heaters.

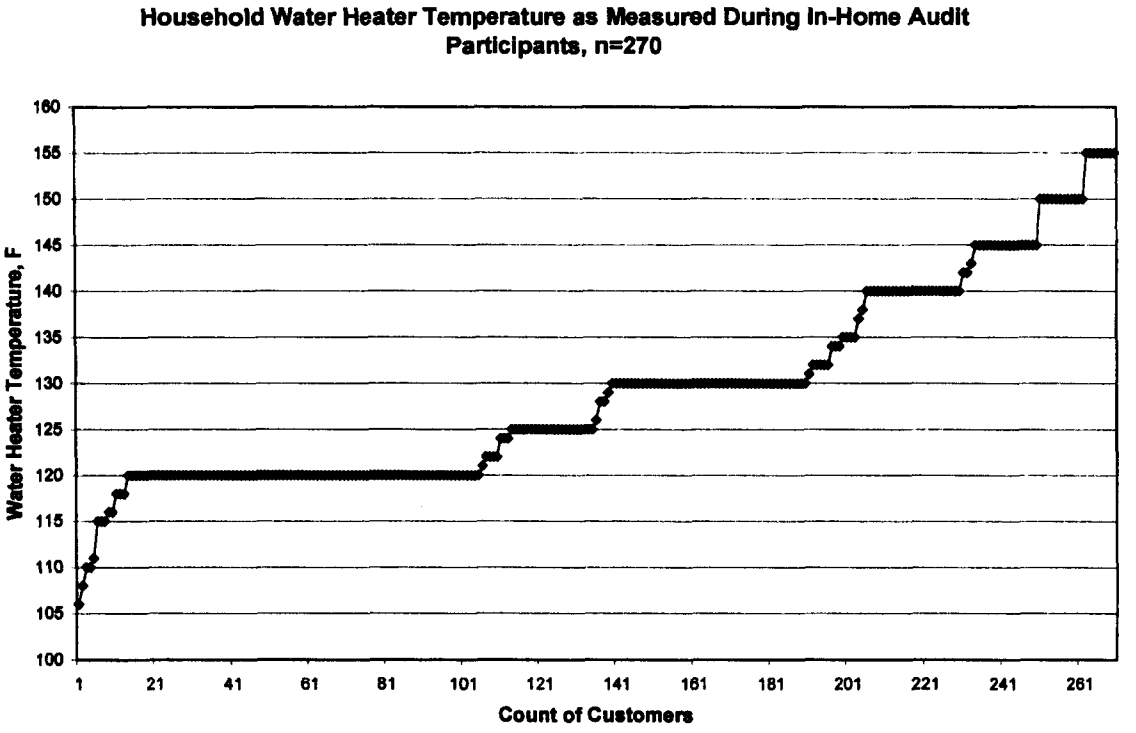


Figure 20. Water Heater Temperature at the Time of the HEHC Audit

Number of People Living in the Home

There is no apparent connection between the number of people living in the home and the energy savings realized by the HEHC participants. Overall increases and decreases in consumption were scattered, with one exception: all the homes occupied by a single person (one individual) had an overall decrease in consumption. This finding indicates that people living alone are more likely to benefit from the HEHC than people living with others in the home.

Auditor

A look at the energy savings of homes by the auditor conducting the examination revealed no significant differences in energy savings. Six of the seven auditors had groups that increased their consumption overall, and groups that decreased their consumption overall. One auditor had overall decreases in consumption, but this is most likely a coincidence given the small sample sizes when each of the groups is divided into seven smaller groups.

Days to Mail the Audit Report

Home Energy House Call managers claim that the reports are mailed within ten days of the audit. However, this is not consistent with the data examined in this study. Many audit reports were mailed three weeks or more after the audit. However, most of these delays occurred in the beginning of the program when the auditing firms were

experiencing start-up difficulties. According to Cinergy Program Managers, the more recent participants are receiving their audit reports within 10 days. The following graphic indicates the time between the audit and the mailing of the audit report for the population examined in this study. The delays in the receipt of the audit report may be expected to have an impact on the customer's ability to implement actions taken or maintain customer interest in taking actions.

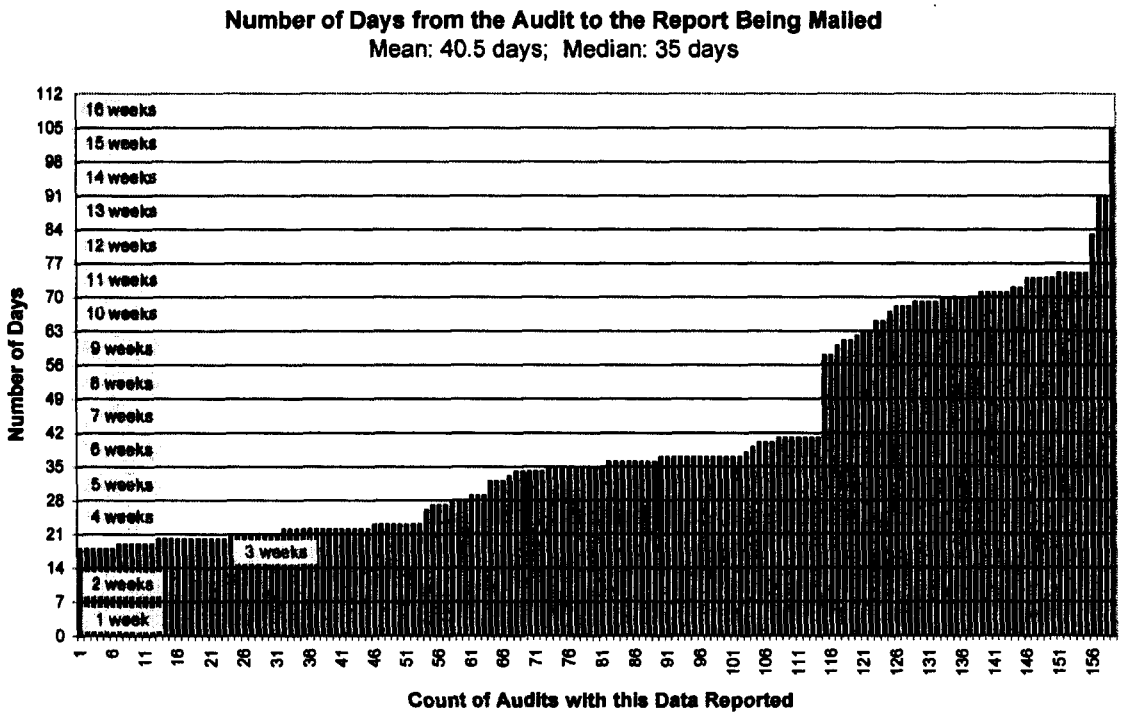


Figure 21. Number of Days from the Audit to the Report Being Mailed

Final Report

APPENDIX C

Kentucky NEED: Impact Evaluation

Prepared for:
Cinergy

Prepared by:

Lauren Miller Gage
M. Sami Khawaja, Ph.D.
Tony Larson
Quantec, LLC

September 12, 2005
K:\2005 Projects\2005-29 (Cinergy) KY NEED\Report\KYN_Report_091205.doc

Introduction

National Energy Education Development (NEED) is a Washington, DC-based nonprofit association with the mission of promoting "an energy conscious and educated society by creating effective networks ... to design and deliver objective, multi-sided energy education programs."[1] The NEED Program includes curriculum materials that teach the scientific concepts of energy and includes information to, "educate students about energy efficiency and conservation, and tools to help educators, energy managers and consumers use energy wisely."

In December of 1994, Kentucky began a NEED Program. Shortly thereafter, Karen Reagor was hired to establish the KYNEED Program. It was her responsibility to secure funding and statewide Program delivery. In October 1997, Union Light Heat and Power (ULH&P) began funding the KYNEED-ULH&P Program. Since then, the Program has hosted teacher/student workshops, sponsored teachers' attendance at summer training conferences, participated in Teacher In-Service and professional development opportunities, and sponsored award-winning teachers and students to attend NEED's National Youth Awards Conference in Washington, DC.

Currently, the KYNEED project goal includes providing "non-biased energy education programs in schools in Boone, Campbell, Kenton, Gallatin, Grant and Pendleton counties, with a focus on energy conservation and efficiency". The following table provides an update regarding goals, targets and current progress.

