APPENDIX F

Final Report

An Evaluation of the Kentucky Small Commercial and Industrial Incentive Program

Results of a Process and Impact Evaluation

July 16, 2007

Prepared for

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Executive Summary

About This Report

This report presents the results of a process and impact evaluation of Duke Energy's Small Commercial and Industrial Incentive Program as it operates in Kentucky. This program provides incentives for commercial and industrial electric customers not on rate TT (Time-of-Day Rate for Service at Transmission Voltage) . The incentives can be applied to new buildings or retrofits, and cover lighting, HVAC and Pumps/Motors. This report presents the results from a process and impact evaluation.

The first section provides the results from the process evaluation. The process evaluation employed in-depth interviews with program design, planning and implementation staff, and short interviews with program participants.

The second section provides findings from the impact evaluation efforts. The impact evaluation employed a tracking system review, engineering review of lighting energy savings calculations, and building energy simulation modeling of typical commercial buildings to estimate the HVAC program savings.

Summary of Findings

An overview of the key findings identified through this evaluation is presented in this section.

Significant Process Evaluation Findings

Program Technologies

The equipment incentivized under the Kentucky C&I Program are selected by a panel of industry experts and reviewed regularly. This practice ensures that the most efficient technologies are covered and incentivized by the program.

Changes in technologies and incentives will bring on customer dissatisfaction, but are necessary as the technologies in the market become more efficient. When the technologies being offered are updated and certain equipment is no longer incentivized, there should be two to three month window for those technologies to remain on the list and be incentivized for those that provide receipts showing that the purchase was made before the equipment was removed from the program.

The Incentives

The incentives are altered according to the suggestions of the industry expert panel and are subject to change, resulting in some participant dissatisfaction when they change. However, this condition cannot be avoided. The incentives are not to exceed 50 percent of the incremental price of the energy efficient equipment. As a result, when changes to the incremental efficiency costs are observed, changes are required in the incentives accordingly.

The participants are generally happy with the level of the incentives, however some participants believe it takes too long for the incentives to be processed. At the current size of the program this is not a substantial problem, however, this issue should be addressed by the program's management. Incentives should be paid quickly to support strong participant satisfaction and encourage participation. If the program expands to serve more customers, it is recommended that additional efforts be implemented to reduce incentive payment durations. Participants report that incentives take from 4 to 8 weeks to obtain, so we recommend changes to the processing process be incorporated into the process to allow payments within two weeks of the receipt of the appropriate applications for non-inspected participants and 4 weeks for inspected participants. We understand that changes to the rebate process are underway. An outside contractor has been hired and beginning March 1, 2007, all checks should be delivered to the customers within 2-3 weeks provided that the applications are accurate and complete.

Program Satisfaction

The participants are satisfied with the program overall, and think it is a great program that provides an extra push to help customers make an energy efficient choice.

Significant Impact Findings

Energy and demand savings from this evaluation exceeded the tracking system estimates and the program planning estimates used by Duke Energy by a significant margin. The differences are due to a combination of data entry errors within the tracking system and differences in the methods used to estimate savings. The gross energy and demand savings estimated by this evaluation are summarized in Table 1 and Table 2 below:

Table 1. Lighting Program Gross Energy and Demand Savings

Savings Basis	Source	kW	kWh
Savings/measure	Planning Estimate		130
	Tracking System	0.12	56
	Evaluation Estimate	0.11	365
Savings/participant	Tracking System	28.5	13,186
	Evaluation Estimate	26.1	86,743

Table 2. HVAC Program Gross Energy and Demand Savings

Savings Basis	Source	kW	kWh
Savings/measure	Planning Estimate		130
	Tracking System	0.16	443
	Evaluation Estimate	0.69	763
Savings/participant	Tracking System	1.3	3,673
	Evaluation Estimate	5.7	6,336

The impact analysis was confounded by several factors that could be improved in the future:

1. **Uncertainty in lighting measure baseline**. The tracking system contained information on lighting fixtures installed, but no data were available on the type of lighting fixtures removed. We made assumptions on the type of fixture removed based on a review of the program engineering documentation. Recording the number and type of fixtures removed within the tracking system will remove this uncertainty. We understand that this information is not always readily available or reliable, but applying some effort in this regard should improve the overall impact estimates in the future.
2. **Ambiguity in measure descriptions**. The lighting measure descriptions in the tracking system for T-8 fluorescent lamps were somewhat ambiguous. Although the lamp type, length and number of lamps per fixture were recorded, the lamp watts were not. Several styles of T-8 lamps with varying input watts are available, and adding a lamp wattage description will better define the specific type of the installed measure.
3. **Lack of building type information.** Lighting and HVAC measure savings calculations rely on an understanding of the building type. We were able to identify the building type from the customer name in most cases, but an additional field indicating the building type or customer SIC or NAICS code would be helpful in making this determination in the future.

Introduction

This report presents the results of a process and impact evaluation of the Small Commercial and Industrial Incentive Program as it is provided in Kentucky. To conduct the process evaluation we interviewed program managers and program participants. To conduct the impact evaluation, we relied on an engineering analysis of information provided in the program tracking system.

Program Description

Duke Energy encourages its business customers to increase the energy efficiency of their facilities through their Commercial and Industrial Energy Efficiency Rebate Program. The equipment rebates provided through this program are available to Duke Energy's Kentucky commercial and industrial customers who are not in rate group TT (Time-of-Day Rate for Service at Transmission Voltage). Eligible products include lighting, HVAC and Motors/Pumps. The energy efficient equipment can be installed in new or existing facilities, however some of the lighting product rebates apply only to retrofit applications (this change to retrofit only application was made on 4/15/06). Customers may, depending on the size of the project, install the equipment themselves, however, those installations have to be inspected by Duke Energy before the rebate is awarded.

Evaluation Methodology

The study methodology consists of the following general parts:

1. A process evaluation in which TecMarket Works surveyed 15 participants from a pool of available Kentucky customers, and an in-depth interview with the program manager.
2. An impact analysis that combined a review of the program tracking system, engineering review of lighting program savings estimates, and building energy simulations of typical buildings to estimate HVAC program savings.

Process Evaluation

The process evaluation included a telephone interview with the Duke Energy program manager and interviews with program participants. The management interview focused on the design, planning, and implementation of the program and a review of the program's goals and objectives. This interview was conducted with Connie Rhodes, Duke's Small Commercial and Industrial Program Manager. Interviews were also conducted with participants, these interviews focused on their participation experiences, satisfaction with the program, the operations of the program and other subjects presented in this report.

The interviews were conducted in January 2007. Both sets of interviews followed formal evaluation interview protocols. These protocols are provided in Appendix A and B of this report and allow the reader to examine the range and scope of the questions addressed during the interviews.

Ninety-six participant interviews were conducted with both Indiana (81) and Kentucky (N=15) participants. The low number of interviews with Kentucky participants is because of the small number of participants in that program, consistent with the current level of the budgeted offerings in that region. The Indiana interviews are discussed in this report in order to compare the two programs and to provide information on programs that are operated with a similar approach. While the two programs are not identical, the differences are minor from a process evaluation perspective. The participants interviewed were randomly selected from the following location/technology groups: Kentucky-HVAC, Kentucky-Lighting, Indiana-Lighting, Indiana-HVAC, and Indiana-Motors. Table 3 below presents the number of participants in each of the five groups, and indicates the number that were randomly targeted from each group. Due to the low numbers of customers in HVAC and Motors, we were unable to obtain the number of interviews planned due to refusals, closed businesses, and personnel changes.

Table 3. Interviewed Participants in the Small C&I Incentive Program

Program	Number of Participants	Target: Number of Interviews, n=100	Conducted: Number of Interviews, n=96
Indiana HVAC	61	15	11
Indiana Lighting	260	61	68
Indiana Motors	7	5	2
Kentucky HVAC	10	8	4
Kentucky Lighting	46	11	11

Energy Impact Evaluation

The impact evaluation used an engineering-based approach to estimate program savings. Separate impact analyses were conducted for the lighting and HVAC components of the program. The evaluation effort consisted of the following steps:

1. Review of program savings estimates developed by Balance Engineering
2. Review of program participation data
3. Review of secondary research relevant to the measures covered under the program
4. Development of building energy simulation models of typical buildings treated under the program
5. Development of revised engineering estimates for lighting and HVAC measures

Engineering review of the lighting program savings involved review of lamp wattage, light output and lamp life assumptions against manufacturers' catalog data. The assumptions regarding the equivalencies between the assumed baseline and efficient lighting fixtures were reviewed. Lighting design and measure applications issues identified during the data review were highlighted. Operating hour assumptions embedded in the program estimates were identified for later comparison to data gleaned from the secondary research review. Engineering review of the HVAC program savings involved a review of the measure baseline efficiency assumptions and measure energy savings calculation methodology. These data were compared to program savings calculations used in other programs in other states through a secondary research review.

The secondary research review focused on program design "workpapers" and other research conducted in support of program design efforts elsewhere in the country. The review incorporated research conducted in support of the California Database for Energy Efficiency Resources (DEER), the Pacific Gas and Electric Company (PG&E) commercial mass markets program, the Southern California Edison Company (SCE) workpapers for their commercial retrofit programs, and the Efficiency Vermont technical reference manual[1]. The research review collected information on lighting system operating hours and coincidence factors by lamp and building type, HVAC baseline efficiency assumptions, and HVAC system equivalent full-load hour data. These data were used to test the assumptions used in the Duke program, as well as to develop data resources for conducting the impact study.

The tracking system review was used to identify the measures and building types covered under the program, thus focusing the scope of the engineering analysis. Tracking system savings estimates were also compared to the program assumptions to identify potential problems with tracking system data entry or data processing algorithms.

The secondary research revealed a lack of sufficient data for estimating HVAC measure impacts with the level of rigor that we would like, therefore detailed impacts were established by using a set of prototypical building models were developed using the DOE-2.2 building energy simulation program. Prototype models were developed for small retail, small office and full service restaurant, covering the building types represented by the HVAC program participants. The prototypes are based on the models used in the California DEER study, with appropriate modifications to adapt these models to local design practices and climate. Energy savings estimates were developed from the prototype models and applied to the HVAC program tracking system to estimate program savings.

The databases received from Duke Energy contained participants from January 2005 through October 2006. Since the program period ended in December 2006, the analysis is based on most but not all of the program participants. Thus, the results are normalized per participant and per measure installed. These results will be applied by Duke Energy to the final participant database to estimate the final program savings.

[1] Efficiency Vermont Technical Reference Manual, Master Manual #4. Measure Savings Algorithms and Cost Assumptions, January, 2003.

Section I: Process Interview Results

A total of ninety-six interviews were conducted with participants of the Small C&I Incentive Program, 15 of which were Kentucky customers. All of the interviewees took part in one or more program offerings. At the time of the evaluation, there was a small sample of Kentucky customers that had completed the full participation process for TecMarket Works to interview.

There are suggestions for improvement for the program discussed in this report, however, the program is meeting its objectives as it is currently operated. In summary, some participants would like to have energy audits made available through the program, or have more program-related contact with their vendors when program offerings are changed or when new technologies are added to the program. The program seems to be experiencing a slow but steady increase in participation. This may be due to marketing and participant networking, to higher energy costs increasing interests in the program, to the falling price of energy efficient technologies relative to the program incentive levels, or a combination of these reasons. The participant population, at this time, is too small to be able to define the exact cause of the increased interest. However, the program managers have noticed the increase. This increase has led to the program being able to process the program's budget allocations to participants. Additional participation will require additional program budgets.

Awareness and Understanding of the Program

All of the Kentucky customers contacted remembered participating in the program. Most of the customers found out about the Program through a brochure mailed by Duke (40%), or from their contractor (33%). Other sources were Duke's web site and word of mouth. Table 4 below presents the responses.

Table 4. Awareness of the Kentucky Small C&I Program

	Number	Percent
Remember Participating	15	100%
How Participants Discovered Program		
Duke brochure	6	40%
Contractor	5	33%
Duke web site	1	7%
Owner of business told me	1	7%
Owner of another business told me	1	7%
Don't recall	1	7%

Over half (60%) of the customers were able to make a participation decision based on the information they received when they first learned about the program, while the other 40 percent had to obtain further information about the program in order to decide to participate. Of the customers that had to find more information, five of them (83%) were able to have their questions answered by visiting the program web site, calling their contractor, or calling Duke Energy. One customer with further questions went to the web site to find more information about the program, but found the information there was too vague and confusing for a "lay person", yet decided to participate without a complete understanding of the program. The other customer with additional unanswered questions could not recall what the specific issue was.

Table 5. Understanding of the Kentucky Small C&I Program

	Number	Percent
The Program Information was Adequate	9	60%
Not adequate: went to web site	3	20%
Not adequate: called contractor	2	13%
Not adequate: called Duke	1	7%
Did you have Questions About the Program that were not Answered?		
Yes	2	13%
No	13	87%

Program Paperwork

The participants themselves filled out the application forms 60 percent of the time, while the others were filled out by their contractors. However, the participants were more likely to submit the forms (73%). All the participants indicated that the program's forms were easy to understand. This finding indicates that at this time, there does not seem to be an issue with the complexity or structure of the participation forms that acts as a barrier to participant understanding of the form's requirements.

Table 6. Participants' Reaction to the Small C&I Program Paperwork

	Number	Percent
Who Filled Out the Forms?		
Participant	9	60%
Contractor	6	40%
Who Submitted the Forms?		
Participant	11	73%
Contractor	4	27%
Were the Forms Easy to Understand?		
Yes	15	100%
No	0	0%

While a participant may understand a form, that does not mean that they are satisfied with its structure, function and use. To help get at satisfaction we asked participants about their satisfaction with the forms. Of the 15 participants interviewed 13 were able to address this question. These participants rated their satisfaction with the forms on a 1 to 10 scale, with 1 meaning very dissatisfied and 10 meaning very satisfied. The mean score from this question is 7.15 indicating acceptance, but some level of dissatisfaction among the participants. The median satisfaction score was 8. Satisfaction scores for this and other aspects of the Kentucky program are covered later in this report.

Program Incentives

We asked the participants about the program's incentives. First, we asked if participants had any problems receiving the incentive. Only three of the 15 (20%) indicated that they had problems. When we asked the participants to explain the problem, the following explanations were provided:

- Our two incentive checks were sent to our old address, one was returned to Duke, but they are now waiting for the second check to be returned before re-processing.
- Duke lost our paperwork.
- We did the remodeling in mid-2005 and put the new equipment in service in 2006. When filling out the application I put 2006 as our date of installation, however, the efficiency level changed in that period and I was no longer eligible to receive the incentive. If I would have put 2005 as the year on the installation I would have received the incentive.

Program Participation

Reasons for Participating

We asked the participants what their primary reason was for their participation decision. Thirty-three percent of the participants indicated that the primary reason for purchasing or upgrading their equipment was for the energy savings. Another 33 percent said the reason for the purchase was because of a remodeling project. Twenty-five percent of the participants indicated that the main reason for the purchase was because it was recommended by their contractor. The other reasons provided relate in one way or another to the project. These responses are presented in Figure 1 below.

We then asked the participants how important the incentive was in the decision to purchase a more energy efficient model. We asked if it was the primary reason, an important reason, one of the reasons but not the most important, one of the reasons but a minor one, or not a reason at all. Forty percent indicated that it was an important reason, and 33 percent indicated that it wasn't a reason at all.