Figure I.1: KYNEED Goals, Targets and Progress

Goal	Target	Progress
Provide NEED Energy Education Materials to Teachers	100 teachers receive materials	94 Teachers registered in the KYNEED program
Conduct Teacher/Student Training Workshops	Three workshops	Three conducted
Plan, Coordinate and Facilitate Teacher In-Services	Three teacher in-services and a classroom presentation for university education majors	8 teacher in-service and one university presentation
Provide In-depth Training for Teachers via NEED curriculum	Encourage teachers from the collaborative service territory to attend NEED's trainings	12 teachers attended from the territory
Develop, Coordinate and Facilitate a Parent/Student Energy Efficiency & Conservation Program	500 students and their families participate	To-date, 238 kits have been distributed and 9 participating teachers enrolled for fall 2005
Energy Efficiency and Conservation Practices in the Schools	Provide information to all school districts and work with those who request assistance	Working directly with 2 schools and co-hosted High Performance Schools Workshop in May
Promote participation in the NEED Youth Awards Program for Energy Achievement	Encourage schools in the six county area to participate	Six participating schools

[1] http://www.need.org/info.htm

A major Program enhancement was introduced in 2003. In addition to the current educational Program, a Conservation Action Kit was distributed to participating students. This kit contained energy-saving measures that were intended to facilitate hands-on learning and ultimately encourage energy awareness and behaviors that could ultimately lead to a lower energy bill. The kit contained several energy-efficient devices that required minimal installation time and effort, including:

- A compact fluorescent light bulb. This low-energy bulb was intended to replace the commonly-used higher energy incandescent light bulb.
- A high-efficiency showerhead that reduces water usage when used instead of an existing, higher-flow showerhead.
- Kitchen and bathroom aerators that reduce water flow when installed in bathroom and kitchen sinks.
- Thermometers that monitor temperature for rooms, hot water heaters and refrigerator/freezer components. These thermometers increase energy use awareness, which may in turn cause students to adjust their energy devices accordingly.
- A plastic bag that measures shower and faucet flow rates..

Along with the kit, students were asked to return an audit form that had three components:

1. ***House and Appliance Characteristics,*** which asks students if they are ULH&P customers and basic information about their home, such as number of occupants, if they have certain appliances, and the fuel usage of heating and cooling equipment.

2. ***Behavioral Assessment,*** which is presented in two separate forms—one to be filled out before the lessons and the other afterwards. The top portion asks questions about the number of incandescent and fluorescent bulbs in the home, use of the Energy Saver feature found on dishwashers, cold water laundry usage, the number of baths and showers in the home, and the temperature settings on cooling and heating equipment. The bottom portion of the form is more qualitative, and asks students to report the number of times per day that lights and electronics are left on, if water is run needlessly or if a window is left open.

3. ***Installation Survey.*** This final component asks students about what occurs in their household with each measure. For example, if they installed the compact fluorescent lights (CFLs), what bulb Wattage was replaced, and how long is the bulb on each day? If they didn't use the CFL, why not, and do they plan to in the future?

Evaluation Overview

This evaluation assessed energy savings attributable to Program efforts and provided feedback about the Program delivery in ULH&P's Kentucky service territory, particularly with regard to the kit. The evaluation consisted of the following:

- Program document review
- Program staff interviews (3)
- Program instructor interviews (2)
- An assessment of returned student surveys and the associated savings

Conservation Lessons Delivery

Quantec's 2002 Program evaluation recommended improvements in five areas: 1) increase conservation emphasis of lessons, 2) develop targeted, measure-based lessons, 3) provide students with conservation measures, 4) provide measurable metrics, and 5) improve data collection instruments. The KYNEED Program has made significant progress on all of these recommendations.

Prior to 2002, the KYNEED Program had an implied conservation message throughout its curriculum. An Energy Conservation Contract was then used to increase awareness about saving energy at home. Since 2003, the Program developed curriculum that focuses on energy efficiency generally, but also emphasizes the kit. Each student receives an "Energy Efficiency Notebook" that contains nine lessons, each including a journal and homework assignment. Through this medium, each measure in the kit is introduced, and students are asked to take them home to install or implement some recommended behavioral changes. Teachers are provided with a Teacher's Guide containing additional information.

In addition to the notebook, audit forms are provided to students as a separate homework assignment. The *Energy Usage Before* survey is the homework assignment for Lesson 1, "What is Energy." Both the *Energy Usage After* and *Installation* surveys are part of the Lesson 9, "Landscaping Investigations,"[2] assignment.

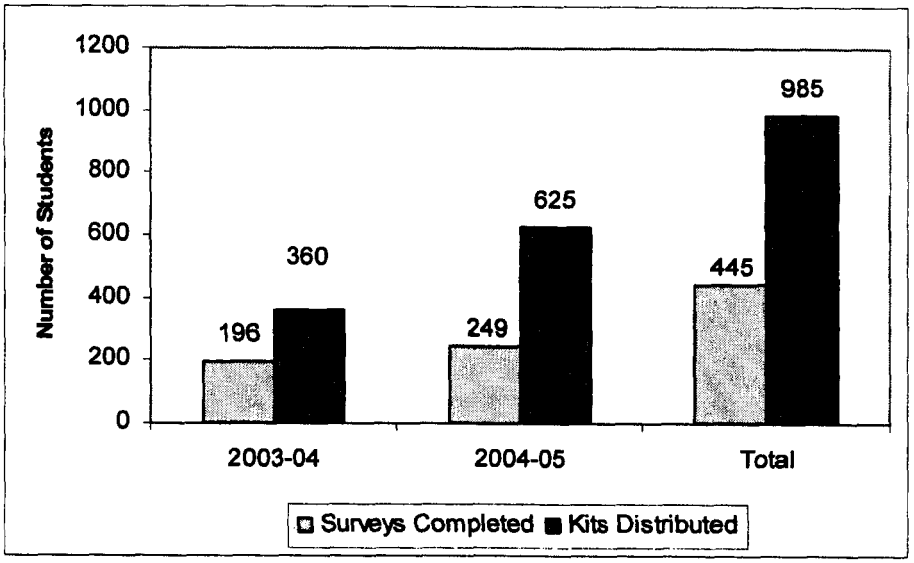
Teachers and Program staff interviews indicated that teachers, parents and school administrators are excited about the new conservation focus. Several mentioned that the measures' "hands-on" nature is extremely beneficial in the classroom. Teachers are currently on waiting lists to receive additional kits of measures.

Teachers noted that their most significant concern was the confusion caused when only some of the students receive kits. UHL&P only provides measures to their customers even though many teachers have households served by Owen Electric, thus a portion of the class may not receive measures to take home.

From 2003 to 2005 (covering two Program years), UHL&P provided a total of 985 kits for an approximate cost of $30,000. Overall, nearly half of the students returned some portion of the audit forms. In 2003 to 2004 the response rate was 54%, which dropped down to 40% in 2004 to 2005.

[2] One teacher noted that this lesson was skipped because it was too difficult for 5th graders and beyond their control.

Figure I.2: Surveys Returned and Kits Provided



Demographics

The *House and Appliance Characteristics* portion of the audit form was designed to describe students' home, energy-using equipment and baseline consumption characteristics.

The average home occupancy for respondents was 4.4, including 2.1 adults, 0.6 teens (12-18 years of age) and 1.8 children. The average home age is 21 years. Participants were also asked if they had certain appliances, as shown in Table I.2 below.

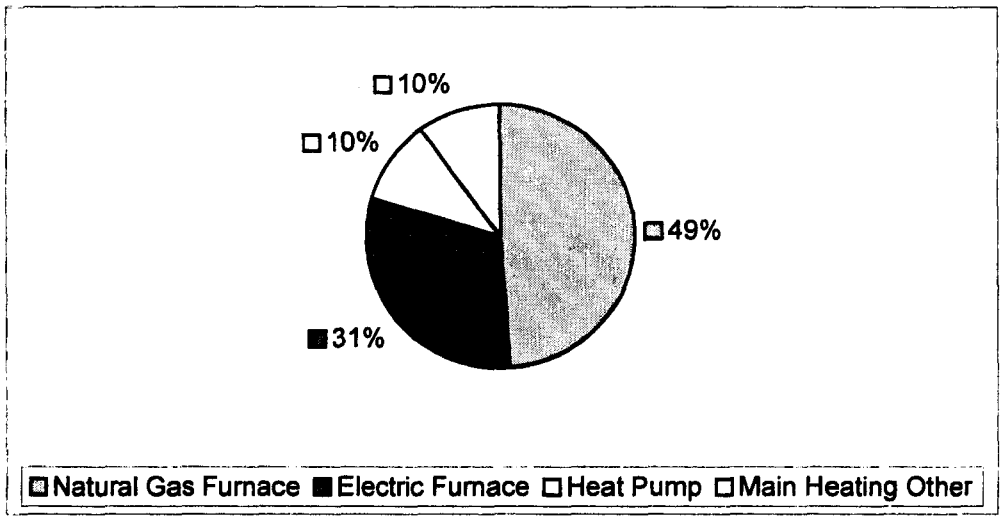
Table I.2: Appliance Saturations, % of Respondents (N=445)

Refrigerator	Television	Clothes Dryer	Clothes Washer
98%	98%	96%	95%
Computer	**Dishwasher**	**Video Game System**	**Stand Alone Freezer**
93%	89%	86%	41%

For heating water, 51% of participants use electricity and 46% use natural gas.[3] Central air conditioning is used in 85% of the homes and 5% utilize room units. Most families heat their homes using natural gas (49%) and a smaller but significant amount use electric (31%), as shown by Figure I.2.

[3] Remainder "don't know."

Figure I.3: Primary Heating Source (N=445)



Behavioral Assessment

The second audit form section was designed as a fundamental part of the curriculum as well as a way for Program staff to assess energy saving behaviors. Because the pre-2002 Energy Conservation Contract was the primary teaching tool, the behavioral assessment in the audit tool remained similar to the previous contract in order to provide a way to teach students new behaviors.

As described above, this behavioral assessment was handed out before the lessons and then again at the end of the lessons as a separate assignment. The objective was to see how students had improved on their energy behaviors, such as removing incandescent light bulbs, increasing air conditioners temperatures, leaving lights on and not allowing water to run needlessly.

Response rates for this section of the audit form were quite high, showing that most students responded to both the before and after questions. Ideally, the evaluation team would estimate the change in behavior for each indicator then estimate the resulting energy savings. Yet, a significant number of responses indicated that students were using *more* energy (an extremely unlikely result of the Program). Figure I.3 displays the percent of responses in each of three categories: using more energy, no change and using less energy.

Figure I.4: Behavioral Responses (N=407[4])

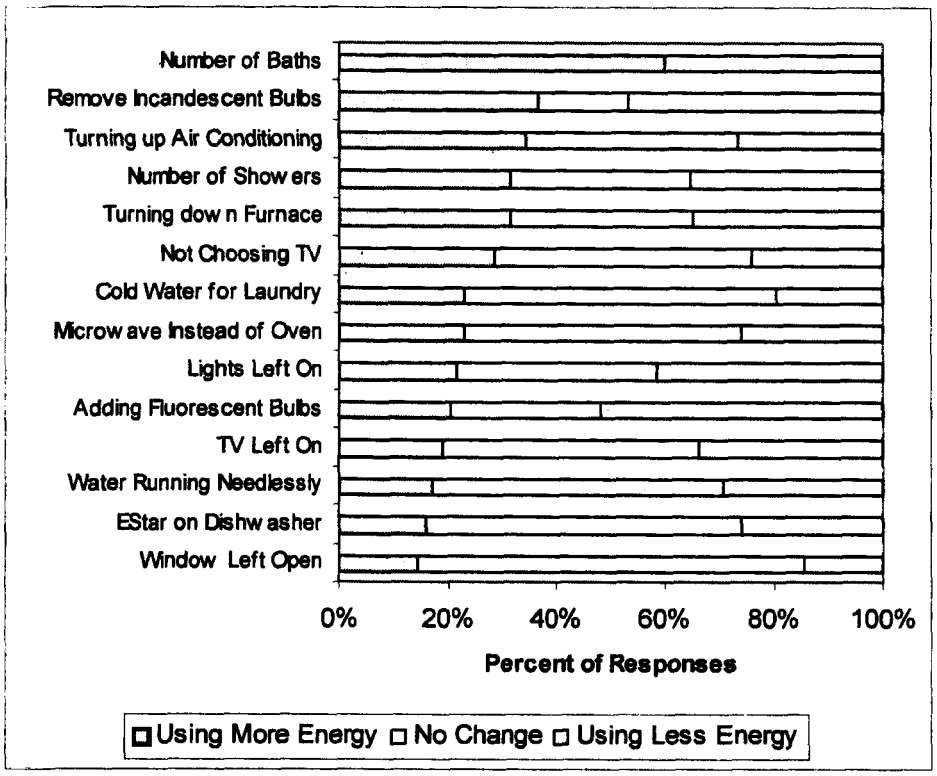


Table I.3 outlines the average change[5] in behaviors for answers that indicated less energy use, more energy use, and the average for all responses. In addition, the number of units are provided. Because of the high propensity for students to report an increase in energy-consuming behaviors, the overall averages indicate little overall change in energy consumption due to behaviors.

[4] Average number of responses across questions.

[5] Calculated as after lessons response minus before lessons

Table I.3: Average Behavioral Changes

Energy Saving Behavior	Average Change for Less Energy	Average Change For More Energy	Overall Average	Units
Window Left Open	-1.6	1.8	0.0	Times per day
EStar on Dishwasher	2.6	-2.8	0.2	Loads per Week
Water Running Needlessly	-2.3	2.4	-0.3	Times per day
TV Left On	-2.5	2.1	-0.4	Times per day
Adding Fluorescent Bulbs	3.8	-5.8	0.8	No. Bulbs
Lights Left On	-3.1	2.8	-0.7	Times per day
Microwave Instead of Oven	2.2	-2.0	0.1	Times per day
Cold Water for Laundry	2.6	-3.6	-0.3	Loads per Week
Not Choosing TV	2.7	-2.8	-0.1	Times per day
Turning down Furnace	-4.0	3.9	-0.4	Degrees
Number of Showers	-8.3	7.2	-0.7	Showers per week
Turning up Air Conditioning	4.9	-5.3	-0.3	Degrees
Remove Incandescent Bulbs	-17.3	15.4	-2.4	No. Bulbs
Number of Baths	-4.5	4.2	0.7	Baths per Week

* Change calculated as Post-behavior minus Pre-behavior

Due to the magnitude and direction of many responses, we have concerns about the reliability of these data. Therefore, we did not estimate behavioral energy savings attributable to the Program, except in one case (turning down furnace). Some examples of the responses' inconsistencies are provided below.

One typical energy conservation lesson students learn is to reduce their number of baths and conversely, increase their number of showers. Taking a bath uses significantly more hot water, so showers can contribute to lower energy usage. On average, students reported an additional 0.73 baths taken in their home each week, driven by 60% of respondents who indicated *more* baths taken in their home each week. Complementing this result is that students reported 0.7 *fewer* showers each week.

Ideally, students would learn about energy efficient lighting through the Program, which would prompt their families to replace incandescent light bulbs with CFLs. Nearly half (47%) of students reported that they removed incandescent bulbs as a result of the Program, with an average of 17.3 removed bulbs. Yet, 40% of students stated that they *increased* the number of traditional bulbs after the Program at an average rate of 15.4 bulbs. Regardless of direction, the magnitude of these changes indicates a reporting issue. Specifically, one would expect that if large quantities of incandescent lights were removed from a home, a similar number of CFLs would be installed. This was not the case. CFLs were reported to be added at a rate of 3.8 per household (52% of respondents) and removed at a rate of 5.8 (20% of respondents).

In terms of appliance usage, a surprising number of students indicated an increased energy use, with 35% reporting that air conditioning temperature was turned *down*, 31% reporting that their furnace was turned *up*, 23% reporting that cold water was used for laundry *less* often after the lessons, and 16% stating that the energy saving feature on the dishwasher was used *less* often.

There are several possibilities why the results are so inconsistent with expectations:

- ***Students have not learned energy saving behaviors***. It is possible that students do not know what to do to conserve energy as related to the topics on the behavioral assessment. This could be caused by incomplete lesson information. If the lessons are teaching this information, students could be forgetting it by the time they complete their "after" survey.