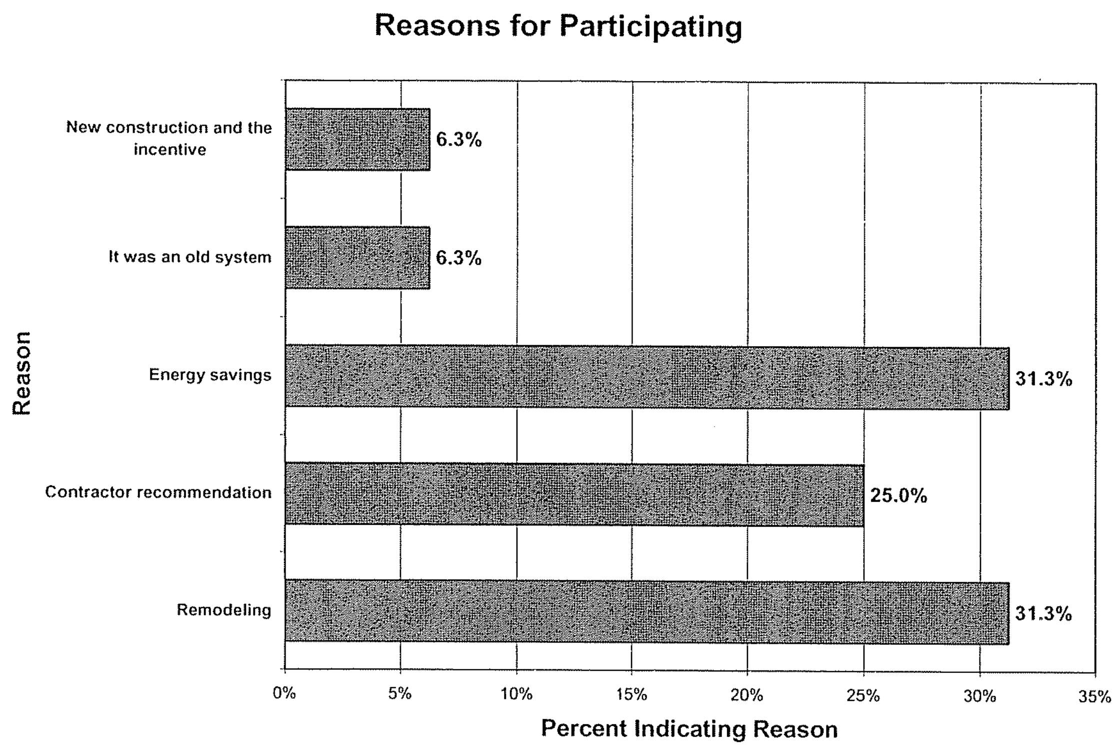

Figure 1. Reasons for Participation

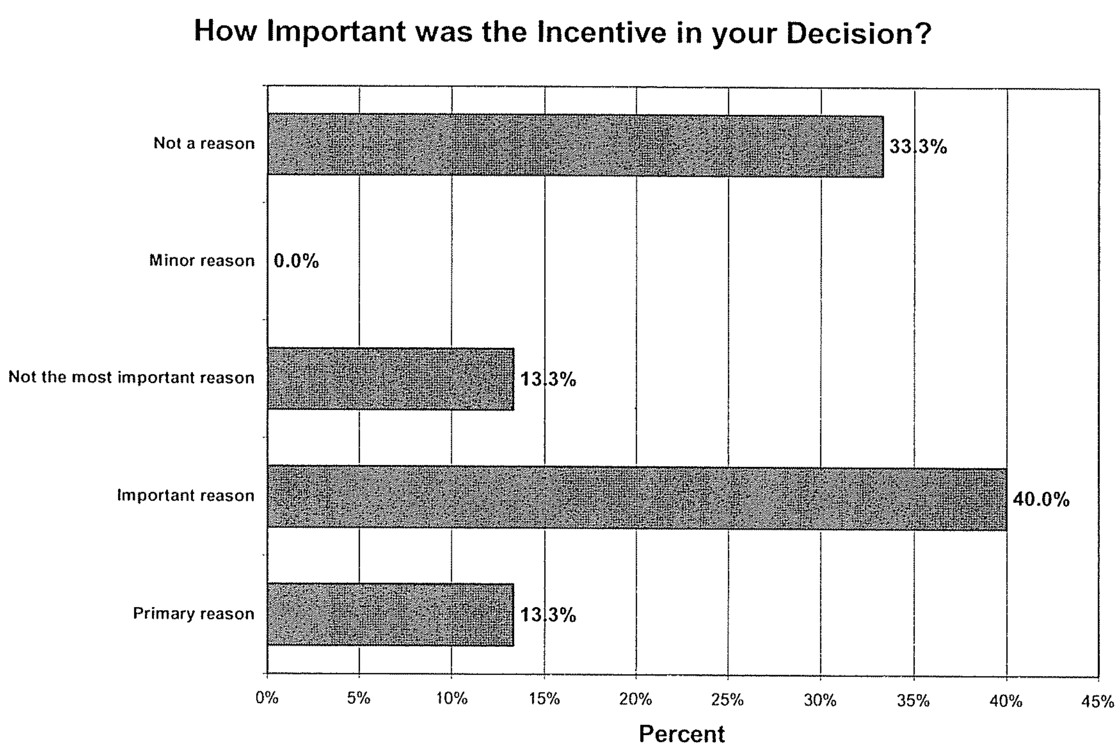

Figure 2. Importance of Incentive in Decision

Other reasons given for the participants deciding to go with the more energy efficient options include:

- Had to fit existing space, and this option fit
- Energy efficient model is cheaper to run
- EPACT credit
- Improved lighting quality
- It makes sense to go as efficient as feasible on new projects
- The lights put out the lumens we wanted, and were high quality
- It was recommended by our contractor

Other Actions (Spillover)

We asked the participants if they had taken any other energy efficiency actions as a result of their experiences with the program. Twenty percent indicated that they had taken other steps towards more energy efficient operations that were in some way influenced by their participation. These included:

- Chalking, sealing and weatherstripping
- replacing lights with energy efficient bulbs
- putting in skylights
- working with other programs, such as KEEPS

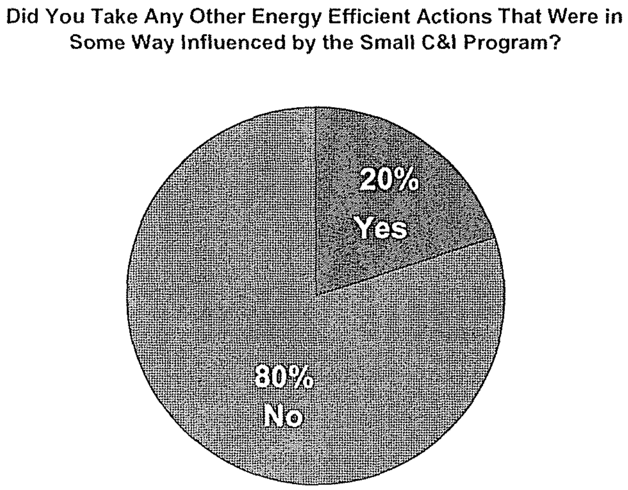

Figure 3. Participants Taking Other Energy Efficiency Actions

Freeridership

Participants were asked a series of questions about why they participated, their intentions before discovering the program, what they would have done if the program were not offered, etc. These and other questions in this section determine the levels of free-ridership with the Kentucky program.

We asked the participants the following question: "*Did you originally plan on purchasing the exact same efficiency level in the equipment you purchased before you knew that there was an incentive offered by Duke Energy*?" The responses to this question indicate that the program is not the motivating factor for these participants to make an energy efficient choice. Most (67%) of the participants said that they had already planned on purchasing the exact same efficiency level before they knew about the program. While we are not suggesting that the freerider rate is 67 percent, (as discussed in the impact section of this report) this strongly suggests that there is a need to focus attention on ways to reduce the level of freeridership. See Figure 4 below.

The next question asked: "*In your decision process, did you search for or consider other less energy efficient equipment that might have cost less*?". The responses to this question confirmed the responses of the previous question, as 73 percent did not consider less energy efficient equipment, indicating that a significant majority of the participants had intended to buy the energy efficient models regardless of the program's objectives (see Figure 5 below).

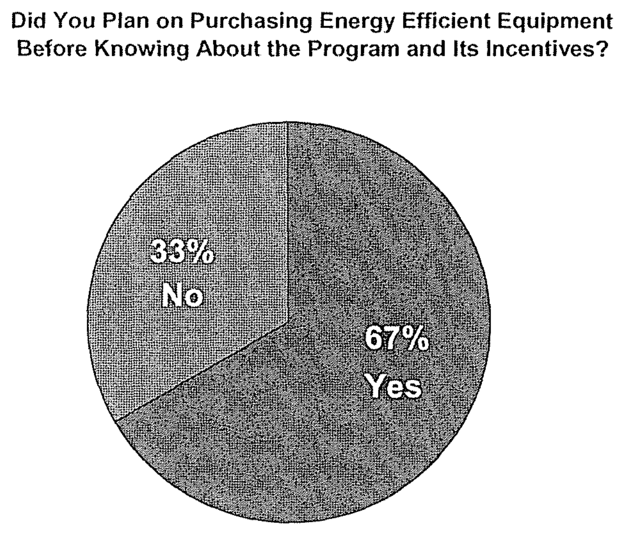

Figure 4. Intended Efficiency Levels Before the Program

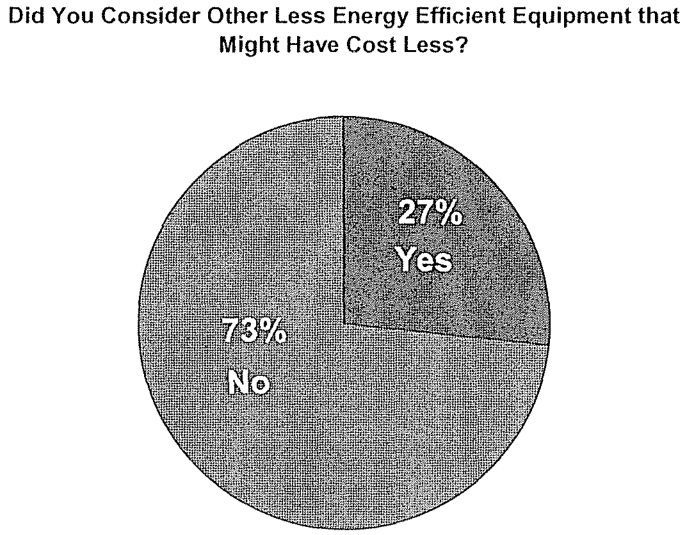

Figure 5. Participants Searching for Less Energy Efficient Options

We also asked the participants if they would have delayed their purchase if the incentives offered through the program would not have been available. The responses to this question reduce the level of free-ridership slightly, because half (47%) said that the project would have been delayed if the incentive was unavailable, meaning that the incentive pushed several participants forward with their energy efficient project. Likewise, some of the participants indicated that they would have never implemented their project without the incentive, or that it would have been delayed indefinitely. The length of delay varied from less than one year to indefinitely (see Figure 6 and Table 7 below).

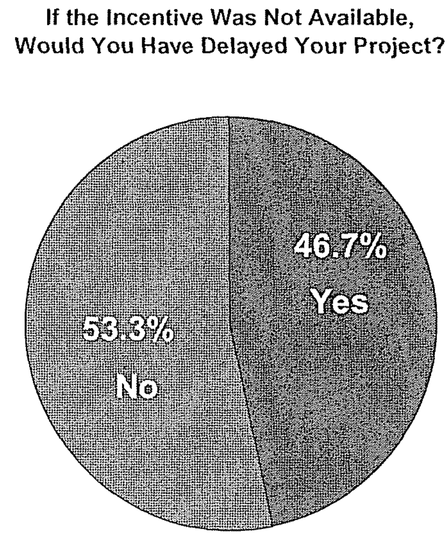

Figure 6. Effects of Incentive on Timing of Project

Table 7. Length of Delay of Project if Incentive Was Not Available

n=	Length of Delay
1	Less than a year
1	1-2 year
2	Don't Know
2	Indefinitely
1	Wouldn't Have Done Project

Calculation of Freeridership

Because the sampling frame within Kentucky alone was not large enough to calculate freerider levels exclusively for Kentucky programs as a stand alone program, we combined the freerider question results from the Kentucky participants with the participants from the Indiana Small Commercial Program evaluation. The Kentucky and Indiana programs are operated in the same way, using the same technologies and rebate levels, and are managed by the same program staff. Together, the two evaluations provided 85 participants who were able to answer the freerider questions to support the analysis.

In calculating freeridership levels we used a per-participant calculation of the influence of the program on their decision to make the change, on the role the incentive played in the decision to go to the high efficiency model, and the amount of delay that would have occurred to the upgrade without the incentive. We informed this analysis by the responses to the questions on whether or not the participant searched or considered equipment of lower efficiency and the reason for upgrading to the high efficiency equipment. As in all freerider analysis this process requires the application of professional judgment because typically from 20 to 40 percent of the participants give responses that are not consistently logical. For example, customers will say that they that they originally planned on buying the same level of efficiency, and then respond that the incentive was important to their decision to go to the energy efficient model. In cases where the responses appear contradictory we gave a partial credit to the program for helping to speed the project forward when the incentive was important in that timing. For these reasons the approach for estimating freeridership is controversial within the evaluation community, with many top-of-the-field evaluation professionals agreeing that it is an inexact and problematic science. However, the use of a partial credit is a standard practice in the freerider estimation process and is used in all evaluation approaches.

Using this approach we provided the following credits based on the responses received:

Type of participant	Credit provided to the program for driving the energy efficient decision	Number of respondents in group
Before hearing about the program did not originally plan on going with the energy efficient equipment and the rebate was a reason for the decision.	100	33
Had originally planned on the same efficiency level, but the rebate was a reason and the project would have been delayed without it	75	9
Not sure if they considered the same equipment at first, but the rebate was a reason for going forward with the project with or without a delay	75	8
Did not originally plan on the energy efficient equipment before hearing about the program incentive, but said the incentive had no effect on their final decision	50	2
Had originally planned on going with the same equipment, but said the incentive was a reason for the choice, but did not speed the project forward	25	15
Planned on the same equipment, the incentive had no effect, did not speed the project.	0	29
Calculated freerider level	Average .50	N=85

Using the distributions presented above, the average freerider rate for this program is 0.50. This means that it is estimated that somewhat less than half of the energy saved would have been saved even if the program had not provided the incentives to the participants. While the field of evaluation has no reliable approach for estimating freeridership, our professional judgment suggests that the rate for this program is in the .4 to .6 range and can be assumed to be from 45 to 55 percent as currently implemented. Within the field of evaluation, freerider rates for these types of programs range from a low of 25 to 30 percent for programs with enrollment screeners that refuse participation to customers who say they are going to take the same actions, to a high of 60 to 65 percent for programs that allow open enrollment. Duke's program holds a position about mid-point in the range of expected values. However this rate indicates that there is a need to educate both customers and equipment contractors and trade allies that the program's incentives are to be provided only to the customers that will not take the energy efficient choice without the incentive.

We also point out that the above freerider estimate is not adjusted to account for spillover. As with most purchase decisions, the decisions that are considered to be successful or correctly made are often repeated by the same decision makers. For example, if a participant has two facilities and takes the action because of the program in one of the facilities, that same individual is likely to take the same action in the second facility with or without the program. Thus, program spillover, or the replications of actions taken via the program, often offset the freerider rate and act to increase the net energy impacts associated with a program. When we asked participants what additional actions they took at their facilities because of the information provided by the program, about 35 percent of the respondents indicated that they took one or more actions (see Other Actions – Spillover section of this report). While the calculation of the savings from the other program-influenced actions is beyond the scope of this study, these actions act to increase the savings from the program. As a result, while the freerider rate for this program is estimated at 0.47, the net rate, once the freerider rate is adjusted for spillover, appears to be in the .20 to .30 range. Again, this estimate is beyond the scope of this study.

Contact with Duke Energy

Almost half of the participants had to contact Duke at some point during their participation experience. Of the participants that contacted Duke for program information or clarification, 43 percent did not think their questions or needs were handled effectively by Duke Energy. However, a review of the comments indicate that the problem may not rest in the communication approach, but with the processes used for processing rebates. Never-the-less, this data indicates that it may be necessary to monitor the communications between Duke and the program participant to determine if there is a communication issue that needs to be addressed. Because of the small sample size and the nature of the comments, these data should not be considered conclusive of an issue that needs to be resolved, yet when 43 percent of interviewees indicate that they do not think Duke handled their issues effectively there is cause for concern over why these were not handled effectively.

Often times vendors would call in and ask for exceptions to be made to the rules for different measures (different configurations, different technologies) and they would get very frustrated with managers when they were told that this is a prescriptive, not a customized program. There was a lot of frustration with the "first come- first served" but program managers have since implemented a "reservation" process driven by the number of applications we received and the amount of the incentives.

	Number	Percent
Participant Contacted Duke		
Yes	7	47%
No	8	53%
Were your Questions Effectively Handled?		
Yes	4	57%

No	3	43%

The reasons for their dissatisfaction with the responses are:

- Duke answered my questions with vague responses
- The incentive should be sent within a month, takes too long now
- Still waiting for my incentive check, takes too long, it's a mess
- It would be better if the incentive check was sent within 2 months, it takes too long
- Duke needs to fully explain the reasons for changes in efficiency levels

Increasing Participation

We asked the participants for ways in which Duke Energy could increase interest and participation in the program. The most popular response received centered around a suggestion to increase the incentive levels. Thirty-nine percent of the participants provided this response. Fifteen percent had other suggestions including:

- Provide energy audits through the program
- Eliminate $50,000 cap so you get bigger projects
- Provide potential customers with objective case studies to support claims
- Decrease the amount of paperwork involved, speed up the process, takes too long

The program manager interviewed in this study suggested that increasing the marketing efforts would result in an increase the levels of participation. This is something that should be assessed to identify cost effective ways to market the program. For example, other programs use bill inserts to their commercial customers, presentations and discussions with trade ally groups, presentations and discussions with contractors and business partners, advertising or public service announcements in trade journals, case stories in business publications, journals, industry newsletters, industry awards ceremonies, etc. etc. Duke should explore these potential avenues to see which marketing efforts are cost effective and can be developed within the programs management and marketing budgets.