- ***Students are not aware of their "pre" response***. Program staff rationally decided that it was best for the "before" and "after" surveys to be on separate pages, which would reveal the "true" results of their behavioral change. Yet, if families have forgotten their pre-responses, it may be difficult to indicate their changes in behavior.

We have noted survey improvement recommendations at the end of this report in the *Conclusions* section.

Measure Installation

The third portion of the audit form asked students specifically about the Conservation Action Kit measures' installation and use. Participants were asked if they had installed each measure, and if not, why.

Generally, this section had a much lower response rate than the first two sections, as only half of the *returned* surveys contained installation information.

Lighting

Each kit included a 15-Watt compact fluorescent bulb. Of the 985 kits delivered, 24% responded to whether they had installed the CFL. Of those respondents, 73% affirmed that they installed the bulb; the average incandescent removed was 68 Watts. The CFLs were most often put in the bedroom and used just over four hours per day.

Table I.4: Installation Characteristics of CFLs (N=233)

% Response Rate	% Installed By Respondents	Average Wattage Replaced*	Average hours Used
24%	73%	67.9	4.2

* Limited to less than100 Watts

Of the 64 respondents who reported not installing the CFL, only six stated that the bulb didn't fit, and 40 plan to install it in the future. Five respondents specified other reasons why they didn't install the bulb, including "did not want to," and "don't like fluorescents."

Hot Water Savings Measures

Each kit contained three measures to reduce hot water usage in the home: high efficiency showerhead, bathroom aerator, and kitchen aerator. Like the CFL, the response rate was a consistent 24% of provided kits.

The high efficiency showerhead was most often installed; 40% of respondents utilized this measure in their homes. The kitchen aerator and bathroom aerators were installed by 34% and 31% of respondents, respectively. Program participants were also asked to measure the pre- and post-installation flow rates, which were used to determine the average flow reduction for each device, measured in gallons per minute (GPM), as shown on Table I.5.

Table I.5: Installation Characteristics Hot Water Measures (N=233)

Measure	Response Rate	% Installed by Respondents	Average Reduction in GPM*
Showerhead	24%	40%	0.89
Kitchen Aerator	24%	34%	0.96
Bathroom Aerator	24%	31%	0.90

* Post GPM – Pre GPM, each limited between 1 and 7 GPM

Of the 139 students who reported not installing the showerhead, 25% indicated that it did not fit, 25% stated that they already had an efficient model, 15% said they plan to install at a later time, 10% are renters or struggled with installation, and 7% prefer their existing measure.

For the kitchen aerator, 31% (of 153) reported that the new model did not fit at their home, 12% indicated they already had the measure, and only 3% plan to install at a later time. For the bathroom aerator, a similar rate of respondents (32% of 162) stated that the measure did not fit in their home, 10% already have the measure in place, and 10% plan to install later.

Educational Measures

The kit provided several devices to provide information for students to adjust various appliances, including hot water heaters, refrigerators, freezers, stand-alone freezers, furnaces, and air conditioners.[6]

Adjustment rates for these measures were below the installation rates above. This may be expected due to a student's lack of control over major appliances. Of the measures on the installation survey, the refrigerator was most often reported to be adjusted (17%), followed by the freezer (15%), the hot water heater (13%) and stand-alone freezer 5%.

[6] Furnace and air conditioning changes were queried on the Behavioral Assessment; therefore the responses are not directly comparable.

Table I.6: Appliance Adjustments

Appliance Adjusted	Response Rate	% Adjusted by Respondents*	% Who Plan To Adjust	Average Change in Temperature*
Hot Water Heater	22%	13%	42%	-12.6
Refrigerator	22%	17%	40%	1.1
Freezer	22%	15%	45%	0.4
Stand Alone Freezer	18%	5%	27%	0.3
Furnace**	32%	61%	NA	-0.4
Air Conditioning**	29%	81%	NA	-0.3

* Post-temperature minus Pre-temperature, each limited: hot water heater 100-200°F, refrigerator 30-44°F, freezer and stand-alone freezer -10-30°F, furnace and air conditioning 50-90°F

** Responses provided on Section 2 of the audit form

Although adjustment rates were relatively low, the portion of students who plan to adjust was quite high. For all measures, except the stand-alone freezers, over 40% reported that they planned on adjusting the temperature but had not completed this yet (this question was not asked for furnaces and air-conditioning units).

For those families that did make adjustments, the average reported changes are relatively small. When the audit tool asked students why they did not make the recommended changes, the most frequently provided response was that they were already set at the correct temperature[7]. In addition, several comments were made by respondents that their current temperature settings were preferred or they were not sure how to make the recommended adjustments. For hot water heaters, several commented that they rent and therefore do not have control over that particular appliance.

Additionally, respondents were asked to report any other changes made in their energy consumption. Few responses were provided (7), including insulation, weatherization, new doors, and turning off lights.

Energy Savings

We calculate a range of energy savings by measure for the average respondent. Additional details are provided in the Appendix. For the high-case, we assume that the non-respondents' installation rates are equal to that of the respondents. For the low-case, we assume that one-half as many non-respondents installed measures as compared to respondents. For example, if 50% of respondents indicated that they installed a particular measure, we assumed 25% of the non-respondents installed the measure. We feel this range of energy savings is relatively conservative since we are not crediting the Program with additional savings for those who "plan to install" and are not estimating energy savings from behavioral changes.

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[7] Refrigerators: 24 of 65 responses, Freezers: 18 of 56, Stand Alone Freezers 19 of 41

We find that, based on the equipment saturations, baseline consumption patterns, and installation rates (reported in Appendix), the average participant saved between 240 and 360 kWh and between 10 and 16 therms per year. This translates to first year average cost savings of between $25 and $38, assuming rates of $0.07/kWh and $0.80/therm. The table below outlines estimated savings by measure.

Table I.7: Estimates of Energy Savings

Measure	High Savings Estimates		Low Savings Estimates	
	Electric (kWh/year)	Natural Gas (therms/year)	Electric (kWh/year)	Natural Gas (therms/year)
CFL-1	59		38	
Showerhead	214	9	147	7
Kitchen Aerator	32	1	22	1
Bathroom Aerator	25	1	18	1
Adjust Hot Water heater	10	1	7	0
Adjust Refrigerator	2		1	
Adjust Freezer	1		1	
Adjust Stand Alone Freezer	0		0	
Adjust Furnace	19	3	8	1
Total Savings (energy units)	**362**	***16***	**243**	**10**
Total Cost Savings (Annually)	**$38**		**$25**	

Using high and low savings results, the levelized cost of conserved energy was calculated for the kits only ($30/kit) and kits plus admin ($162,000)[8]. As shown below, when compared to the kit prices only, the energy savings are relatively inexpensive, $0.02/kWh. Yet, when administrative costs are included, this cost per kWh increases ten-fold.

Table I.8: Levelized Cost of Conserved Energy

	Kits Only	Kits Plus Administrative
High Case	$0.015	$0.097
Low Case	$0.022	$0.143

[8] Admin costs were reported to be $81,000 per year. Discount rate was assumed to be 7.5% and line losses were assumed to be 10%.

Conclusions

Overall, the evaluation team is impressed with the progress made in the KYNEED-UHL&P Program, particularly with respect to conservation lessons. The combination of UHL&P's kit provision and the associated targeted curriculum has undoubtedly increased student conservation understanding. The Energy Efficiency Notebook has created a focused effort toward improving energy behaviors and installing kit measures.

The primary areas of Program improvement is related to the data collection instrument and encouraging installation of measures.

- ***Focus on collecting measure-based data.*** The primary goal of data collection for UHL&P should be verification of provided measures and related feedback. Therefore, it is possible for the audit form to be reduced to the final page and only a few demographic questions.

- ***Integrate verification into lessons.*** So far, the Program has done a sound job of integrating the conservation lessons and the measures taken home by students. Yet, the low response rates for the installation survey were below expectations. A reason for this could be that Lessons 4 through 8 cover the measure distribution but the *Installations* survey assignment is a requirement of Lesson 9, "Landscaping Investigations." We recommend integrating the questions about verifying installation into the lessons that distribute the measures.

- ***Set goals for increased response rates.*** The audit form response rates, particularly for the *Installation* survey, need to significantly improve. We expect that reduced data-collection requirements and integration into lessons will help. In addition, KYNEED should stress to teachers the importance of the data collection for their funding sources. Cinergy should set a reasonable response rate goal, possibly around 75%.

- ***Set goals for increased installation rates.*** Many of the installation rates, as reported by respondents, are lower than other school-based programs we have evaluated, as shown in Table I.9. Therefore, we recommend that the Program set the goal of increasing installation rates. One option is to provide a core set of measures (e.g., CFL, thermometers) and then provide hot-water measures, such as showerheads and aerators, only to those who do not already have an efficient unit at home. Another option may be for students to return the measures if they are not needed or don't fit in their homes. In addition, the program could provide incentives for students that install measures, such as additional lightbulbs.

Table I.9: Installation Rate Comparison

	Washington	Utah	Iowa	KYNEED
% Respondents that Installed				
CFL	87%	99%	92%	73%
Showerhead*	33%	63%	75%	40%
Bathroom Aerator	-	70%	73%	34%
Kitchen Aerator	-	-	-	31%
% Participants that Adjusted				
Water Heater	9%	62%	16%	13%
Refrigerator	10%	38%	6%	17%
Freezer	8%	64%	6%	15%
Stand-Alone Freezer	2%	-	--	5%
Furnace	65%	69%	28%	61%
AC	71%	65%	25%	81%
** Only given to those households using electric water heaters replacing an inefficient showerhead received showerheads*				

- ***Consider a way for students to follow up on installation.*** When asked why they didn't install or adjust measure, many respondents said they "plan to," which was not counted toward energy savings for this evaluation. It would be ideal if students have an opportunity to follow up on these questions in the future and verify actual installation.

- ***Consider optional behavioral assessment.*** Although a primary Program goal is to teach students energy saving behaviors, the audit form's behavioral assessment did not provide useful information. If UHL&P would like to collect behavioral changes data, we recommend making significant changes to the current format. Otherwise, we recommend that the Program ensure that the behaviors on the audit tool are integrated into the lessons themselves, and this portion of the audit form is removed.

- ***Develop reporting functionality.*** We recommend that UHL&P develop a process to more regularly track statistics on returned survey results, which will enable more mid-stream process changes.

- ***Consider measure changes.*** If after one year, installation rates do not improve, it may be wise for UHL&P to consider removing those measures with the worst performance and adding others to replace them. For example, it may be possible to add weather-stripping, outlet covers or a room-temperature switch plate.

Appendix: Energy Savings Calculation Details

Installation Rate Assumptions

Installation	High	Low
CFL-1	73%	47%
Showerhead	40%	28%
Kitchen Aerator	34%	24%
Bathroom Aerator	31%	22%
Adjust Hot Water heater	13%	9%
Adjust Fridge	17%	12%
Adjust Freezer	15%	10%
Adjust Stand Alone Freezer	5%	3%
Adjust Furnace	61%	25%

CFL Details

	Lifetime	Pre-Watt	Post-Watt	Hours per Day	Saturation*
Electric Savings	6	67.9	15.0	4.2	100%

Showerhead Details

	Lifetime	Change in GPM	Shower Minutes per week*	Saturation	Conversion from GPM To kW or Therms
Electric Savings	8	0.9	183.7	51%	0.12
Gas Savings				46%	0.006

**shower minutes per week = average occupants * average post-lesson length of shower*

Kitchen Aerator Details

	Lifetime	Change in GPM	Water Flow In Minutes per Day*	Saturation	Conversion from GPM
Electric Savings	3	1.0	21.8	51%	0.073
Gas Savings				46%	0.004

**Water Flow = % of HH Without Dishwasher * (15^1 + Occupants * 2^1) + (% of HH With Dishwasher) * (3^2 + Occupant * 0.5^2)*

Assumptions :
1) Without Dishwasher-15 Minutes of Use Per Day Plus 2 Minutes for Each Occupant
2) With Dishwasher- 3 Minutes Per Day + 0.5 Minutes for Each Occupant)

Bathroom Aerator Details

	Lifetime	Change in GPM	Water Flow In Minutes per Day*	Saturation	Conversion from GPM
Electric Savings	5	0.9	6.7	51%	0.073
Gas Savings				46%	0.004

** Water Flow = Occupants * 1.5 minutes*

Temperature of Hot Water Heater Details

	Lifetime	Change in Temp °F	% Savings /° F*	Saturation	Savings (unit)/year	Average Savings (unit/year)
Electric Savings	2	12.6	0.40%	51%	154.9	7.1
Gas Savings				46%	11.6	0.5

**% Savings / °F = 4%/10 – conversion for change in temperature found in DOE, Consumer Energy for Hot Water Heaters*

Temperature of Fridge Details

	Lifetime	Change in Temp °F	% Savings / ° F*	Saturation
Electric Savings	2	-1.1	-2.50%	98%

** OPALCO estimate of 25% per 10 deg F.*

Negative value used to convert negative change in temperature to positive energy savings

Temperature of Freezer Details

	Lifetime	Change in Temp °F	% Savings / ° F	Saturation
Electric Savings	2	- 0.4	-3.60%	98%

**% savings / °F = -18% / 5 - conversion for change in temperature found Based on Home Energy Article for Freezer*

Negative value used to convert negative change in temperature to positive energy savings

Temperature of Stand Alone Freezer Details

	Lifetime	Change in Temp °F	% Savings / ° F	Saturation
Electric Savings	2	0.3	-3.60%	41%

** % savings / °F = -18% / 5 - conversion for change in temperature found Based on Home Energy Article for Freezer*

Negative value used to convert negative change in temperature to positive energy savings

Temperature of Furnace Details

	Lifetime	Change in Temp °F	% Savings /° F*	Saturation
Electric Savings	2	0.7	3.00%	41%
Gas Savings				49%

** % savings / °F = 3%- conversion for change in temperature for a furnace found based on Kentucky Natural Resources and Environmental Protection Cabinet for "Make Your Home More Energy Efficiency and Save Money" fact sheet*

Appendix D

Kentucky DSM Rider

Comparison of Revenue Requirement to Rider Recovery

Residential Programs	(1) Projected Program Costs 7/2004 to 6/2005 (A)	(2) Projected Lost Revenues 7/2004 to 6/2005 (A)	(3) Projected Shared Savings 7/2004 to 6/2005 (A)	(4) Program Expenditures 7/04 through 6/05 (B)	(5) Program Expenditures (C) Gas	(6) Program Expenditures (C) Electric	(7) Lost Revenues 7/04 through 6/05 (B	(8) Shared Savings 7/04 through 6/05 (B	(9) 2004 Reconciliation Gas (D)	(10) 2004 Reconciliation Electric (E)	(11) Rider Collection (F) Gas	(12) Rider Collection (F) Electric	(13) (Over)/Under Collection Gas (G)	(14) (Over)/Under Collection Electric (H)
Res. Conservation & Energy Education	$ 499,800	$ 7,742	$ (8,996)	$ 471,174	$ 296,368	$ 174,806	$ 77	$ (383)			NA	NA	NA	NA
Refrigerator Replacement	$ 100,000	$ 2,848	$ 4,700	$ 53,589		$ 53,589	$ 270	$ 751						
Residential Home Energy House Call	$ 150,000	$ 37,820	$ 81,750	$ 112,147	$ 70,540	$ 41,607	$ 1,205	$ 10,991			NA	NA	NA	NA
Res. Comprehensive Energy Education	$ 81,500	$ -	$ -	$ 76,856	$ 48,342	$ 28,514	$ -	$ -			NA	NA	NA	NA
Home Energy Assistance Plus	$ 75,000	$ -	$ -	$ 28,573		$ 28,573	$ -	$ -						
Power Manager	$ 750,000	$ -	$ 60,000	$ 782,927		$ 782,927	$ -	$ 21,023						
Program Development Funds	$ 140,000	$ -	$ -	$ 88,578	$ 55,715	$ 32,863	$ -	$ -			NA	NA	NA	NA
Energy Star Products	$ 243,000	$ 126,096	$ 51,220	$ -	$ -	$ -	$ -	$ -			NA	NA	NA	NA
Energy Efficiency Website	$ 17,850	$ 9,577	$ 4,195	$ -	$ -	$ -	$ -	$ -			NA	NA	NA	NA
Total	$ 2,057,150	$ 184,083	$ 192,869	$ 1,613,844	$ 470,965	$ 1,142,879	$ 1,552	$ 32,382	$ 1,735,848	$ 585,859	$ 1,800,320	$ 1,989,171	$ 406,293	$ (226,499)

(A) Amounts identified in report filed on September 30, 2004.
(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2004 through June 30, 2005.
(C) Allocation of program expenditures to gas and electric. Uses 62.9% gas based upon saturation of gas space heating.
(D) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.
(E) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.
(F) Revenues collected through the DSM Rider between July 1, 2004 and June 30, 2005.
(G) Column (5) + Column (9) - Column(11).
(H) Column (6) + Column (7) + Column (8) + Column (10) - Column(12).