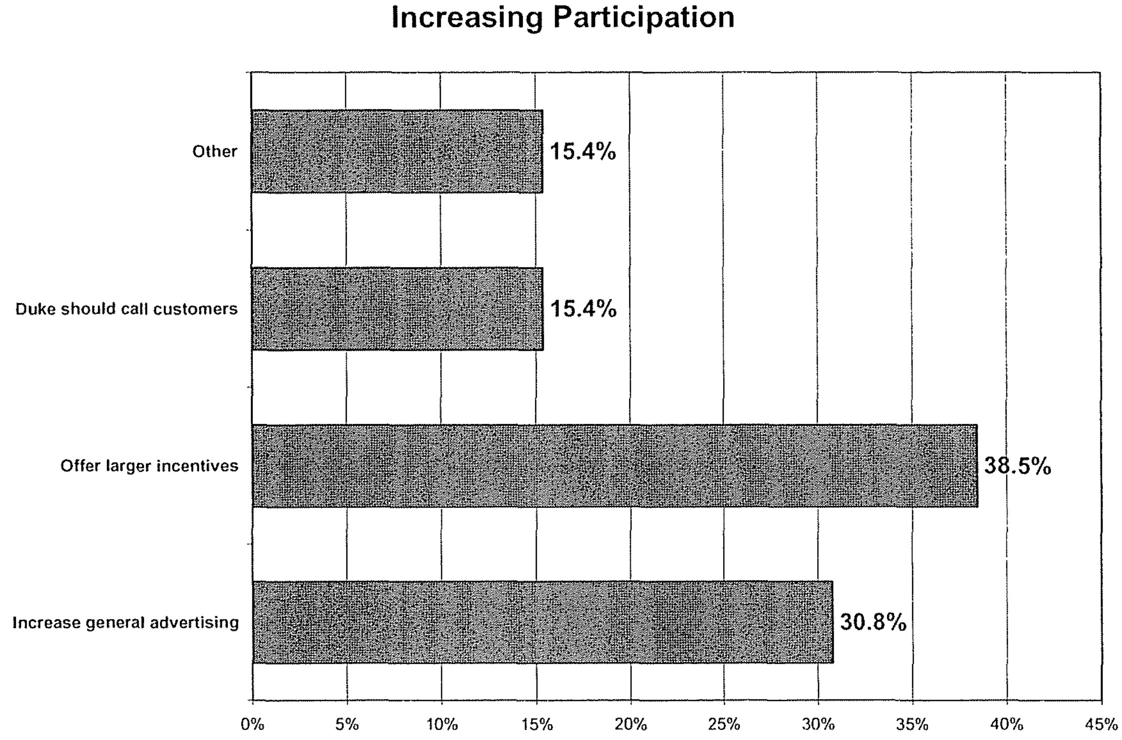

Figure 7. Suggestions for Increasing Participation

Program Satisfaction

We asked the participants about their satisfaction with various program components. We asked them to rate their satisfaction on a 10-point scale with 1 meaning they were very dissatisfied and 10 meaning they were very satisfied. If a participant scored any of the aspects with a score of 8 or lower, we asked the participant how that aspect could be improved. The program overall received an average score of 7.42 and a median score of 8. This indicates that the program has some areas in which at least half the participants are, to some degree, dissatisfied with some component of the program. Dissatisfaction with a program impacts the level of support that participants can provide to the program. This in-turn impacts the most effective information dissemination method by which word of the program spreads in a market – peer-networking. If 50 percent of the participants in some way are dissatisfied with a program, that program cannot be expected to ever have strong demand. Each of the program aspects that contractors voices some level of dissatisfaction with are discussed below. The contractor's satisfaction scores are provided in Figure 8.

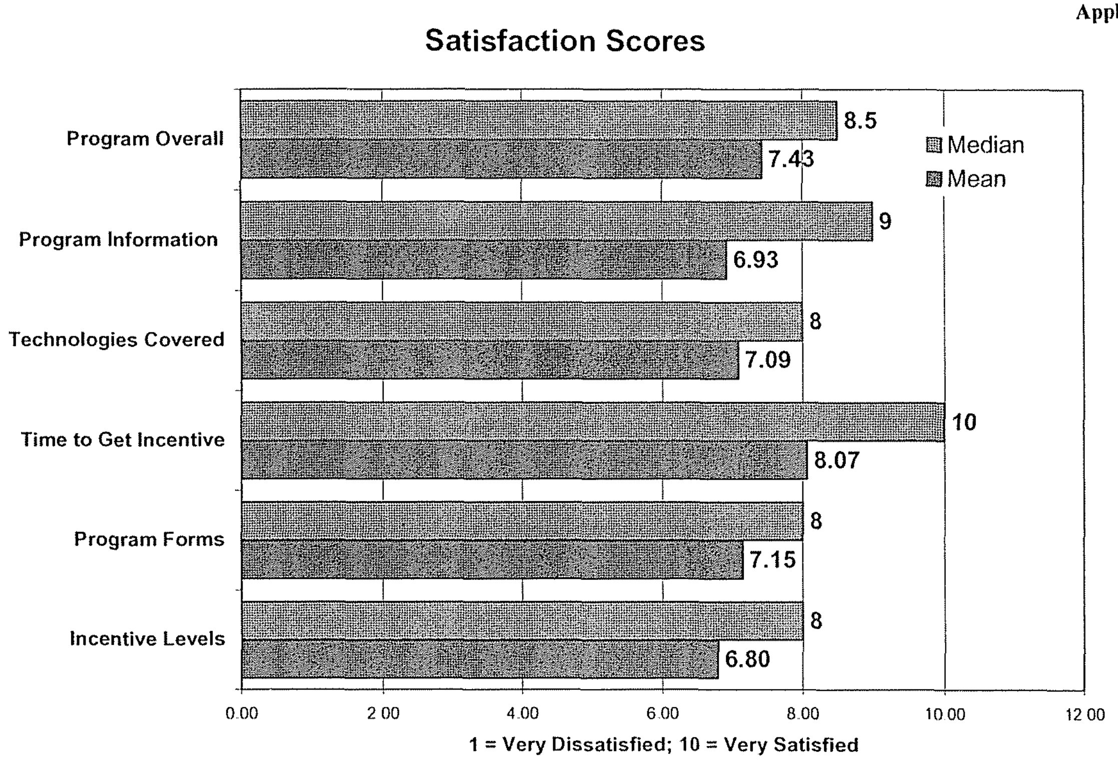

Figure 8. Program Satisfaction Scores

Incentive Levels

The incentive levels are set by a panel of industry experts and are limited to rebate no more than 50 percent of the incremental equipment cost difference between the standard efficiency model and the high efficiency model. This differential is set by policy. When prices change, the advisors review the typical equipment cost and the appropriate changes to the incentives are made so that the 50 percent level is maintained.

The median satisfaction score for the incentive levels is 8, meaning that half of the respondents scored their satisfaction with the incentive levels at 8 or above and the other half scored less than eight. However, the mean score for the incentive levels is 6.80. This data means that while most participants scored the incentive level higher, a few were significantly dissatisfied with the incentive to provide a significantly lower score. This somewhat low mean-score can be explained by the participants' comments on how to improve satisfaction with the incentive amount. These comments are:

- remove the $50,000 incentive cap so more energy can be saved
- the incentive was cut in half from the time we viewed the web site [and decided to participate] and the time we talked to someone [about the rebate amount]
- the incentives decreased to covering 25 percent of added cost [rather than 50 percent]
- they [incentives] were cut in the middle of the project
- too much program hassle for the amount of money we received

- too much time to participate and too little incentive
- my installation no longer qualified because it was installed in 2005, but instead started in 2006 [even thought our participation decision was made in 2005]. The program changed in the middle of our process

While a few participants indicated that the incentive levels are too low compared to the effort it takes to be a participant, others participants stated that they were dissatisfied because of the changes that took place during the time of their participation (see above comments).

Program Forms

Satisfaction with the program forms received a median score of 8, and a mean score of 7.14. These scores indicate that while the forms were not an issue for most of the participants, for a few the forms presented challenges. The reasons given for the scores 8 or lower are below.

- some of it was confusing to me, had to ask the electrician to get some of the answers
- they are not written for the lay person to understand
- more explanations are needed for the technologies covered and the participation and incentive requirements
- I had to resend the forms, the first copies I sent were lost by Duke

Time to Get Incentive

Over half (53%) of the participants gave the time it took to receive the incentive check from the time they submitted with the forms with a 10, indicating very strong satisfaction with the time to get paid. The mean score provided by the participants is 8.07, also a good score. However, the distance between the 10 score and the mean score is almost a full two points, indicating that there is some significant level of dissatisfaction with a subset of the participants. Those that gave a score of 8 or lower provided the following comments:

- it should only take 2-3 weeks to get the check
- they need to send us the incentive within a month
- I am still waiting for the payment, it's a mess
- Payment in less than 2 months would be better

While most customers are very satisfied with the payment periods, the frequency of these comments in relationship to the small sample size suggests that there is a need to monitor these periods to determine if there is a process issue. The small sample size of this study precludes definitive conclusions, but the fact that there are a several participants who are not receiving payments in what they consider to be a reasonable period suggest that attention be placed into determining if there is a process issue and if so, how it can be solved.

Technologies Covered

The technologies covered by the program are determined by a panel of industry experts, and the participants seem satisfied with the options available. The changes in technologies that are rebated are needed in order to keep the participants moving towards increasing efficiency. However, given the current estimate of 50 percent free ridership, it is likely that the number and/or type of appliances and equipment incented should be reviewed and updated once more.

Participants scored their satisfaction with the technologies covered by the program with a mean score of 7.09 and a median score of 8. These are reasonable technology satisfaction scores. It is not unusual to find some level of dissatisfaction with the technologies or with the program's conditions relating to the technologies. However, one of the responses is more about the efficiency level change than the technology itself. Two of the low scores were provided by participants who felt that their equipment should have been covered by the program, and in one case, the exact model and efficiency was covered in 2005 when she purchased it, but not covered when she installed it. This goes back to the issue of timing, which is discussed earlier in this report. While this participant is not talking about changes in the incentive level, but rather the dropping of a covered technology from a decision that was made when the technology was covered. These conditions damage the reputation of the programs if they are not well structured with plenty of advanced notice provided to match the business decision cycle. Other comments received included:

- include more lights - some were the same fixtures but not included (T8 was limited to 6 bulbs, they needed 8-bulb)

Program Information

The level of satisfaction with the program information provided received a low mean satisfaction score of 6.93, however, this aspect also received a high median score of 9, again indicating that most participants were very satisfied and a few participants were not satisfied. Comments received include:

- keep the web site's program language simple
- materials are too complicated for the general public

What Works

The program's web site is a good tool that allows customers to see what technologies are covered by the program and identify the incentives levels at the time the examination is made. The web site has the most up-to-date information available on the program and is the least expensive method of providing the information to a large number of customers. As a result, the program should continue to encourage customers to visit the site to learn more about the program and current program offerings. Expanded use of the web site can help eliminate the problem of incentive and technology changes. That is, the web site can be structured to post the changes months before they become active. At the same time the program promotional materials should instruct customers to check the web site for the most up-to-date information on what technologies are covered and the incentive levels.

Another effective promotional approach rests in the technology vendors and contractors that can tell their customers about the program. If the vendors and contractors are kept current on program operations they can pass the information on to their customers. Vendors and contractors need to be encouraged to check the web site for current information when they deal with their customers. To help ensure that the vendors are keeping up with the program's operations and changes, they are required to apply to Duke to be listed as a program vendor every 18 months and become exposed to the program's current information. They are also encouraged to help the customers with the applications to help reduce application error rates. This information, provided by the program manager, linked to the participant comments may indicate that the application forms may need to be adjusted to help the "typical" customer deal with the application process. Discussions with the program manager indicate that vendors and contractors are able to provide more accurate application forms because they are used to dealing with the equipment and are more familiar with the application terminology.

We asked the participants to tell us what they thought worked well, and provided them an opportunity to say what they liked most about the program. Their responses are listed below:

- it's an effective tool for helping to install more costly equipment that will save businesses money in the long run (3 responses)
- the program helps shorten the payback period (2 responses)
- the program provides an extra push to make the right choice, it gave us confidence that it would work and save us money
- it provided us with a financial incentive in exchange for Duke getting energy savings
- gave us another incentive to save energy (3 responses)
- gives us money-back on our upgrades

What Doesn't Work

We also asked the participants what they thought did not work well. We received about half as many responses to this question than to the question of what worked well. The following responses were provided by participants:

- the incentive cap is too low (2 responses)
- [not] getting the incentive check as promised by Duke
- not enough people know about the program
- nobody would give me accurate incentive information, I spent 5 hours of my time to get a $34 incentive check
- the decrease in the incentives did not help

- too much paperwork required from us

We also asked the program manager what changes are needed to the program operations and management. The managers noted that the program is working reasonably well for the available resources and staff time. The manager noted that the program was managed and staffed by two people and that the staffing was recently reduced to a single individual, however, a subcontractor has been hired to assist Duke Energy with the program.

Section II: Energy Impact Analysis and Findings

Overview of Impact Evaluation Approach

The impact evaluation used an engineering-based approach to estimate program savings. Separate impact analyses were conducted for the lighting and HVAC components of the program. The evaluation effort consisted of the following steps:

1. Review of program savings estimates developed by Balance Engineering
2. Review of program participation data
3. Review of secondary research relevant to the measures covered under the program
4. Development of building energy simulation models of typical buildings treated under the program
5. Development of revised engineering estimates for lighting and HVAC measures

Program Savings Calculation Review

Measure savings estimates used by Duke Energy for program planning purposes were developed by Cascade Engineering. Savings estimates were developed for the following lighting and HVAC measures:

- **Compact Fluorescent Lamps (CFL).** This measure category covers replacement of incandescent lamps with screw-in compact fluorescent lamps in standard incandescent fixtures and installation of compact fluorescent fixtures utilizing compact fluorescent lamps with integral ballasts. Energy savings estimates were developed for eight different CFL sizes ranging from 5 watts to 42 watts.

- **Linear fluorescent lamps (T-5 and T-8).** This measure category covers replacement of fixtures with T-12 lamps and magnetic ballasts with efficient fixtures utilizing T-5 lamps or T-8 lamps and electronic ballasts. The T-5 measure category contains 14 specific measures developed from combinations of 2, 3 and 4 lamp fixtures with 4 foot normal light output and high output (HO) lamps. The T-8 measure category contains 28 specific measures developed from combinations of 2, 3 and 4 lamp fixtures with 2, 4 and 8 foot normal and HO lamps.

- **Light tubes.** This measure category addresses installation of light tubes (also know as daylight pipes or tubular skylights). These devices capture natural light through a dome-shaped skylight on the roof and channel it down through an internal reflective system to the building interior. At the ceiling level, a diffuser resembling a recessed lighting fixture spreads the light evenly to the designated space. During daylight hours a photocell or control system shuts off a conventional 400-watt probe-start metal halide fixture in response to the availability of natural light.

- **High Bay Fluorescent and Pulse Start HIDs.** This measure category covers the use of high bay fluorescent and pulse-start metal halide fixtures as a replacement for 400-

watt probe-start metal halide fixtures. Four specific measures are covered: a 4 lamp high output T-5 fixture, a 6 lamp normal light output T-8 fixture, an 8 lamp compact fluorescent fixture with 42 watt CFLs, and a 320 watt pulse-start metal halide fixture.

- **LED Exit Signs.** This measure category covers replacement of incandescent and CFL exit signs with energy efficient LED exit signs.

- **Packaged HVAC systems.** This measure category covers the upgrade of standard efficiency packaged HVAC systems with high efficiency units. The program addresses single package rooftop air conditioners and heat pumps, split system air conditioners and heat pumps, packaged terminal air conditioners and heat pumps, and ground source and water loop heat pumps in a variety of size ranges. The program baseline is defined by the National Appliance Energy Conservation Act (NAECA) minimum efficiency for single phase equipment and ASHRAE 90.1 – 2004 minimum efficiency for three phase equipment.

The measure savings estimates for each of these measure categories were reviewed by energy engineers and lighting designers at Architectural Energy Corporation. The review comments are listed below:

Compact Fluorescent Lamp Measure Review Comments

Light output. The energy savings estimates are based on replacement of standard incandescent lamps with compact fluorescent lamps at an equivalent level of light output. Lumen output is generally consistent between incandescent and the CFL equivalents, but diverges at the higher wattage end. The 150W and 200W incandescent lamps put out 18 percent more initial lumens than their CFL equivalents. (See Figure 9, below.)