Commercial Programs	(1) Projected Program Costs 7/2004 to 6/2005 (A)	(2) Projected Lost Revenues 7/2004 to 6/2005 (A)	(3) Projected Shared Savings 7/2004 to 6/2005 (A)	(4) Program Expenditures 7/04 through 6/05 (B)	(5) Lost Revenues 7/04 through 6/05 (B)	(6) Shared Savings 7/04 through 6/05 (B	(7) 2004 Reconciliation (C)	(8) Rider Collection (D)	(9) ((Over)/Under Collection (E)
High Efficiency Program									
Lighting	$ 52,380	$ 17,482	$ 2,674	$ -	$ -	$ -			
HVAC	$ 35,690	$ 6,661	$ 3,647	$ -	$ -	$ -			
Motors	$ 25,169	$ 5,210	$ 6,430	$ -	$ -	$ -			
Other	$ 112,703	$ 74,709	$ 112,207	$ -	$ -	$ -			
Total	$ 225,942	$ 104,062	$ 124,958	$ -	$ -	$ -	$ (1,228,123.00)	$ (811,165)	$ (416,958)

(A) Amounts identified in report filed on September 30, 2004.
(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2004 through June 30, 2005.
(C) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.
(D) Revenues collected through the DSM Rider between July 1, 2004 and June 30, 2005.
(E) Column (4) + Column (5) + Column (6) + Column (7) - Column (8)

Members of the Supreme Court of the United States

NAME	State App't From	Appointed by President	Judicial Oath Taken	Date Service Terminated
Chief Justices				
Jay, John	New York	Washington	(a) October 19, 1789	June 29, 1795
Rutledge, John	South Carolina	Washington	August 12, 1795	December 15, 1795
Ellsworth, Oliver	Connecticut	Washington	March 8, 1796	December 15, 1800
Marshall, John	Virginia	Adams, John	February 4, 1801	July 6, 1835
Taney, Roger Brooke	Maryland	Jackson	March 28, 1836	October 12, 1864
Chase, Salmon Portland	Ohio	Lincoln	December 15, 1864	May 7, 1873
Waite, Morrison Remick	Ohio	Grant	March 4, 1874	March 23, 1888
Fuller, Melville Weston	Illinois	Cleveland	October 8, 1888	July 4, 1910
White, Edward Douglass	Louisiana	Taft	December 19, 1910	May 19, 1921
Taft, William Howard	Connecticut	Harding	July 11, 1921	February 3, 1930
Hughes, Charles Evans	New York	Hoover	February 24, 1930	June 30, 1941
Stone, Harlan Fiske	New York	Roosevelt, F.	July 3, 1941	April 22, 1946
Vinson, Fred Moore	Kentucky	Truman	June 24, 1946	September 8, 1953
Warren, Earl	California	Eisenhower	October 5, 1953	June 23, 1969
Burger, Warren Earl	Virginia	Nixon	June 23, 1969	September 26, 1986
Rehnquist, William H.	Virginia	Reagan	September 26, 1986	September 3, 2005
Associate Justices				
Rutledge, John	South Carolina	Washington	(a) February 15, 1790	March 5, 1791
Cushing, William	Massachusetts	Washington	(c) February 2, 1790	September 13, 1810
Wilson, James	Pennsylvania	Washington	(b) October 5, 1789	August 21, 1798
Blair, John	Virginia	Washington	(c) February 2, 1790	October 25, 1795
Iredell, James	North Carolina	Washington	(b) May 12, 1790	October 20, 1799
Johnson, Thomas	Maryland	Washington	(a) August 6, 1792	January 16, 1793
Paterson, William	New Jersey	Washington	(a) March 11, 1793	September 9, 1806
Chase, Samuel	Maryland	Washington	February 4, 1796	June 19, 1811
Washington, Bushrod	Virginia	Adams, John	(c) February 4, 1799	November 26, 1829
Moore, Alfred	North Carolina	Adams, John	(a) April 21, 1800	January 26, 1804
Johnson, William	South Carolina	Jefferson	May 7, 1804	August 4, 1834
Livingston, Henry Brockholst	New York	Jefferson	January 20, 1807	March 18, 1823
Todd, Thomas	Kentucky	Jefferson	(a) May 4, 1807	February 7, 1826
Duvall, Gabriel	Maryland	Madison	(a) November 23, 1811	January 14, 1835
Story, Joseph	Massachusetts	Madison	(c) February 3, 1812	September 10, 1845
Thompson, Smith	New York	Monroe	(b) September 1, 1823	December 18, 1843
Trimble, Robert	Kentucky	Adams, J. Q.	(a) June 16, 1826	August 25, 1828
McLean, John	Ohio	Jackson	(c) January 11, 1830	April 4, 1861
Baldwin, Henry	Pennsylvania	Jackson	January 18, 1830	April 21, 1844
Wayne, James Moore	Georgia	Jackson	January 14, 1835	July 5, 1867
Barbour, Philip Pendleton	Virginia	Jackson	May 12, 1836	February 25, 1841
Catron, John	Tennessee	Van Buren	May 1, 1837	May 30, 1865
McKinley, John	Alabama	Van Buren	(c) January 9, 1838	July 19, 1852
Daniel, Peter Vivian	Virginia	Van Buren	(c) January 10, 1842	May 31, 1860
Nelson, Samuel	New York	Tyler	February 27, 1845	November 28, 1872
Woodbury, Levi	New Hampshire	Polk	(b) September 23, 1845	September 4, 1851
Grier, Robert Cooper	Pennsylvania	Polk	August 10, 1846	January 31, 1870
Curtis, Benjamin Robbins	Massachusetts	Fillmore	(b) October 10, 1851	September 30, 1857
Campbell, John Archibald	Alabama	Pierce	(c) April 11, 1853	April 30, 1861
Clifford, Nathan	Maine	Buchanan	January 21, 1858	July 25, 1881
Swayne, Noah Haynes	Ohio	Lincoln	January 27, 1862	January 24, 1881
Miller, Samuel Freeman	Iowa	Lincoln	July 21, 1862	October 13, 1890
Davis, David	Illinois	Lincoln	December 10, 1862	March 4, 1877
Field, Stephen Johnson	California	Lincoln	May 20, 1863	December 1, 1897
Strong, William	Pennsylvania	Grant	March 14, 1870	December 14, 1880
Bradley, Joseph P.	New Jersey	Grant	March 23, 1870	January 22, 1892
Hunt, Ward	New York	Grant	January 9, 1873	January 27, 1882
Harlan, John Marshall	Kentucky	Hayes	December 10 1877	October 14, 1911
Woods, William Burnham	Georgia	Hayes	January 5, 1881	May 14, 1887
Matthews, Stanley	Ohio	Garfield	May 17, 1881	March 22, 1889
Gray, Horace	Massachusetts	Arthur	January 9, 1882	September 15, 1902
Blatchford, Samuel	New York	Arthur	April 3, 1882	July 7, 1893
Lamar, Lucius Quintus C.	Mississippi	Cleveland	January 18, 1888	January 23, 1893
Brewer, David Josiah	Kansas	Harrison	January 6, 1890	March 28, 1910
Brown, Henry Billings	Michigan	Harrison	January 5, 1891	May 28, 1906
Shiras, George, Jr.	Pennsylvania	Harrison	October 10, 1892	February 23, 1903
Jackson, Howell Edmunds	Tennessee	Harrison	March 4, 1893	August 8, 1895

NAME	State App't From	Appointed by President	Judicial Oath Taken	Date Service Terminated
White, Edward Douglass	Louisiana	Cleveland	March 12, 1894	December 18, 1910*
Peckham, Rufus Wheeler	New York	Cleveland	January 6, 1896	October 24, 1909
McKenna, Joseph	California	McKinley	January 26, 1898	January 5, 1925
Holmes, Oliver Wendell	Massachusetts	Roosevelt, T.	December 8, 1902	January 12, 1932
Day, William Rufus	Ohio	Roosevelt, T.	March 2, 1903	November 13, 1922
Moody, William Henry	Massachusetts	Roosevelt, T.	December 17, 1906	November 20, 1910
Lurton, Horace Harmon	Tennessee	Taft	January 3, 1910	July 12, 1914
Hughes, Charles Evans	New York	Taft	October 10, 1910	June 10, 1916
Van Devanter, Willis	Wyoming	Taft	January 3, 1911	June 2, 1937
Lamar, Joseph Rucker	Georgia	Taft	January 3, 1911	January 2, 1916
Pitney, Mahlon	New Jersey	Taft	March 18, 1912	December 31, 1922
McReynolds, James Clark	Tennessee	Wilson	October 12, 1914	January 31, 1941
Brandeis, Louis Dembitz	Massachusetts	Wilson	June 5,1916	February 13, 1939
Clarke, John Hessin	Ohio	Wilson	October 9, 1916	September 18, 1922
Sutherland, George	Utah	Harding	October 2, 1922	January 17, 1938
Butler, Pierce	Minnesota	Harding	January 2, 1923	November 16, 1939
Sanford, Edward Terry	Tennessee	Harding	February 19, 1923	March 8, 1930
Stone, Harlan Fiske	New York	Coolidge	March 2, 1925	July 2, 1941*
Roberts, Owen Josephus	Pennsylvania	Hoover	June 2, 1930	July 31, 1945
Cardozo, Benjamin Nathan	New York	Hoover	March 14, 1932	July 9, 1938
Black, Hugo Lafayette	Alabama	Roosevelt, F.	August 19, 1937	September 17, 1971
Reed, Stanley Forman	Kentucky	Roosevelt, F.	January 31, 1938	February 25, 1957
Frankfurter, Felix	Massachusetts	Roosevelt, F.	January 30, 1939	August 28, 1962
Douglas, William Orville	Connecticut	Roosevelt, F.	April 17, 1939	November 12, 1975
Murphy, Frank	Michigan	Roosevelt, F.	February 5, 1940	July 19, 1949
Byrnes, James Francis	South Carolina	Roosevelt, F.	July 8, 1941	October 3, 1942
Jackson, Robert Houghwout	New York	Roosevelt, F.	July 11, 1941	October 9, 1954
Rutledge, Wiley Blount	Iowa	Roosevelt, F.	February 15, 1943	September 10, 1949
Burton, Harold Hitz	Ohio	Truman	October 1, 1945	October 13, 1958
Clark, Tom Campbell	Texas	Truman	August 24, 1949	June 12, 1967
Minton, Sherman	Indiana	Truman	October 12, 1949	October 15, 1956
Harlan, John Marshall	New York	Eisenhower	March 28, 1955	September 23, 1971
Brennan, William J., Jr.	New Jersey	Eisenhower	October 16, 1956	July 20, 1990
Whittaker, Charles Evans	Missouri	Eisenhower	March 25, 1957	March 31, 1962
Stewart, Potter	Ohio	Eisenhower	October 14, 1958	July 3, 1981
White, Byron Raymond	Colorado	Kennedy	April 16, 1962	June 28, 1993
Goldberg, Arthur Joseph	Illinois	Kennedy	October 1, 1962	July 25, 1965
Fortas, Abe	Tennessee	Johnson, L.	October 4, 1965	May 14, 1969
Marshall, Thurgood	New York	Johnson, L.	October 2, 1967	October 1, 1991
Blackmun, Harry A.	Minnesota	Nixon	June 9, 1970	August 3, 1994
Powell, Lewis F., Jr.	Virginia	Nixon	January 7, 1972	June 26, 1987
Rehnquist, William H.	Arizona	Nixon	January 7, 1972	September 26, 1986*
Stevens, John Paul	Illinois	Ford	December 19, 1975	
O'Connor, Sandra Day	Arizona	Reagan	September 25, 1981	
Scalia, Antonin	Virginia	Reagan	September 26, 1986	
Kennedy, Anthony M.	California	Reagan	February 18, 1988	
Souter, David H.	New Hampshire	Bush	October 9, 1990	
Thomas, Clarence	Georgia	Bush	October 23, 1991	
Ginsburg, Ruth Bader	New York	Clinton	August 10, 1993	
Breyer, Stephen G.	Massachusetts	Clinton	August 3, 1994	

Notes: The acceptance of the appointment and commission by the appointee, as evidenced by the taking of the prescribed oaths, is here implied; otherwise the individual is not carried on this list of the Members of the Court. Examples: Robert Hanson Harrison is not carried, as a letter from President Washington of February 9, 1790 states Harrison declined to serve. Neither is Edwin M. Stanton who died before he could take the necessary steps toward becoming a Member of the Court. Chief Justice Rutledge is included because he took his oaths, presided over the August Term of 1795, and his name appears on two opinions of the Court for that Term.

The date a Member of the Court took his/her Judicial oath (the Judiciary Act provided "That the Justices of the Supreme Court, and the district judges, before they proceed to execute the duties of their respective offices, shall take the following oath . . .") is here used as the date of the beginning of his/her service, for until that oath is taken he/she is not vested with the prerogatives of the office. The dates given in this column are for the oaths taken following the receipt of the commissions. Dates without small-letter references are taken from the Minutes of the Court or from the original oath which are in the Curator's collection. The small letter (a) denotes the date is from the Minutes of some other court; (b) from some other unquestionable authority; (c) from authority that is questionable, and better authority would be appreciated.

[The foregoing was taken from a booklet prepared by the Supreme Court of the United States, and published with funding from the Supreme Court Historical Society.]

*Elevated.

Appendix D

Kentucky DSM Rider

Comparison of Revenue Requirement to Rider Recovery

Residential Programs	(1) Projected Program Costs 7/2004 to 6/2005 (A)	(2) Projected Lost Revenues 7/2004 to 6/2005 (A)	(3) Projected Shared Savings 7/2004 to 6/2005 (A)	(4) Program Expenditures 7/04 through 6/05 (B)	(5) Program Expenditures (C) Gas	(6) Program Expenditures (C) Electric	(7) Lost Revenues 7/04 through 6/05 (B	(8) Shared Savings 7/04 through 6/05 (B	(9) 2004 Reconciliation Gas (D)	(10) 2004 Reconciliation Electric (E)	(11) Rider Collection (F) Gas	(12) Rider Collection (F) Electric	(13) (Over)/Under Collection Gas (G)	(14) (Over)/Under Collection Electric (H)
Res. Conservation & Energy Education	$ 499,800	$ 7,742	$ (8,998)	$ 471,174	$ 296,368	$ 174,806	$ 77	$ (383)			NA	NA	NA	NA
Refrigerator Replacement	$ 100,000	$ 2,848	$ 4,700	$ 53,589		$ 53,589	$ 270	$ 751						
Residential Home Energy House Call	$ 150,000	$ 37,820	$ 81,750	$ 112,147	$ 70,540	$ 41,607	$ 1,205	$ 10,991			NA	NA	NA	NA
Res. Comprehensive Energy Education	$ 81,500	$ -	$ -	$ 76,856	$ 48,342	$ 28,514	$ -	$ -			NA	NA	NA	NA
Home Energy Assistance Plus	$ 75,000	$ -	$ -	$ 28,573		$ 28,573	$ -	$ -						
Power Manager	$ 750,000	$ -	$ 60,000	$ 782,927		$ 782,927	$ -	$ 21,023						
Program Development Funds	$ 140,000	$ -	$ -	$ 88,578	$ 55,715	$ 32,863	$ -	$ -			NA	NA	NA	NA
Energy Star Products	$ 243,000	$ 126,096	$ 51,220	$ -	$ -	$ -	$ -	$ -			NA	NA	NA	NA
Energy Efficiency Website	$ 17,850	$ 9,577	$ 4,195	$ -	$ -	$ -	$ -	$ -			NA	NA	NA	NA
Total	$ 2,057,150	$ 184,083	$ 192,869	$ 1,613,844	$ 470,965	$ 1,142,879	$ 1,552	$ 32,382	$ 1,735,648	$ 585,859	$ 1,800,320	$ 1,989,171	$ 406,293	$ (226,499)

(A) Amounts identified in report filed on September 30, 2004.
(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2004 through June 30, 2005.
(C) Allocation of program expenditures to gas and electric. Uses 62.9% gas based upon saturation of gas space heating.
(D) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.
(E) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.
(F) Revenues collected through the DSM Rider between July 1, 2004 and June 30, 2005.
(G) Column (5) + Column (9) - Column(11).
(H) Column (6) + Column (7) + Column (8) + Column (10) - Column(12).