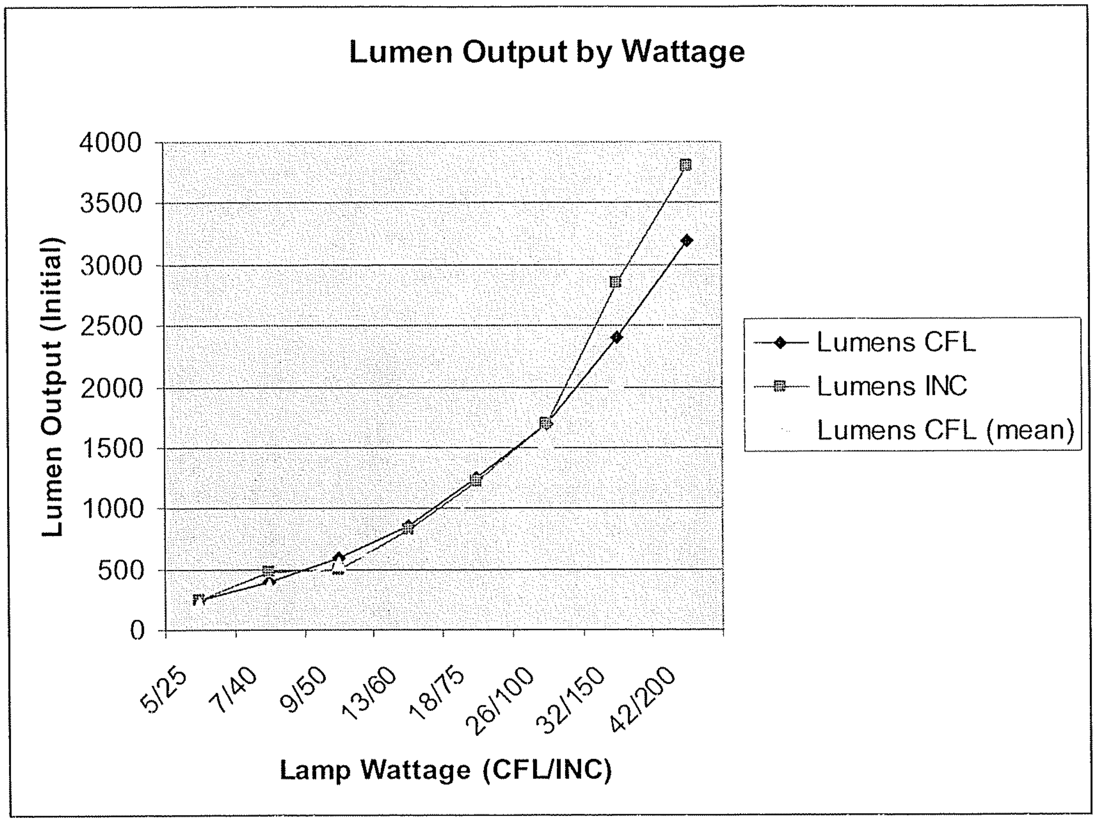

Figure 9: Lamp Lumen output by Wattage[2]

When one considers *mean lumens* instead of initial lumens, there is between an 8 percent and 39 percent decrease in output between the incandescent lamp and the replacement compact fluorescent lamp, again with the disparity increasing with the higher wattages. There is no clear alternative to better match the lumen output differences at the upper end of the wattage range, either. The 42W lamp has been the highest-wattage lamp available in the compact fluorescent line for some time. Philips recently released a 57W lamp, but the mean lumens are significantly *higher* than the 200W incandescent, and as brand-new technology, facilities managers may be reluctant to adopt this product.

Lamp life. The lamp life for incandescent lamps is a reasonable average between the commonly-used "long life" and regular incandescents; CFL lamp life is accurate and consistent with industry sources.

Lighting design issues. In general, we have a concern about the way the program is pushing the higher wattage CFLs as screw-in replacements for incandescent lamps. In our view, the higher the lamp wattage, the higher potential for glare. The higher wattage incandescent lamps tend to be significantly larger than their CFL replacements, with higher mean operating lumens. As a result, high-wattage screw-in replacements tend to be improperly shielded in fixtures designed for incandescent sources. Additionally, the

[2] Lumen figures derived from 2006 Philips lamp catalog for typical lamps for each wattage

luminaire efficiency generally suffers, as the "luminous centers" of the lamps are different.

Fixture watts and measure kW savings. The screw in CFL and incandescent lamp wattage assumptions are quite reasonable. The hardwired CFL measure does not take into account the additional ballast loads that will be incurred; wattage savings are still directly compared lamp-to-lamp. We recommend revising the fixture watts and energy savings assumptions to include ballasts losses in these fixture types.

Annual Operating Hours. Program savings estimates are developed for two operating hour assumptions – a minimum level of 1800 hours per year and a typical commercial building assumption of 4160 hours per year. The typical operation assumes lighting system operation for 16 hours per day, 5 days per week, 52 weeks per year. Naturally, the lighting system operating hours vary by building type and lamp application. As is evident from the secondary research review, 4160 hours per year is on the high end of most commonly accepted estimates of lighting operating hours.

Linear Fluorescent Lamp Measure Review Comments

Measure Baseline. The baseline fixture assumes a 34W T-12 lamp, however the *basest* baseline lamp for this fixture and application is the 40W T-12, which is still commercially available. Additional energy savings will result when upgrading from a 40W T-8 system, thus the savings estimates used by the program are conservative.

T-8 lamp types and ballast factors. There are additional T-8 lamp types available beyond the lamp wattages covered in the program calculations. There is a trend in the lighting industry to treat lamps and ballasts as a "system," thus a particular lamp may perform differently depending on the ballast used in the fixture.

Lighting Design Issues. Given the large increase in light output with the newer system, consideration should be given to the potential for overlighting the retrofit spaces. A T-8 rather than a T-5 solution may make more sense to realize some energy savings while better matching the existing designed luminous environment. Philips offers a range of 4' T-8 lamp wattages to balance energy savings with light output. For example, their "Energy Advantage" product comes as a 25W T-8, which produces 2280 mean lumens -- the same light output as the 34W T-12 current baseline system. This solution would use roughly the same energy at the proposed T-5 system, but with a light output that is better matched to the baseline. It can be argued that in some environments, "more is not better". Another consideration is that the T-5HO is proposed to replace two-lamp T-12 fixtures in one case. This could become an issue if there was any stepped switching scheme employed, as the T-5HO solution utilizes a single lamp.

Luminaire Efficiency. There is a wide range of fixtures that could utilize the lamp and ballast combinations offered under the program, with an attendant wide range in luminaire efficiencies. While this does not affect energy savings per se, there could be significant impacts on the amount of light delivered to the task plane. Typically, T-12 luminaires are utilitarian fixtures such as open reflector striplights and troffers with 100 percent direct components (i.e. no indirect, uplight component, to the distribution). These typically range in efficiency from between 92-75 percent (the lower efficiency fixtures being the lensed variety). Luminaires for T-5 and T-8 lamps are available in direct/indirect versions with efficiencies as low as 40 percent. Perhaps a lower limit on luminaire efficiency should be included in the measure specification.

Lamp Life. Rated lamp life estimates are in line with manufacturer's data.

Fixture watts and measure kW savings. The fixture wattage assumptions for the lamp and ballast combinations presented are quite reasonable and consistent with industry sources.

Light Tubes Measure Review Comments

Based on the program participation data received from Duke Energy, light tube measures were not adopted by program participants. Therefore, we did not do an extensive analysis of this measure. However, we do offer the following general comments on the measure savings calculations.

Energy Savings Estimates. The light tube analysis assumes 13,900 lumens as the average output, but this is more appropriate for sunnier climates such as those found in Colorado. Energy savings from light tubes (a.k.a. tubular skylights) is difficult to quantify, as output data only exists for a few select cities. The nearest cities to the Duke Energy territory that have tubular skylight data are Chicago, IL and St. Louis MO. The use of climate-driven performance numbers for cities that are potentially far from the retrofit site makes these savings numbers somewhat dubious.

Measure Installation Issues. There are certainly practical issues associated with the tubular skylight retrofit scenario. Because these units need an interface between the roof and the ceiling, and because the tubes must be as straight as possible to limit efficiency losses, a successful retrofit can be difficult in an existing plenum that was not designed with the skylights in mind. Efficient, uniform skylight lens layouts may be difficult or impossible given the realities of typical plenum spaces.

The success of this strategy is highly dependent on proper design and execution of the tubular skylight additions. Since this is not a simple one-for-one swap, some thought must be applied to the layout of the skylights. Since the spacing criteria is different for the skylights than it is for the luminaires, this adds complexity to the design of the layout.

Measure Cost Assumptions. The cost assumption is reasonable for the unit itself, but the complexity of the installation can vary widely, so the actual installed cost is a large variable in this strategy. Also, for energy savings to be realized, a photosensor needs to be ties into the lighting system so that the metal halide fixtures get turned off when the tubular skylights are delivering adequate light. This does not appear to be accounted for in the analysis.

High Bay Fluorescent and Pulse-start HID Measure Review Comments

Fixture watts and lumen equivalents. We are in agreement with the Balance Engineering analysis of the fixture wattage and equivalent lumen output.. The 16 percent decrease in lumen output of the 4 lamp T-5 HO retrofit scenario is most likely acceptable for most applications, but the 28 percent decrease in lumen output in the 6 lamp 32W T-8 scenario is not.

Lighting Design. The T-5 and T-8 luminaire/lamp measures have different physical characteristics. These high bay fluorescent fixtures are large-footprint, area sources, whereas the pulse-start metal halide sources they are replacing in a retrofit application are more like the point sources. This may have implications regarding the original design intent.

Measure Baseline. The most probable alternate baseline fixtures other than 400 watt metal halide likely to be found in this scenario are low pressure sodium, high pressure sodium, and mercury vapor. These lamps have varying efficacies and therefore different wattages would be found for the 400W Metal halide baseline scenario. Depending on the lamp type replaced, a significant *increase* in energy use could result.

LED Exit Sign Measure Review Comments

The input power assumptions for the standard and energy efficient exit sign systems are fair, conservative averages. There is a range of system input power available under the general description of "LED Exit sign". The range is from 1.3 - 5.0 watts, according to our research. Four watts is a good average for these systems.

HVAC Measure Review Comments

Energy and demand savings calculations for HVAC measures developed by Balance Engineering were reviewed. The savings calculations covered single package rooftop air conditioners and heat pumps, split system air conditioners and heat pumps, packaged terminal air conditioners and heat pumps, and ground source and water loop heat pumps in a variety of size ranges. The program baseline was defined by the National Appliance Energy Conservation Act (NAECA) minimum efficiency for single phase equipment and ASHRAE 90.1 – 2004 minimum efficiency for three phase equipment. The equipment covered, the size ranges, and the program baseline efficiency assumptions are shown in Table 8.

Table 8. HVAC Equipment Baseline Efficiency Assumptions

Equipment Category	Capacity Range Btu/hr	Baseline Efficiency		Source
		SEER	EER	
Packaged Terminal A/C	All		10	ASHRAE 90.1-2004
Packaged Terminal HP	All		10	ASHRAE 90.1-2004
Unitary A/C (1) phase	<65,000 1 Ph	13		NAECA
Unitary A/C (3) phase	<65,000 3 Ph	12		ASHRAE 90.1-2004
Unitary A/C (3) phase	65,000 - 135,000		10.1	ASHRAE 90.1-2004
Unitary A/C (3) phase	135,000 - 240,000		9.5	ASHRAE 90.1-2004
Unitary A/C (3) phase	240,000 - 760,000		9.3	ASHRAE 90.1-2004
Unitary A/C (3) phase	>760,000		9	ASHRAE 90.1-2004
Unitary HP (1) phase	<65,000 1 Ph	13		NAECA
Unitary HP (3) phase	<65,000 3 Ph	12		ASHRAE 90.1-2004
Unitary HP (3) phase	65,000 - 135,000		9.9	ASHRAE 90.1-2004
Unitary HP (3) phase	135,000 - 240,000		9.1	ASHRAE 90.1-2004
Unitary HP (3) phase	>240,000		8.8	ASHRAE 90.1-2004
Rooftop A/C (1) phase	<65,000 1 Ph	13		NAECA
Rooftop A/C (3) phase	<65,000 3 Ph	12		ASHRAE 90.1-2004
Rooftop A/C (3) phase	65,000 - 135,000		10.1	ASHRAE 90.1-2004
Rooftop A/C (3) phase	135,000 - 240,000		9.5	ASHRAE 90.1-2004
Rooftop A/C (3) phase	240,000 - 760,000		9.3	ASHRAE 90.1-2004
Rooftop A/C (3) phase	>760,000		9	ASHRAE 90.1-2004
Rooftop HP (1) phase	<65,000 1 Ph	13		NAECA
Rooftop HP (3) phase	<65,000 3 Ph	12		ASHRAE 90.1-2004
Rooftop HP (3) phase	65,000 - 135,000		9.9	ASHRAE 90.1-2004
Rooftop HP (3) phase	135,000 - 240,000		9.1	ASHRAE 90.1-2004
Rooftop HP (3) phase	>240,000		8.8	ASHRAE 90.1-2004
Ground Source HP Closed Loop	<135,000 & 59 F EWT		16.2	ASHRAE 90.1-2004
Ground Source HP Closed Loop	<135,000 & 77 F EWT		13.4	ASHRAE 90.1-2004
Water Source Heat Pump	<17,000		11.2	ASHRAE 90.1-2004
Water Source Heat Pump	17,000 - 65,000		12.0	ASHRAE 90.1-2004
Water Source Heat Pump	65,000 - 135,000		12.0	ASHRAE 90.1-2004

Energy savings estimates per HVAC unit were developed based on difference the baseline and as-installed unit efficiency and the unit size. A representative unit was selected for each size range, and an estimate of the typical annual cooling load and cooling kWh consumption at a variety of efficiency levels was developed. Savings were estimated by subtracting the cooling kWh at the baseline efficiency assumption from the cooling kWh at the installed measure efficiency.

An estimate of the annual equivalent cooling full load hours was developed from the program assumptions. The results of these calculations are summarized in Table 9.

Table 9. HVAC Annual Cooling Load Assumptions by Unit Size

Typical Building	Unit size (ton)	Total cooling load (kBtu/yr)	Equivalent Full-load Cooling hours
1	1	17,139	1,428
2	5	41,355	689
3	10	113,804	948
4	20	227,608	948
5	25	438,026	1,460
6	65	1,206,401	1,547

As is evident from the table above, the equivalent full-load hour estimates vary according to unit size. In general, equivalent full load hours are a function of building type and operating schedule, HVAC system type and control, and climate. Estimating equivalent full load cooling hours by building type may be more representative than by unit size alone.

Secondary Research Review

Secondary research review was conducted to obtain estimates of engineering parameters used in the energy savings calculations. The secondary research review focused on program design "workpapers" and other research conducted in support of program design efforts elsewhere in the country. The review incorporated research conducted in support of the California Database for Energy Efficiency Resources (DEER), the Pacific Gas and Electric Company (PG&E) commercial mass markets program, the Southern California Edison Company (SCE) workpapers for their commercial retrofit programs, and the Efficiency Vermont (EVT) technical reference manual. The research review collected information on lighting system operating hours and coincidence factors by lamp and building type, HVAC baseline efficiency assumptions, and HVAC system equivalent full-load hour data. These data were used to test the assumptions used in the Duke program, as well as to develop data resources for conducting the impact study.

Lighting Operating Hours

Review of lighting operating hour assumptions in the literature showed a wide variety of average lighting operating hours across the different types of commercial buildings. A summary of the assumptions used by various groups across the country, along with our best judgment on a representative value for use in this study is shown in Table 10.

Table 10. General Lighting Operating Hours by Building Type

Building Type	PG&E	SCE	EVT	DEER	Evaluation Assumption
Assembly				3164	3164
Education - Community College	3,792	3,900	5,010	2180	3,846
Education - Primary School	1,440	2,150	2,080	1579	1,440
Education - Secondary School	2,305	2,150	2,080	1666	2,305
Education - University	3,073	3,900	5,010	2172	3,487
Grocery	5,824	5,800	4,612	4081	5,812
Health/Medical - Hospital	8,736	4,400	4,532	6229	8,736
Health/Medical - Nursing Home	8,736	4,400	4,532	3817	8,736
Lodging – Guest Room	8,736	5,500	2,697		8,736
Lodging - Hotel	8,736	5,500	2,697	6971	8,736
Lodging - Motel	8,736	5,500	2,697	4754	8,736
Lodging- Blend	8,736	5,500	2,697		8,736
Manufacturing - Light Industrial	2,860	4,400	2,235	2730	2,548
Office - Large	2,808	4,000	3,435	4006	3,414
Office - Small	2,808	4,000	3,435	3025	3,414
Process Industrial	2,860	6,650	2,235		6,650
Restaurant - Fast-Food	6,188	4,600	4,156	6348	6,188
Restaurant - Sit-Down	4,368	4,600	4,156	3366	4,375
Retail - 3-Story Large	4,259	4,450	3,068	3221	4,355
Retail - Single-Story Large	4,368	4,450	3,068	3981	4,409
Retail - Small	4,004	4,450	3,068	3094	4,227
Storage - Conditioned	2,860	3,550	2,388	3695	2,624
Storage - Unconditioned	2,860	3,550	2,388	3695	2,624
Warehouse - Refrigerated	2,600	3,550	2,388	3379	2,494
Other		4500	2278		3,389

Appropriate values for CFL operating hours in commercial buildings has been the subject of intense study recently, especially in California. Traditionally, programs have not assigned different operating hours to CFLs verses general lighting systems. Due to the importance of CFLs in commercial program energy savings portfolios, specific operating hour assumptions for both screw-in and hardwired CFLs have been developed. A summary of the literature on screw-in and hard-wire CFL operating hours is presented in Table 11 and Table 12. These data are shown along with our best judgment on appropriate operating hour assumptions for this study.