Commercial Programs	(1) Projected Program Costs 7/2004 to 6/2005 (A)	(2) Projected Lost Revenues 7/2004 to 6/2005 (A)	(3) Projected Shared Savings 7/2004 to 6/2005 (A)	(4) Program Expenditures 7/04 through 6/05 (B)	(5) Lost Revenues 7/04 through 6/05 (B)	(6) Shared Savings 7/04 through 6/05 (B	(7) 2004 Reconciliation (C)	(8) Rider Collection (D)	(9) ((Over)/Under Collection (E)
High Efficiency Program									
Lighting	$ 52,380	$ 17,482	$ 2,874	$ -	$ -	$ -			
HVAC	$ 35,890	$ 6,661	$ 3,647	$ -	$ -	$ -			
Motors	$ 25,169	$ 5,210	$ 6,430	$ -	$ -	$ -			
Other	$ 112,703	$ 74,709	$ 112,207	$ -	$ -	$ -			
Total	$ 225,942	$ 104,062	$ 124,958	$ -	$ -	$ -	$ (1,228,123.00)	$ (811,165)	$ (416,958)

(A) Amounts identified in report filed on September 30, 2004.
(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2004 through June 30, 2005.
(C) Recovery allowed in accordance with the Commission's Order in Case No. 2004-00389.
(D) Revenues collected through the DSM Rider between July 1, 2004 and June 30, 2005.
(E) Column (4) + Column (5) + Column (6) + Column (7) - Column (8)

2006 Projected Program Costs, Lost Revenues, and Shared Savings

Residential Program Summary

Residential - Current Programs/Measures	Costs	Lost Revenues	Shared Savings	Total	Allocation of Costs Electric	Allocation of Costs Gas	Electric Costs	Budget (Costs, Lost Revenues, & Shared Savings) Electric	Budget (Costs, Lost Revenues, & Shared Savings) Gas Costs
Residential Conservation & Energy Education	$ 499,800	$ 1,283	$ (1,340)	$ 498,546	37.1%	62.9%	$ 185,426	$ 185,369	$ 314,374
Refrigerator Replacement	$ 100,000	$ 3,188	$ 2,254	$ 107,548	100.0%	0.0%	$ 100,000	$ 105,442	$ -
Home Energy House Call	$ 150,000	$ 15,771	$ 26,686	$ 269,570	37.1%	62.9%	$ 55,650	$ 98,107	$ 94,350
Residential Comprehensive Energy Education	$ 81,500	$ -	$ -	$ 81,500	37.1%	62.9%	$ 30,237	$ 30,237	$ 51,264
Home Energy Assistance Plus (continuing)	$ 75,000	$ -	$ -	$ 75,000	37.1%	62.9%	$ 27,825	$ 27,825	$ 47,175
Power Manager	$ 750,000	$ -	$ 70,463	$ 810,000	100.0%	0.0%	$ 750,000	$ 820,463	$ -
Program Development Funds	$ 140,000	$ -	$ -	$ 140,000	37.1%	62.9%	$ 51,940	$ 51,940	$ 88,060
Energy Star Products	$ 240,430	$ 126,096	$ 51,220	$ 782,613	100.0%	0.0%	$ 240,430	$ 417,746	$ -
CFL's (Compact Fluorescent Lights)									
Torchieres (Floor lamps)									
Energy Efficiency Web Site	$ 21,493	$ 9,577	$ 4,195	$ 84,537	37.1%	62.9%	$ 7,974	$ 21,746	$ 13,519
Total Costs, Net Lost Revenues, Shared Savings	$ 2,058,223	$ 155,915	$ 153,478	$ 2,367,616			$ 1,449,481	$ 1,758,874	$ 608,742

Small C&I DSM Program Summary

High Efficiency Program	Costs	Lost Revenues	Shared Savings	Total	Allocations Electric	Allocations Gas	Electric Costs	Budget (Costs, Lost Revenues, & Shared Savings) Electric	Budget (Costs, Lost Revenues, & Shared Savings) Gas
Lighting	$ 80,548	$ 36,585	$ 1,959	$ 119,092	100.0%	0.0%	$ 80,548	$ 119,092	NA
HVAC	$ 15,390	$ 1,219	$ (274)	$ 16,335	100.0%	0.0%	$ 15,390	$ 16,335	NA
Motors	$ 6,047	$ 2,828	$ 5,670	$ 14,545	100.0%	0.0%	$ 6,047	$ 14,545	NA
Other	$ -			$ -	100.0%	0.0%	$ -	$ -	NA
Total	$ 101,985	$ 40,632	$ 7,355	$ 149,972			$ 101,985	$ 149,972	

The Union Light Heat and Power Company
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations for 2006 Programs

January, 2006 through December, 2006

	Program Costs (A)
Electric Rider DSM	
Residential Rate RS	$ 1,758,874
Distribution Level Rates DS, DP, DT, GS-FL, EH & SP	$ 149,972
Gas Rider DSM	
Residential Rate RS	$ 608,742

(A) See Appendix D, page 2 of 5.

The Union Light Heat and Power Company
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Billing Determinants

Year	2006
Projected Annual Electric Sales MWH	
Rates RS	1,451,109
Rates DS, DP, DT, GS-FL, EH, & SP	2,285,632
Projected Annual Gas Sales MCF	
Rate RS	7,702,477

Appendix D

The Union Light Heat and Power Company
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations

January, 2006 through December, 2006

Rate Schedule	True-Up Amount (A)	Expected Program Costs (B)	Total DSM Revenue Requirements	Estimated Billing Determinants (C)		DSM Cost Recovery Rider (DSMR)	
Electric Rider DSM							
Residential Rate RS	$ (231,867)	$ 1,758,874	$ 1,527,007	1,451,109	mWh	$ 0.001052	$/kWh
Distribution Level Rates							
DS, DP, DT, GS-FL, EH & SP	$ (426,840)	$ 149,972	$ (276,868)	2,285,632	mWh	$ (0.000121)	$/kWh
Gas Rider DSM							
Residential Rate RS	$ 415,922	$ 608,742	$ 1,024,664	7,702,477	MCF	$ 0.133030	$/MCF
Total Recovery			$ 2,274,803				

(A) (Over)/Under of Appendix D page 1multiplied by 1.0237 for 2005 for the average three-month commercial paper rate to include interest on over or under-recovery.
(B) Appendix D, page 2.
(C) Appendix D, page 4.

Appendix E

The Union Light, Heat and Power Company
1697-A Monmouth Street
Newport, Kentucky 41071

RIDER DSMR

DEMAND SIDE MANAGEMENT RATE

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 75 of this Tariff.

The DSMR to be applied to residential customer bills beginning with the January 2006 revenue month is 0.1052 cents per kilowatt-hour. (R)

The DSMR to be applied to non-residential service customer bills beginning with the January 2006 revenue month for distribution service is (0.0121) cents per kilowatt-hour, and 0.00000 cents per kilowatt-hour for transmission service. (R)

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

Issued: Effective:

Issued by Gregory C. Ficke, President

Appendix F

The Union Light, Heat and Power Company
1697-A Monmouth Street
Newport, Kentucky 41071

RIDER DSMR

DEMAND SIDE MANAGEMENT RATE

The Demand Side Management Rate (DSMR) shall be determined in accordance with the provisions of Rider DSM, Demand Side Management Cost Recovery Rider, Sheet No. 61 of this Tariff.

The DSMR to be applied to residential customer bills beginning with the January 2006 revenue month is 1.33030 cents per hundred cubic feet. (R)

The DSMR to be applied to non-residential service customer bills beginning with the January 2006 revenue month is 0.00 cents per hundred cubic feet.

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

Issued: Effective:

Issued by Gregory C. Ficke, President