Table 11. CFL Hard-wired Fixture Operating Hour Assumptions

Building Type	PG&E	SCE	EVT	Evaluation Assumption
Education - Community College	3,792	3,900	5,010	3,846
Education - Primary School	1440	2,150	2,080	1,440
Education - Secondary School	2,305	2,150	2,080	2,305
Education - University	3,073	3,900	5,010	3,487
Grocery	5,824	5,800	4,612	5,812
Health/Medical - Hospital	8,736	4,400	4,532	8,736
Health/Medical - Nursing Home	8,736	4,400	4,532	8,736
Lodging – Guest Room	8,736	5,500	2,697	8,736
Lodging - Hotel	8,736	5,500	2,697	8,736
Lodging - Motel	8,736	5,500	2,697	8,736
Lodging- Blend	8,736	5,500	2,697	8,736
Manufacturing - Light Industrial	2,860	4,400	2,235	2,548
Office - Large	2,808	4,000	3,435	3,414
Office - Small	2,808	4,000	3,435	3,414
Process Industrial	2,860	6,650	2,235	6,650
Restaurant - Fast-Food	6,188	4,600	4,156	6,188
Restaurant - Sit-Down	4,368	4,600	4,156	4,375
Retail - 3-Story Large	4,259	4,450	3,068	4,355
Retail - Single-Story Large	4,368	4,450	3,068	4,409
Retail - Small	4,004	4,450	3,068	4,227
Storage - Conditioned	2,860	3,550	2,388	2,624
Storage - Unconditioned	2,860	3,550	2,388	2,624
Warehouse - Refrigerated	2,600	3,550	2,388	2,494
Other		4500	2278	3,389

Table 12. CFL Screw-in Lamp Operating Hour Assumptions

Building Type	PG&E	SCE	EVT	Evaluation Assumption
Assembly				
Education - Community College	3,792	3,900	5,010	3,846
Education - Primary School	1,440	2,150	2,080	1,440
Education - Secondary School	2,305	2,150	2,080	2,305
Education - University	3,073	3,900	5,010	3,487
Grocery	5,824	5,800	4,612	5,812
Health/Medical - Hospital	8,736	4,400	4,532	8,736
Health/Medical - Nursing Home	8,736	4,400	4,532	8,736
Lodging -- Guest Room	1,145	5,500	2,697	1,145
Lodging - Hotel	8,736	5,500	2,697	8,736
Lodging - Motel	8,736	5,500	2,697	8,736
Lodging- Blend	3,675	5,500	2,697	3,675
Manufacturing - Light Industrial	2,860	4,400	5,913	5,157
MF Housing	1278			1278
Office - Large	2,739	4,000	3,435	3,391
Office - Small	2,492	4,000	3,435	3,309
Process Industrial	2,860	6,650	5,913	6,282
Restaurant - Fast-Food	6,188	4,600	4,156	6,188
Restaurant - Sit-Down	3,444	4,600	4,156	4,067
Retail - 3-Story Large	4,259	4,450	3,068	4,355
Retail - Single-Story Large	4,368	4,450	3,068	4,409
Retail - Small	3,724	4,450	3,068	4,087
Storage - Conditioned	2,860	3,550	2,388	2,624
Storage - Unconditioned	2,860	3,550	2,388	2,624
Warehouse - Refrigerated	2,600	3,550	2,388	2,494
Other		4500	2278	3,389

Summer coincident diversity factors (CDF) have been developed by PG&E and SCE for their commercial programs. This factor is defined as the ratio of the connected lighting load that is on during the summer peak hour to the total connected lighting load. The values used by the California utilities are derived from load research studies that examined hourly commercial building lighting load by building type, and the coincidence of lighting use with the utility peak period. A summary of these data is shown in Table 13.

Table 13. Lighting Coincident Diversity Factors for PG&E and SCE

Building Type	CDF
Church	0.76
College	0.68
Community Center	0.76
Elem/Middle School	0.42
hotel/motel	0.67
Industrial	0.99
Medical Office	0.81
Multifamily	0.67
Office	0.81
Police/Fire	1
Restaurant	0.68
Retail	0.88
University	0.68
Warehouse	0.84
Other/DK	0.76

HVAC equivalent full load hour (EFLH) and coincident diversity factor assumptions were also researched. Equivalent full load hours are defined as the ratio of the total annual consumption (Btu) to the peak cooling load (Btu/hr). In some contexts, this is also defined as the annual cooling electricity consumption (kWh) divided by the peak cooling demand (kW). Strictly speaking, differences between the HVAC system efficiency under seasonal average and peak conditions make these different definitions incompatible. Cooling equivalent full-load hours are highly influenced by local climate, building operating schedule, building design, HVAC system design and controls, making it difficult to transfer data from different parts of the country. However, it is useful to examine full load hour assumptions from various utilities as an overall reasonableness check against the assumptions used in the Duke program. The coincident diversity factor also estimates the fraction of the total connected HVAC load that is running during the utility peak period. A compilation of the cooling EFLH used in the PG&E and SCE program is shown in Table 14.

Table 14. PG&E and SCE Equivalent Full Load Cooling Hours for HVAC Technologies

Building Type	Equivalent Full-Load Cooling Hours	HVAC CDF
Office	1,000	0.87
Retail	800	0.85
University	1,200	0.73
School	500	0.24
Grocery	600	0.83
Restaurant	1,300	0.86
Health Care/Hospital	1,900	0.89
Hotel/Motel	700	0.77
Warehouse	300	0.8
Process Industrial	800	0.75
Assembly Industrial	2,100	0.75
All Other	1,200	0.78

The Efficiency Vermont commercial programs use EFLH assumptions based on HVAC system type, not building type. Since heating is an important end-use in Vermont, both heating and cooling EFLH data have been developed. These data are shown in Table 15.

Table 15. Efficiency Vermont Equivalent Full Load Cooling Hours for HVAC Technologies

HVAC System Type	Equivalent Full-load Cooling Hours	Equivalent Full-load Heating Hours
Split system and single package rooftop A/C units	800	
Split system and single package rooftop heat pumps	800	1600
Packaged terminal A/C	830	
Packaged terminal heat pumps	830	1640
Water source heat pumps	2088	2248

In the Efficiency Vermont programs, the summer coincident diversity factor is set to 0.36, and the winter coincident diversity factor is set to 0.372.

Tracking System Review

Lighting and HVAC program participation records covering the period from January, 2005 through October, 2006 were obtained from Duke Energy. The data, delivered as a series of Excel spreadsheets, contained customer name and address, installing vendor contact information, measure descriptions, unit energy savings estimates, number of measures installed, rebate amounts, and so on. Separate spreadsheets were obtained for lighting and HVAC measures. These data were examined to identify which of the measures promoted by the program were adopted by program participants and in what numbers, how the energy savings in the tracking system compared to the program savings estimates, and the availability of any customer description data that could be used in the analysis.

Lighting program participation

The lighting program tracking system showed lighting measures installed in a total of 47 buildings. Since some installations were done in multiple buildings owned by the same company, a total of 41 individual companies participated in the program. Customer name and address data were used to assign a building type to each customer in the database. In most cases, the customer name was recognizable (e.g. a national chain). In other cases, customer name and address information was searched over the internet to determine the building type. The building type and number of participants by building type are show in Table 16.

Table 16. Lighting Program Participation by Building Type

Building Type	Count
Church	1
College	1
Community Center	1
Elem/Secondary School	4
Grocery	1
Industrial	8
Medical Office	1
Office	4
Other/DK	1
Restaurant	1
Retail	17
University	2
Warehouse	5
Total	47

The types and quantity of measures installed are shown in Table 17.

Table 17. Lighting Measures Installed Under Program

Measures Installed	Measure Group	Count
CFL 26W HARDWIRED	CFL hard-wire	16
CFL 5W HARDWIRED	CFL hard-wire	12
CFL 7W HARDWIRED	CFL hard-wire	6
CFL 13W SCREW-IN	CFL screw in	131
CFL 18W SCREW-IN	CFL screw in	93
CFL 26W SCREW-IN	CFL screw in	156
CFL 32W SCREW-IN	CFL screw in	210
CFL 42W SCREW-IN	CFL screw in	53
CFL 5W SCREW-IN	CFL screw in	80
LED Exit Signs	Exit sign	340
T-5 HO 4 ft 4 lamp high bay	High Bay	1,049
T-8 4 ft 6 lamp high bay	High Bay	4,072
T-5 - 4 ft 4 lamp 28W	Linear Fluorescent	5
T-5 HO 4 ft 1 lamp 54W	Linear Fluorescent	95
T-8 2 ft 1 lamp	Linear Fluorescent	9
T-8 2 ft 2 lamp	Linear Fluorescent	360
T-8 3 ft 1 lamp	Linear Fluorescent	26
T-8 3 ft 2 lamp	Linear Fluorescent	5
T-8 4 ft 1 lamp	Linear Fluorescent	341
T-8 4 ft 2 lamp	Linear Fluorescent	1,671
T-8 4 ft 3 lamp	Linear Fluorescent	374
T-8 4 ft 4 lamp	Linear Fluorescent	1,920
T-8 8 ft 2 lamp	Linear Fluorescent	121
T-8 8 ft 2 lamp HO	Linear Fluorescent	15

Energy and demand savings estimates were provided for each measure in the tracking system. The watts saved per fixture by fixture type in the tracking system matched the values recommended in the Balance Engineering reports. The 4 foot T-8 lamp measure description in the database is not complete, since there are a variety of T-8 lamp wattages available, including 28W, 30W and 32W T-8 lamps. The database wattage savings estimates indicated that 30W T-8 lamps were assumed to be installed.

Several of the database entries showed no kWh savings, presumably due to data entry errors. The equivalent full load hours for measures with energy savings varied from 4800 to 5400 hours per year, with the exception of exit signs, which were based on 8760 hours per year. Based on the secondary literature research review, the lighting full load hour estimates used in the database are high for most building types, and exceeded the values recommended by Balance Engineering.

HVAC program participation

The HVAC program tracking system showed measures installed in a total of 10 buildings. Customer name and address data were used to assign a building type to each customer in the database. In most cases, the customer name was recognizable (e.g. a national chain). In other cases, customer name and address information was searched over the internet to determine the building type. The building type and number of participants by building type are show in Table 18.

Table 18. HVAC Program Participants by Building Type

Building Type	Number
Office	2
Full Service Restaurant	2
Retail	6
Total	10

HVAC unit make and model number were also provided in the tracking system database. These data were used to assign an equipment type, cooling capacity and cooling efficiency to each unit in the database. A combination of manufacturers' catalog data and the Air-conditioning and Refrigeration Institute (ARI) searchable database was used to assign these data.

The HVAC units installed under the program included packaged terminal heat pumps, packaged terminal air conditioners and rooftop air conditioners. The number and size range of the measures installed are summarized in Table 19.

Table 19. Type of HVAC Equipment Installed Under the Program

Unit type	Size Range	Number installed
Packaged terminal air conditioner	All sizes	2
Packaged terminal heat pump		35
Rooftop air conditioner	< 5.4 tons	15
	5.4 tons – 11.25 tons	10
	11.25 tons – 17.5 tons	21

Unit kW and kWh savings data were included in the database. From these data, the equivalent full-load cooling hours for each unit were inferred. The estimated cooling full load hours ranged from about 2300 to 3100 hours, which are substantially higher than the estimates in the Balance Engineering calculations.

Summary of Energy Savings

The energy savings calculations and program savings results for the lighting and HVAC programs are summarized as follows:

Lighting Gross Energy and Demand Savings

Energy and demand savings estimates were developed for each measure in the database using the following engineering equations:

$$kW_{savings} = \sum_{i}^{buildings} \sum_{j}^{measures} units_{i,j} \times kWsaved_j \times CDF_i$$

$$kWh_{savings} = \sum_{i}^{buildings} \sum_{j}^{measures} units_{i,j} \times kWsaved_j \times FLH_{i,j}$$

where:

units	= quantity of each measure installed in each building type
kWsaved	= unit kW savings for each measure
CDF	= coincident demand factor by building type
FLH	= full load lighting hours by measure and building type

The unit kW savings assigned to each lighting measure are shown in Table 20.

Table 20. Lighting Fixture Wattage Savings Assumptions

Measure	Unit kW savings	Notes
CFL 13W SCREW-IN	0.047	
CFL 18W SCREW-IN	0.057	
CFL 26W HARDWIRED	0.073	Hardwired CFL savings revised to reflect ballast losses
CFL 26W SCREW-IN	0.074	
CFL 32W SCREW-IN	0.118	
CFL 42W SCREW-IN	0.158	
CFL 5W HARDWIRED	0.016	Hardwired CFL savings revised to reflect ballast losses
CFL 5W SCREW-IN	0.020	
CFL 7W HARDWIRED	0.030	Hardwired CFL savings revised to reflect ballast losses
LED Exit Signs	0.013	
T-5 - 4 ft 4 lamp 28W	0.024	
T-5 HO 4 ft 1 lamp 54W	0.015	
T-5 HO 4 ft 4 lamp high bay	0.212	
T-8 2 ft 1 lamp	0.010	
T-8 2 ft 2 lamp	0.002	
T-8 3 ft 1 lamp	0.011	
T-8 3 ft 2 lamp	0.010	
T-8 4 ft 1 lamp	0.016	F30T8 savings used per database
T-8 4 ft 2 lamp	0.019	F30T8 savings used per database
T-8 4 ft 3 lamp	0.034	F30T8 savings used per database
T-8 4 ft 4 lamp	0.040	F30T8 savings used per database
T-8 4 ft 6 lamp high bay	0.231	
T-8 8 ft 2 lamp	0.020	
T-8 8 ft 2 lamp HO	0.050	

The lighting full-load hours and coincident diversity assumptions were developed from the secondary research described in the previous section. These data were applied to each measure according to the measure type and building type.

The lighting program gross energy and demand savings were summed across all entries in the database, and normalized on a per-measure and per-program-participant basis. The estimates embedding in the program tracking system, the savings estimated by this evaluation, and the estimates used by Duke Energy for program planning purposes are compared in Table 21.

Table 21. Lighting Program Gross Energy and Demand Savings

Savings Basis	Source	kW	kWh
Savings/measure	Planning Estimate		130
	Tracking System	0.12	56
	Evaluation Estimate	0.11	365
Savings/participant	Tracking System	28.5	13,186
	Evaluation Estimate	26.1	86,743

Since the evaluation is based on partial participation data for 2006, the total program savings will be calculated by Duke Energy from these averages applied to the final program tracking database. Note, the demand savings estimates from the evaluation match quite well with the tracking system estimates. However, the energy savings estimates vary substantially, due to apparent errors in the tracking system noted above.

The energy and demand savings were also tabulated by measure group for the partial database. These results are shown in Table 22.

Table 22. Lighting Program Gross Energy and Demand Savings by Measure Group

Measure group	Measures installed	Total kWh savings	Average kWh savings per measure	Total kW savings	Average kW savings per measure
CFL hardwired	34	4,231	124.	1	0.033
CFL screw-in	723	180,067	249.	39	0.054
Exit	340	38,719	114	4	0.011
High Bay	5,121	3,503,784	684.	1,071	0.209
Linear Fluorescent	4,942	350,109	71	110	0.022

Note, the high bay fixture measure group accounted for the majority of the lighting installations and energy savings for this set of participants.

HVAC Gross Demand and Energy Savings

Secondary research conducted for this evaluation did not reveal any reliable sources of data for estimating cooling full load hours. Thus, a series of prototype building energy simulation models were developed for the building types served under the program. The prototypical simulation models were derived from the California Database for Energy Efficiency Resources (DEER) study, with adjustments make for local building practices and climate. A description of each prototype simulation model follows.

Small Retail Prototype

A prototypical building energy simulation model for a small retail building was developed using the DOE-2.2 building energy simulation program. The characteristics of the small retail building prototype are summarized in Table 23.

Table 23. Small Retail Prototype Description

Characteristic	Value
Vintage	Existing (1970s) vintage
Size	6400 square foot sales area 1600 square foot storage area 8000 square feet total
Number of floors	1
Wall construction and R-value	Concrete block with brick veneer, R-11
Roof construction and R-value	Wood frame with built-up roof, R-19
Glazing type	Single pane clear
Lighting power density	Sales area: 3.4 W/SF Storage area: 0.9 W/SF
Plug load density	Sales area: 1.2 W/SF Storage area: 0.2 W/SF
Operating hours	10 – 10 Monday-Saturday 10 – 8 Sunday
HVAC system type	Packaged single zone, no economizer
HVAC system size	Sales floor: 240 SF/ton Storage area: 380 SF/ton
Thermostat setpoints	Occupied hours: 76 cooling, 72 heating Unoccupied hours: 81 cooling, 67 heating

A computer-generated sketch of the small retail building prototype is shown in Figure 10.

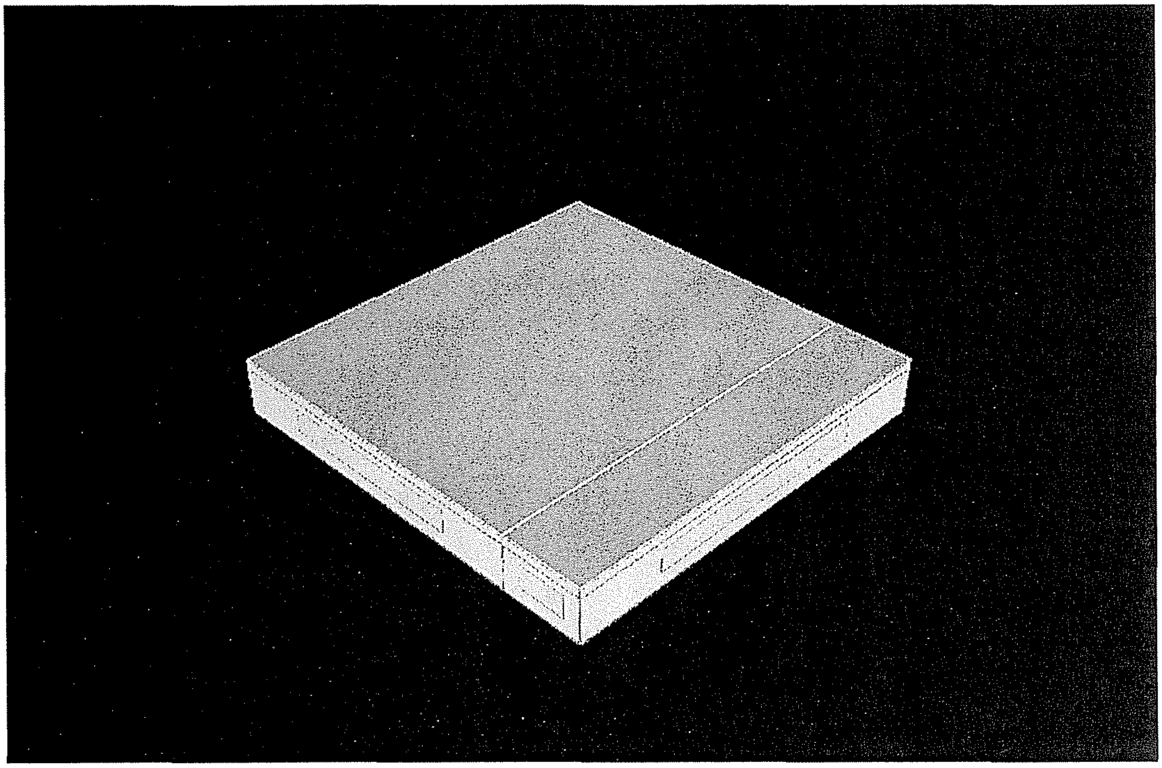

Figure 10. Small Retail Prototype Building Rendering

The energy performance of the prototypical building was simulated using long term average weather data for Covington, Kentucky. Savings were estimated for a representative high efficiency option corresponding to a set of HVAC system type and size combinations. The energy and demand savings were normalized per ton of cooling capacity. The results of the simulation runs are shown in Table 24.

Table 24. Small Retail Demand and Energy Savings

HVAC System Type and Size	Base Efficiency	Measure Efficiency	Demand savings (kW/ ton)	Energy savings (kWh/ton)
AC <65,000 1 Ph	13	14	0.078	73.9
AC <65,000 3 Ph	12	13	0.058	55.4
AC 65,000 - 135,000	10.1	11	0.081	76.1
AC 135,000 - 240,000	9.5	11	0.142	134.9
AC 240,000 - 760,000	9.3	10	0.074	70.7
AC >760,000	9	10	0.110	104.4
HP <65,000 1 Ph	13	14	0.078	113.1
HP <65,000 3 Ph	12	13	0.058	67.8
HP 65,000 - 135,000	9.9	11	0.081	126.2
HP 135,000 - 240,000	9.1	10	0.142	141.0
HP >240,000	8.8	10	0.074	176.4

Full-service Restaurant Prototype

A prototypical building energy simulation model for a full-service restaurant was developed using the DOE-2.2 building energy simulation program. The characteristics of the full service restaurant prototype are summarized in Table 25.

Table 25. Full Service Restaurant Prototype Description

Characteristic	Value
Vintage	Existing (1970s) vintage
Size	2000 square foot dining area 600 square foot entry/reception area 1200 square foot kitchen 200 square foot restrooms
Number of floors	1
Wall construction and R-value	Concrete block with brick veneer, R-11
Roof construction and R-value	Wood frame with built-up roof, R-19
Glazing type	Single pane clear
Lighting power density	Dining area: 1.7 W/SF Entry area: 2.5 W/SF Kitchen: 4.3 W/SF Restrooms: 1.0 W/SF
Plug load density	Dining area: 0.6 W/SF Entry area: 0.6 W/SF Kitchen: 3.1 W/SF Restrooms: 0.2 W/SF
Operating hours	9am -- 12am
HVAC system type	Packaged single zone, no economizer
HVAC system size	Dining area: 150 SF/ton Entry area: 90 SF/ton Kitchen: 220 SF/ton Restrooms: 190 SF/ton
Thermostat setpoints	Occupied hours: 77 cooling, 72 heating Unoccupied hours: 82 cooling, 67 heating

A computer-generated sketch of the full-service restaurant prototype is shown in Figure 11.

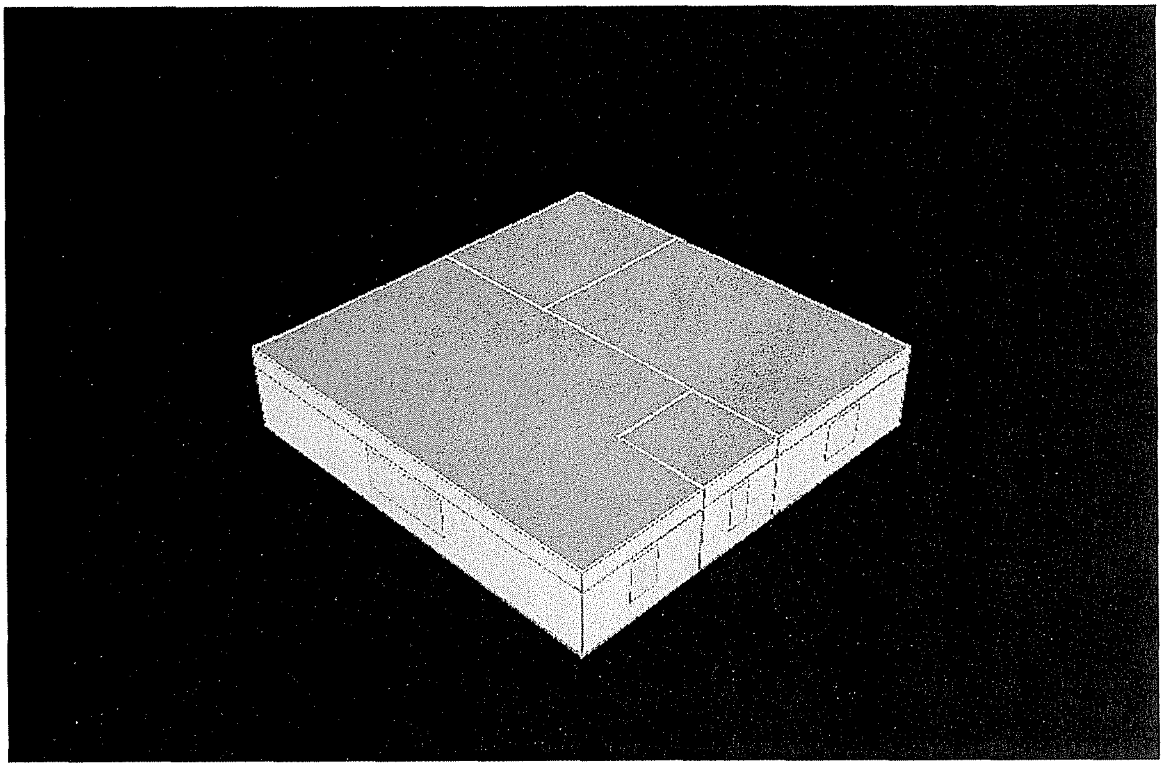

Figure 11. Full Service Restaurant Prototype Rendering

The energy performance of the prototypical building was simulated using long term average weather data for Covington, Kentucky. Savings were estimated for a representative high efficiency option corresponding to a set of HVAC system type and size combinations. The energy and demand savings were normalized per ton of cooling capacity. The results of the simulation runs are shown in Table 26.

Table 26. Full Service Restaurant Demand and Energy Savings

HVAC System Type and Size	Base Efficiency	Measure Efficiency	Demand savings (kW/ ton)	Energy savings (kWh/ton)
AC <65,000 1 Ph	13	14	0.072	54.1
AC <65,000 3 Ph	12	13	0.056	40.5
AC 65,000 - 135,000	10.1	11	0.075	55.7
AC 135,000 - 240,000	9.5	11	0.136	98.8
AC 240,000 - 760,000	9.3	10	0.068	51.8
AC >760,000	9	10	0.102	76.5
HP <65,000 1 Ph	13	14	0.072	111.6
HP <65,000 3 Ph	12	13	0.056	60.2
HP 65,000 - 135,000	9.9	11	0.075	117.9
HP 135,000 - 240,000	9.1	10	0.136	142.5
HP >240,000	8.8	10	0.068	168.6

Small Office Prototype

A prototypical building energy simulation model for a small was developed using the DOE-2.2 building energy simulation program. The characteristics of the small office prototype are summarized in Table 27.

Table 27. Small Office Prototype Building Description

Characteristic	Value
Vintage	Existing (1970s) vintage
Size	10,000 square feet
Number of floors	2
Wall construction and R-value	Wood frame with brick veneer, R-11
Roof construction and R-value	Wood frame with built-up roof, R-19
Glazing type	Single pane clear
Lighting power density	Perimeter offices: 2.2 W/SF Core offices: 1.5 W/SF
Plug load density	Perimeter offices: 1.6 W/SF Core offices: 0.7 W/SF
Operating hours	Mon-Sat: 9am – 6pm Sun: Unoccupied
HVAC system type	Packaged single zone, no economizer
HVAC system size	180 SF/ton
Thermostat setpoints	Occupied hours: 76 cooling, 72 heating Unoccupied hours: 81 cooling, 67 heating

A computer-generated sketch of the small office prototype is shown in Figure 12.

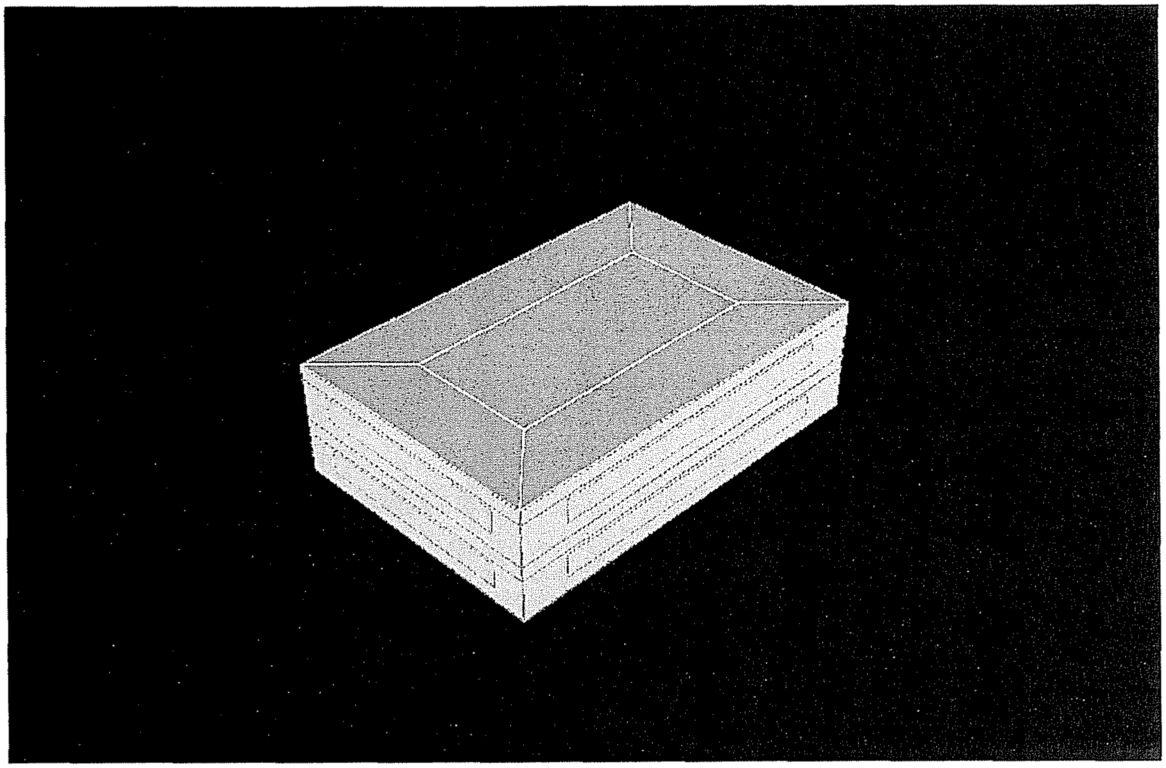

Figure 12. Small Office Prototype Building Rendering

The energy performance of the prototypical building was simulated using long term average weather data for Covington, Kentucky. Savings were estimated for a representative high efficiency option corresponding to a set of HVAC system type and size combinations. The energy and demand savings were normalized per ton of cooling capacity. The results of the simulation runs are shown in Table 28.

Table 28. Energy and Demand Savings for Small Office

HVAC System Type and Size	Base Efficiency	Measure Efficiency	Demand savings (kW/ ton)	Energy savings (kWh/ton)
AC <65,000 1 Ph	13	14	0.061	61.0
AC <65,000 3 Ph	12	13	0.047	45.7
AC 65,000 - 135,000	10.1	11	0.065	62.8
AC 135,000 - 240,000	9.5	11	0.114	111.3
AC 240,000 - 760,000	9.3	10	0.059	58.4
AC >760,000	9	10	0.087	86.1
HP <65,000 1 Ph	13	14	0.061	85.2
HP <65,000 3 Ph	12	13	0.047	52.8
HP 65,000 - 135,000	9.9	11	0.065	96.8
HP 135,000 - 240,000	9.1	10	0.114	105.2
HP >240,000	8.8	10	0.059	134.3

Energy and demand savings estimates were developed for each measure in the database using the following engineering equations:

$$kW_{savings} = \sum_{i}^{buildings} \sum_{j}^{measures} units_{i,j} \times ton \times kWsaved/ton_j \times F_{adj} \times CDF_i$$

$$kWh_{savings} = \sum_{i}^{buildings} \sum_{j}^{measures} units_{i,j} \times ton \times kWhsaved/ton_j \times F_{adj}$$

$$F_{adj} = \frac{1 - \dfrac{EER_{base}}{EER_{installed}}}{1 - \dfrac{EER_{base}}{EER_{measure}}}$$

where:

Units	= quantity of each type of HVAC measure installed
Ton	= cooling capacity of HVAC unit
kW/ton	= demand savings per ton from prototype model runs by building and measure type
kWh/ton	= energy savings per ton prototype model runs by building and measure type
Fadj	= efficiency adjustment factor
CDF	= coincident diversity factor by building type

An efficiency adjustment factor was used to account for differences in the installed equipment SEER or EER verses the SEER or EER assumptions used for high efficiency equipment in the simulations. Since HVAC energy consumption is an inverse relationship with SEER and EER, a simple scaling of the EER or SEER differences is not appropriate. This adjustment accurately reflects the influence of efficiency differences on energy and demand savings. The coincident diversity factors from the PG&E and SCE programs as shown in the secondary research section of this report were applied.

The HVAC program gross energy and demand savings were summed across all entries in the database, and normalized on a per-measure and per-program-participant basis. The estimates embedding in the program tracking system, the savings estimated by this evaluation, and the estimates used by Duke Energy for program planning purposes are compared in Table 29.

Table 29. HVAC Program Gross Demand and Energy Savings

Savings Basis	Source	kW	kWh
Savings/measure	Planning Estimate		130
	Tracking System	0.16	443
	Evaluation Estimate	0.69	763
Savings/participant	Tracking System	1.3	3,673
	Evaluation Estimate	5.7	6,336

Appendix A: Process Evaluation: Program Manager Interview Protocol

Name: ____

Title: ____

Position description and general responsibilities:

____

____

____

We are conducting this interview to obtain your opinions about and experiences with the Small Commercial and Industrial Program. We'll talk about the Program and its objectives, your thoughts on improving the program and its participation rates, and the technologies the program covers. The interview will take about an hour to complete. May we begin?

Program Objectives

1. In your own words, please describe the Small Commercial and Industrial Incentive Program's objectives.

2. In your opinion, which objectives do you think are being met or will be met? How do you think the program's objectives have changed over time?

3. Are there any program objectives that are not being addressed or that you think should have more attention focused on them? If yes, which ones? How should these objectives be addressed? What should be changed? Do you think these changes will increase program participation?

4. Should the program objectives be changed in any way because of market conditions, other external or internal program influences, or any other conditions that have developed since the program objectives were devised? What changes would you put into place, and how would it affect the objectives?

5. Do you think the incentives application process offered through the small C&I program is easy to understand and complete?

6. Do you think the incentives offered through the program are large enough to entice the C&I community to purchase the high efficiency items? Why or why not?

7. Do you think the incentives cover the right equipment? Do you think there is equipment that is currently incentivized that should not be, or equipment that is not covered that should be?

8. Which measures have been most used? Why, and why have other measures not been adopted? Why is there a difference between states? (Note in KY the program got off to a fast start and we had to throttle it back, now IN is begging to pick up. Why are these difference there?)

9. What kinds of marketing, outreach and customer contact approaches do you use to make your customers aware of the program and its options? Are there any changes to the program marketing that you think would increase participation?

10. How do you inform trade allies and contractors about the program? How effective has this been in getting participation from the contractors?

11. Are there any changes to the incentives or marketing that could possibly increase participation in the program?

12. The program has experienced a drop in participation over the last year or so and then recently picked up in Indiana, why do you think this has occurred? What can be done to boost participation overall?

13. Thinking about how your program enrolls participants, what do you think your level of freeridership is for this program? (*That is, what percent of the equipment rebated through the program would have been purchased and installed without the program's incentive?*)

14. What do you think the level of spillover is for this program? *(That is, what percent of the participants take similar actions in their business that are not rebated through the program?)*

Overall Small C&I Incentives Management

15. Describe the use of any advisors, technical groups or organizations that have in the past or are currently helping you think through the program's approach or methods. How often do you use these resources? What do you use them for?

16. Overall, what about the Small Commercial and Industrial Incentive Program works well and why?

17. What doesn't work well and why? Do you think this discourages participation?

18. Can you identify any market or operational barriers that impede a more efficient program operation?

19. If you had a magic wand and could change any part of the program what would you change and why?

Program Design & Implementation

20. What market information, research or market assessments are you using to determine the best target markets or market segments to focus on?

21. What market information, research or market assessments are you using to identify market barriers, and develop more effective delivery mechanisms?

22. How do you manage and monitor or evaluate contractor involvement or performance? What is the quality control and tracking process? What do you do if contractor performance is exemplary or below expectations?

23. In your opinion, did the incentives cover enough different kinds of energy efficient products?

1. ☐ Yes 2. ☐ No 99. ☐ DK/NS

If no, 22b. What other products or equipment should be included?

____

____

24. In what ways can the Small Commercial and Industrial Incentive Program's operations be improved?

25. Do you have any suggestions for how program participation can be increased?

Appendix B: Participant Survey Instrument

Name: ____

Title: ____

Hello, my name is ______. I am calling on behalf of Duke Energy to conduct a customer survey about the Commercial and Industrial Program. May I speak with ______________ please?

If person talking, proceed. If person is called to the phone reintroduce.
If not home, ask when would be a good time to call and schedule the call-back:

Call back 1:	Date: ___________,	Time: ______________	❑AM or ❑PM
Call back 2:	Date: ___________,	Time: ______________	❑AM or ❑PM
Call back 3:	Date: ___________,	Time: ______________	❑AM or ❑PM
Call back 4:	Date: ___________,	Time: ______________	❑AM or ❑PM
Call back 5:	Date: ___________,	Time: ______________	❑AM or ❑PM
Call back 6:	Date: ___________,	Time: ______________	❑AM or ❑PM
Call back 7:	Date: ___________,	Time: ______________	❑AM or ❑PM
	❑ Contact dropped after seventh attempt.		

We are conducting this survey to obtain your opinions about the Commercial and Industrial Efficiency Program. We are not selling anything. The survey will take about 10-15 minutes and your answers will be confidential, and will help us to make improvements to the program to better serve others. May we begin the survey?

1. Our records indicate that you participated in the Commercial and Industrial Incentive Program in <date> **and that you installed** <technology> **through the program and received an incentive for your purchase. Do you recall participating in this program?**

1. ❑ Yes, *begin* *Skip to Q2.*
2. ❑ No,
99. ❑ DK/NS

1a. **This program was provided through Duke Energy. In this program, you purchased an energy efficient lighting, HVAC, motor, or pump. In exchange for purchasing the energy efficient option, Duke Energy provided your company with an incentive.**

Do you remember participating in this program?

1. ❑ Yes, *begin* → *Go to Q2.*
2. ❑ No,
99. ❑ DK/NS

If No or DK/NS terminate interview and go to next participant.

2. **How did you become aware of the C&I Incentive Program?**
   - **a.** ❑ Duke Energy sent me a brochure
   - **b.** ❑ Duke Energy called and talked to me about it
   - **c.** ❑ Duke energy website.
   - **d.** ❑ A contractor I was working with told me about the program
   - **e.** ❑ An equipment supplier
   - **f.** ❑ I saw an ad in ______________________________
   - **g.** ❑ Other ______________________________________
   - **h.** ❑ DK/NS

3. **When you first heard about the program and considered taking advantage of the incentive, did you do any additional investigation to confirm the program's offering, or was the information you had adequate to make a participation decision?**
   - **a.**❑ The information was adequate
   - b.❑ Didn't need to confirm/Nothing
   - **c.**❑ Went to the web site
   - **d.** ❑ Called or emailed Duke Energy
   - **e.**❑ Called or emailed a contractor
   - f. ❑ Called or emailed a salesperson
   - g.❑ Other: ____
   - h.❑ DK/NS

If c, d, e, f, g: **4. How well did this work for you, were you able to acquire a more complete understanding of the program?** *Note: many may have only heard about this through their contractors and thus had minimal involvement, so this question may only apply to a few of them.*

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

5. **Did you have additional questions that were not answered? Were their questions that you were unable to answer or information that you were unable to obtain?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

5a. What were they?

____

____

6. **Who filled out the program incentive forms for your company?**
   - **a.** ❑ I did
   - **b.** ❑ Someone from my company did
   - **c.** ❑ The contractor
   - **d.** ❑ The salesperson
   - **e.** ❑ Someone from Duke Energy

7. **Who submitted the forms to Duke/Cinergy?**
   - **a.** ❑ I did
   - **b.** ❑ Someone from my company did
   - **c.** ❑ The contractor
   - **d.** ❑ The salesperson
   - **e.** ❑ Someone from Duke Energy

8. *If they filled it out.* **Was the incentive form easy to understand?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If not, 8b. **Do you remember what it was that was not clear or which part of it was difficult?**

____

____

9. **Did you have any problems receiving the incentives?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, 9b. **Please explain the problem and how it was resolved. Was it resolved to your satisfaction?**

____

____

10. Did you originally plan on purchasing the exact same efficiency level in the equipment you purchased before you knew that there was an incentive offered by Duke Energy?

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

11. In your decision process, did you search for or consider other, less energy efficient equipment that might have cost less?

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

12. **What was the primary reason that you decided to purchase or upgrade your equipment?**

1. ❑ Remodeling
2. ❑ Equipment failure
3. ❑ Contractor recommendation
4. ❑ Energy Savings
5. ❑ Got a good deal
6. ❑ It was an old system
7. ❑ Combination of above: *list*:

____

13. **I would like to ask how important the program incentive was in your decision to buy the more energy efficient model. Would you say the incentive was…** *(read and check the best response).*

a. **# The primary reason why you purchased the high efficacy model,**
b. **#An important reason, along with other reasons,**
c. **#One of the reasons, but it was not the most important,**
d. **#One of the reasons, but it was a minor or unimportant reason, or**
e. **#It was not a reason at all,**
f. **#DK/NS.**

14. If the incentives were not available from the program, would you have delayed your purchase, or would you have made the purchased at the exact same time?

a. # The purchase would have been delayed – **How long do you think you might have waited to make the purchase?** ______________________
b. # The purchase would have been made at the same time
c. #DK/NS

15. Were there other reasons in addition to the incentive that you went with the high efficiency <technology> **instead of something less expensive to purchase?**

____

____

16. When firms have experience with energy efficiency programs or products they sometimes make similar decisions to continue the energy savings in other parts of their business. Have you taken any other energy efficiency actions that may have been, in some way, influenced by your experiences with the Duke program?

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

a. *If yes,* **What have you done?**
b. *If yes,* **How much money do you think you have saved as a result?**

____

____

17. One of the objectives that the program would like to see over the next year is increased participation of businesses like yours. Can you think of things that the program can do to help increase participation or help increase interest from people like yourself?

a. #Increase general advertising
b. #Increase advertising in trade media
c. #Present the program in trade or associated meetings
d. #Offer larger incentives
e. #Offer incentives on other items/include other items
f. #Have program staff call small C&I customers
g. #Make the process more streamlined for customers
h. #Make the process more streamlined for contractors
i. #Other: ______________________________________

18. **During your participation process, did you need to contact Cinergy/Duke to obtain information about the program?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

If yes, 18b. **Were your questions or needs effectively handled by the Cinergy/Duke?**

1. ❑ Yes 2. ❑ No 99. ❑ DK/NS

18c. **How might this be improved?**

____

____

19. Overall, what about the C&I Incentive Program works well and why?

____

____

20. What doesn't work well and why?

____

____

We would like to ask you a few questions about your satisfaction with the program. For these questions we would like you to rate your satisfaction using a 1 to 10 scale where a 1 means that you are very dissatisfied with the program and a 10 means that you are very satisfied.

21. How would your rate your satisfaction with.

a. The incentive levels provided by the program

1 2 3 4 5 6 7 8 9 10

b. The ease of filling out the participation and incentive forms

1 2 3 4 5 6 7 8 9 10

c. The time it took for your to receive your incentive

1 2 3 4 5 6 7 8 9 10

d. The number and kind of technologies covered in the program

1 2 3 4 5 6 7 8 9 10

e. The information you were provided explaining the program,

1 2 3 4 5 6 7 8 9 10

For each item above that received a score of 8 or less ask:
21a. What could have been done to make this better?

For item a: the incentive levels provided by the program

____

____

For item b: the ease of filling out the participation and incentive forms

____

____

For item c: *the time it took for your to receive your incentive*

____

____

For item d: the number and kind of technologies covered in the program

____

____

For item e: the information you were provided explaining the program

____

____

22. Considering all aspects of the program, how would you rate your overall satisfaction with the Program?

1 2 3 4 5 6 7 8 9 10

If score is 8 or less ask: **What could have been done to make your experience better, or have we already covered it?**

____

____

APPENDIX G

PowerShare Impact Analysis in Kentucky

Final Report

Prepared for
Duke Energy

139 East Fourth Street
Cincinnati, OH 45201

October 15, 2007

Submitted by:

Dr. Michael Ozog, Ph.D.
Vice President, Integral Analytics
Fort Collins, Colorado

INTEGRAL ANALYTICS, INC.

Kentucky 2007 PowerShare Impact Analysis

This analysis presents the results of the load analysis of the PowerShare program for customers within Duke Energy Kentucky. This analysis relies upon a statistical analysis of actual customer whole premise hourly electricity consumption during the summer of 2007, which includes two PowerShare events on August 8^{th} and 9^{th}.

For this analysis, since hourly data is available before, during, and after the event, the statistical includes all data throughout the summer period. This is contrasted with the Pro Forma analysis, which only includes pre-event data. In addition, this analysis is focused expected impacts at system level at expected peak temperate (93.5°) rather than for customer payments. Thus, the reported impacts are developed as a function of temperature rather than as a function time as was done in the Pro Forma analysis. Therefore, the results of this analysis are not directly comparable to the results of the Pro Forma results. Table 1 presents the results of this analysis.

Table 1: KY PowerShare Results

	Savings
Program Effect (looking only at Savings with t-value >1.5)	
Call Participants	11.7 kWh/Degree Fahrenheit
Quote Participants	0.54 kWh/Degree Fahrenheit
Total	12.23 kWh/Degree Fahrenheit
Total Program Effect (looking only at Savings with t-value >1.5) at 93.5°	1,144 kWh per hour

Because the PowerShare participant population consists of a diverse range of facilities, it was determined that pooling customers into a single statistical model was inappropriate. Therefore, a statistical equation was estimated for each participant in the PowerShare program. This model had the hourly electricity consumption has the dependent variable, and included weather terms, time of day, and the event term as independent variables.

Algebraically, the model is described as follows:

$$y_t = \alpha + \beta x_t + \varepsilon_t,$$

where:

- y_t = electricity consumption for the facility during hour t
- α = constant term for the facility
- β = vector of coefficients
- x_t = vector of variables that represent factors causing changes in energy consumption for facility during hour t (i.e., weather, time of day, and participation)
- ε_t = error term for during hour t.

The independent variables that were used in the model include:

- The current temperature as well as the temperature for the previous three hours
- The current humidity as well as the humidity for the previous three hours
- A variable incorporating the interaction between temperature and humidity
- An indicator variable for weekend days
- Indicator variables for all 24 hours of the day
- Indicator variables for the month
- An indicator variable for the PowerShare event interacted with the temperature for that hour.

Since this is a pure time-series model, it is critical to account for the potential for autocorrelation, where the error term in one hour is correlated with the error term in the preceding hour(s).[1] In order to account for this potential, the models where estimated using an AR(1) specification:

$$\varepsilon_t = \rho\varepsilon_{t-1} + \mu_t$$

Where:

ρ = is an estimated parameter (Phi)
μ_t = is white noise (i.e., zero mean with no autocorrelation).

The parameters ρ and β in the above equations are estimated for each participant via maximum likelihood techniques. The summary of the estimated electric models are presented in Table 2.[2]

[1] The intuition is that the factors that cannot be "explained" in one hour cannot be explained in other hours. In theory, autocorrelation does not result in bias results, but it does affect the standard error of the estimates, which may lead to erroneous conclusions.
[2] The models include a large number of other independent variables discussed above. These terms were not included in order make interpretation clearer. Each estimated model for each customer containing the complete set of independent variables are included in the appendix.

Table 2: Summary of the Estimated PowerShare Models

Customer	Phi (AR term) (t-value)	PowerShare Savings (kWh) per degree (t-value)
#1 (Call)	0.74 (58.06)	-7.73 (-4.07)
#2 (Call)	0.61 (39.00)	-3.96 (-2.69)
#1 (Quote)	0.95 (162.00)	-0.80 (-0.90)
#2 (Quote)	0.97 (192.30)	-0.60 (-1.10)
#3 (Quote)	0.65 (44.59)	-0.54 (-1.53)
#4 (Quote)	0.91 (108.69)	-.049 (-0.36)
#5 (Quote)	0.98 (249.05)	-0.47 (-1.41)
#6 (Quote)	0.98 (249.33)	-0.24 (-0.54)
#7 (Quote)	0.99 (338.65)	-0.09 (-0.40)
#8 (Quote)	0.74 (55.88)	-0.06 (-0.32)
#9 (Quote)	0.95 (159.60)	0.00 (-0.11)
#10 (Quote)	0.99 (321.38)	0.04 (0.11)
#11 (Quote)	0.98 (237.14)	0.04 (0.08)
#12 (Quote)	0.97 (193.90)	0.06 (0.28)
#13 (Quote)	1.00 (756.55)	0.07 (0.64)
#14 (Quote)	0.87 (86.92)	0.12 (0.32)
#15 (Quote)	0.80 (69.30)	0.13 (0.48)
#16 (Quote)	0.96 (184.35)	0.15 (0.73)
#17 (Quote)	0.91 (103.76)	0.26 (0.40)
#18 (Quote)	0.46 (26.90)	0.48 (1.05)
#19 (Quote)	0.93 (116.19)	0.63 (0.75)
#20 (Quote)	0.95 (145.09)	0.70 (2.01)
Total Program Effect (looking only at Savings with t-value >1.5)		12.2 kWh/Degree

These estimation results show that:

- Autocorrelation is clearly present in the data, with estimated ρ values often near one and in all cases very precisely estimated (i.e., high t-values).
- The vast majority of savings are due to the Call program (i.e., mandatory reductions), with very little savings occurring from the voluntary Quote participants.
- The overall statistically significant savings are 12.2 kWh/degree. At 93.5°, this implies an average savings per hour associated with the PowerShare event of 1,144 kWh for each hour of the PowerShare event.

APPENDIX

INDIVIDUAL ESTIMATED MODELS

```
Number of cross-sectional units       22.000000
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       70204801.
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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to    0.00001

DEPENDENT VARIABLE:                  KWH
                Number of Observations:    2682
                             R-squared:     0.526
            Standard Error of Estimate:   140.307
 Variance of White Noise Error (sigsq):  3776.153
                     Variance of sigsq:297807.722
                    -2*log(likelihood): 29699.725

                COEFFICIENTS OF INDEPENDENT VARIABLES (beta)
```

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	227.743696	130.829300	1.740770	0.082
INTER	-1.330334	0.427411	-3.112541	0.002
JULY	6.964873	8.809666	0.790594	0.429
MAY	24.348710	10.613582	2.294109	0.022
JUNE	3.044180	8.960419	0.339736	0.734
TEMP	2.778289	2.298992	1.208481	0.227
HUMID	0.102517	3.074584	0.033343	0.973
TEMPHUM	-0.002400	0.032820	-0.073135	0.942
TLAG	1.079080	1.990586	0.542091	0.588
TLAG2	-1.670157	1.992199	-0.838348	0.402
TLAG3	-1.091589	1.976479	-0.552290	0.581
TLAG4	0.149843	1.967531	0.076158	0.939
TLAG5	0.981437	1.448464	0.677571	0.498
HLAG	0.728918	2.492851	0.292403	0.770
HLAG2	-0.310095	2.494129	-0.124330	0.901
HLAG3	-1.209322	1.784594	-0.677645	0.498
HOUR1	5.400548	24.596328	0.219567	0.826
HOUR2	11.081496	23.741598	0.466754	0.641
HOUR3	-14.446484	23.315805	-0.619600	0.536
HOUR4	-16.847038	23.157572	-0.727496	0.467
HOUR5	-11.089286	22.932884	-0.483554	0.629
HOUR6	0.316005	22.667323	0.013941	0.989
HOUR7	-0.188506	22.204300	-0.008490	0.993
HOUR8	-4.079476	21.368949	-0.190907	0.849
HOUR9	0.992770	20.450040	0.048546	0.961
HOUR10	-3.260096	19.430226	-0.167785	0.867
HOUR12	-15.336533	19.166945	-0.800155	0.424
HOUR13	-18.725193	19.530217	-0.958781	0.338
HOUR14	-33.879676	20.016490	-1.692588	0.091
HOUR15	-42.518889	20.686882	-2.055355	0.040
HOUR16	-59.291036	21.401347	-2.770435	0.006

HOUR17	-64.539484	21.992407	-2.934626	0.003
HOUR18	-71.228737	22.683823	-3.140068	0.002
HOUR19	-33.919404	23.539896	-1.440933	0.150
HOUR20	-3.283509	24.580007	-0.133585	0.894
HOUR21	2.463888	25.458947	0.096779	0.923
HOUR22	14.964462	26.055068	0.574340	0.566
HOUR23	14.604839	25.913906	0.563591	0.573
HOUR24	11.626543	25.432460	0.457154	0.648
WEEKEND	-321.501069	6.166322	-52.138226	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.898831	0.008463	106.204007	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	19685.951295	1.000000
1	17693.941815	0.898811

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 7

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations: 2682
R-squared: 0.936
Standard Error of Estimate: 200.306
Variance of White Noise Error (sigsq): 2671.495
Variance of sigsq: 5322.064
-2*log(likelihood): 28770.513

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	104.287444	219.751147	0.474571	0.635
INTER	0.064744	0.231026	0.280244	0.779
JULY	-5.065739	42.964259	-0.117906	0.906
MAY	-33.216681	62.375143	-0.532531	0.594
JUNE	4.756022	53.223559	0.089359	0.929
TEMP	2.317812	2.435241	0.951779	0.341
HUMID	1.363501	3.160677	0.431395	0.666
TEMPHUM	-0.024183	0.040074	-0.603477	0.546
TLAG	1.156851	0.531069	2.178345	0.029
TLAG2	-1.093910	0.531498	-2.058165	0.040
TLAG3	-0.551447	0.530925	-1.038652	0.299
TLAG4	-0.095600	0.523626	-0.182573	0.855
TLAG5	0.273245	0.523163	0.522294	0.602
HLAG	0.612700	0.650388	0.942054	0.346
HLAG2	-0.376675	0.650643	-0.578927	0.563
HLAG3	0.553359	0.651801	0.848969	0.396
HOUR1	-0.743000	15.880015	-0.046788	0.963

HOUR2	3.363961	15.461683	0.217568	0.828
HOUR3	-23.675874	15.320978	-1.545324	0.122
HOUR4	-27.560893	15.313088	-1.799826	0.072
HOUR5	-22.823379	15.255078	-1.496117	0.135
HOUR6	-13.036030	15.095953	-0.863545	0.388
HOUR7	-9.234609	14.166248	-0.651874	0.515
HOUR8	-7.287286	12.234376	-0.595640	0.551
HOUR9	1.298464	9.502005	0.136652	0.891
HOUR10	-3.422931	6.018792	-0.568707	0.570
HOUR12	-15.629065	6.115532	-2.555635	0.011
HOUR13	-16.727964	9.816278	-1.704105	0.088
HOUR14	-29.369557	12.886567	-2.279083	0.023
HOUR15	-35.013407	15.351736	-2.280746	0.023
HOUR16	-49.576257	17.167193	-2.887849	0.004
HOUR17	-55.628971	18.395358	-3.024077	0.003
HOUR18	-62.246270	19.114258	-3.256536	0.001
HOUR19	-24.216473	19.379779	-1.249574	0.212
HOUR20	3.123343	19.247040	0.162277	0.871
HOUR21	5.646637	18.882591	0.299039	0.765
HOUR22	12.979257	18.352448	0.707222	0.479
HOUR23	14.040505	17.515350	0.801611	0.423
HOUR24	8.981736	16.602105	0.541000	0.589
WEEKEND	-10.134108	9.214153	-1.099842	0.272

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.966135	0.004983	193.903150	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	40122.663925	1.000000
1	38763.909130	0.966135

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1.1801005e+008

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----------------------- INITIAL ESTIMATES ----------------------

convergence tolerance set to    0.00001

DEPENDENT VARIABLE:                KWH
               Number of Observations:    2299
                            R-squared:     0.744
             Standard Error of Estimate:   246.700
 Variance of White Noise Error (sigsq): 21460.673
                     Variance of sigsq:3337450.938
                    -2*log(likelihood): 29453.412
```

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	4616.976268	252.108092	18.313479	0.000
INTER	0.494279	0.764057	0.646913	0.518
JULY	1.421073	20.521144	0.069249	0.945
MAY	-176.705897	23.683441	-7.461158	0.000
JUNE	-29.038693	20.939390	-1.386797	0.166
TEMP	-20.535079	4.458585	-4.605739	0.000
HUMID	-28.365384	6.025105	-4.707865	0.000
TEMPHUM	0.385489	0.066072	5.834333	0.000
TLAG	3.709058	3.699340	1.002627	0.316
TLAG2	4.556555	3.705571	1.229650	0.219
TLAG3	-2.070825	3.686289	-0.561764	0.574
TLAG4	0.802476	3.675025	0.218359	0.827
TLAG5	4.689606	2.712638	1.728799	0.084
HLAG	2.738019	4.709876	0.581336	0.561
HLAG2	1.745678	4.709215	0.370694	0.711
HLAG3	6.275693	3.380081	1.856669	0.063
HOUR1	-599.844753	46.533484	-12.890605	0.000
HOUR2	-688.649435	44.926180	-15.328466	0.000
HOUR3	-552.644912	44.080599	-12.537146	0.000
HOUR4	-581.137503	43.720666	-13.292055	0.000
HOUR5	-417.719702	43.362092	-9.633292	0.000
HOUR6	-404.072589	42.927247	-9.412963	0.000
HOUR7	-318.536444	42.070240	-7.571539	0.000
HOUR8	-118.132385	40.482218	-2.918130	0.004
HOUR9	-86.814584	38.815169	-2.236615	0.025
HOUR10	-45.731034	36.944348	-1.237836	0.216
HOUR12	-105.797494	36.408843	-2.905819	0.004
HOUR13	-62.626530	37.027810	-1.691338	0.091
HOUR14	-21.181144	37.885036	-0.559090	0.576
HOUR15	-47.272945	39.095242	-1.209174	0.227
HOUR16	-146.645150	40.414944	-3.628488	0.000
HOUR17	-247.163409	41.494021	-5.956603	0.000
HOUR18	-386.866711	42.691166	-9.061985	0.000
HOUR19	-482.687386	44.182259	-10.924914	0.000
HOUR20	-557.903809	46.009752	-12.125773	0.000
HOUR21	-481.587849	47.606879	-10.115930	0.000
HOUR22	-525.439769	48.685296	-10.792576	0.000
HOUR23	-498.509303	48.790807	-10.217279	0.000
HOUR24	-526.823358	48.019668	-10.970991	0.000
WEEKEND	-583.044699	11.651286	-50.041230	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.804279	0.012394	64.894157	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	60861.015214	1.000000
1	48967.095097	0.804572

Total Time for Computation and Printing: 0.11(seconds)

Number of Iterations: 12

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2299
R-squared: 0.920
Standard Error of Estimate: 328.683
Variance of White Noise Error (sigsq): 19010.226
Variance of sigsq:314387.735
-2*log(likelihood): 29173.974

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	3605.463658	536.033084	6.726196	0.000
INTER	0.256465	0.633293	0.404970	0.686
JULY	16.075048	84.381809	0.190504	0.849
MAY	-105.500996	104.133930	-1.013128	0.311
JUNE	-26.846531	92.425065	-0.290468	0.771
TEMP	-9.209582	6.658721	-1.383086	0.167
HUMID	-12.104886	8.603854	-1.406914	0.160
TEMPHUM	0.241032	0.111761	2.156670	0.031
TLAG	4.190639	1.507281	2.780263	0.005
TLAG2	4.898324	1.516438	3.230150	0.001
TLAG3	-1.094747	1.503795	-0.727989	0.467
TLAG4	0.639347	1.493669	0.428038	0.669
TLAG5	-0.613992	1.493042	-0.411235	0.681
HLAG	2.756147	1.833456	1.503252	0.133
HLAG2	1.207777	1.833963	0.658562	0.510
HLAG3	5.047834	1.854628	2.721750	0.007
HOUR1	-498.563402	45.312115	-11.002872	0.000
HOUR2	-598.167141	43.848014	-13.641830	0.000
HOUR3	-468.676230	43.149915	-10.861579	0.000
HOUR4	-500.301091	42.876102	-11.668530	0.000
HOUR5	-340.807174	42.484712	-8.021878	0.000
HOUR6	-331.662531	41.789494	-7.936505	0.000
HOUR7	-262.859073	39.075652	-6.726927	0.000
HOUR8	-78.587995	33.696269	-2.332246	0.020
HOUR9	-60.263645	26.344566	-2.287517	0.022
HOUR10	-32.382277	17.042541	-1.900085	0.058
HOUR12	-97.456596	17.218583	-5.659966	0.000
HOUR13	-41.814791	26.866016	-1.556419	0.120
HOUR14	10.846366	34.785947	0.311803	0.755
HOUR15	-2.393659	41.212937	-0.058080	0.954
HOUR16	-89.633655	46.007502	-1.948240	0.052
HOUR17	-181.321663	49.360779	-3.673395	0.000
HOUR18	-312.920829	51.438543	-6.083392	0.000
HOUR19	-400.746400	52.413362	-7.645882	0.000
HOUR20	-466.977863	52.437584	-8.905404	0.000
HOUR21	-381.808730	51.997622	-7.342811	0.000
HOUR22	-417.142967	51.195213	-8.148085	0.000
HOUR23	-384.756171	49.547706	-7.765368	0.000
HOUR24	-415.458289	47.356083	-8.773071	0.000
WEEKEND	-100.420345	25.557775	-3.929150	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.907763	0.008749	103.759054	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	108032.835773	1.000000
1	98068.164845	0.907763

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2465
R-squared: 0.295
Standard Error of Estimate: 284.506
Variance of White Noise Error (sigsq): 3201.803
Variance of sigsq:5492723.174
-2*log(likelihood): 26888.288

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	2391.552279	274.231790	8.720916	0.000
INTER	1.855154	1.165260	1.592051	0.112
JULY	-197.268988	19.131194	-10.311379	0.000
MAY	5.546663	22.391198	0.247716	0.804
JUNE	-107.465929	19.398236	-5.539985	0.000
TEMP	-13.034457	4.830415	-2.698413	0.007
HUMID	-28.970995	6.432364	-4.503942	0.000
TEMPHUM	0.272356	0.069350	3.927248	0.000
TLAG	2.910941	4.169140	0.698211	0.485
TLAG2	1.393480	4.171834	0.334021	0.738
TLAG3	0.813145	4.147362	0.196063	0.845
TLAG4	0.481359	4.134996	0.116411	0.907
TLAG5	4.011742	3.039782	1.319747	0.187
HLAG	0.823176	5.115460	0.160919	0.872
HLAG2	2.101369	5.115077	0.410819	0.681
HLAG3	1.007357	3.672270	0.274314	0.784
HOUR1	-173.602404	51.810504	-3.350718	0.001
HOUR2	-162.845483	49.979720	-3.258231	0.001
HOUR3	-159.599196	49.054031	-3.253539	0.001
HOUR4	-152.007048	48.660908	-3.123802	0.002

HOUR5	-140.041798	48.268223	-2.901325	0.004
HOUR6	-127.335486	47.727543	-2.667967	0.008
HOUR7	-55.918050	46.766428	-1.195688	0.232
HOUR8	-35.837688	45.080069	-0.794979	0.427
HOUR9	-33.089674	43.250121	-0.765077	0.444
HOUR10	-9.835028	41.123159	-0.239160	0.811
HOUR12	-13.656377	40.512541	-0.337090	0.736
HOUR13	-29.778316	41.240035	-0.722073	0.470
HOUR14	-103.036273	42.216853	-2.440643	0.015
HOUR15	-93.078766	43.594501	-2.135103	0.033
HOUR16	-90.871970	45.095311	-2.015109	0.044
HOUR17	-113.751559	46.314378	-2.456074	0.014
HOUR18	-123.235788	47.715583	-2.582716	0.010
HOUR19	-134.215869	49.412341	-2.716242	0.007
HOUR20	-156.267214	51.467881	-3.036208	0.002
HOUR21	-173.407315	53.295737	-3.253681	0.001
HOUR22	-194.349692	54.418366	-3.571399	0.000
HOUR23	-202.414320	54.329936	-3.725650	0.000
HOUR24	-195.391311	53.467633	-3.654385	0.000
WEEKEND	-245.681127	12.939245	-18.987284	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.980438	0.003964	247.309373	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	80943.529782	1.000000
1	79260.691778	0.979210

Total Time for Computation and Printing: 0.05(seconds)
Number of Iterations: 4

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2465
R-squared: 0.980
Standard Error of Estimate: 316.793
Variance of White Noise Error (sigsq): 2339.259
Variance of sigsq: 4439.866
-2*log(likelihood): 26114.067

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1068.734318	227.143536	4.705106	0.000
INTER	0.038721	0.365981	0.105801	0.916
JULY	17.975425	47.629192	0.377404	0.706
MAY	60.539384	80.119120	0.755617	0.450
JUNE	27.133643	65.885155	0.411832	0.680
TEMP	-0.198344	2.363627	-0.083915	0.933

HUMID	-3.684604	3.049653	-1.208204	0.227
TEMPHUM	0.052399	0.038948	1.345351	0.179
TLAG	2.988366	0.510152	5.857791	0.000
TLAG2	1.298766	0.509326	2.549967	0.011
TLAG3	1.095707	0.507813	2.157697	0.031
TLAG4	0.358886	0.504324	0.711618	0.477
TLAG5	-0.177693	0.503294	-0.353059	0.724
HLAG	1.057471	0.617278	1.713118	0.087
HLAG2	1.401222	0.617724	2.268363	0.023
HLAG3	0.289459	0.618067	0.468329	0.640
HOUR1	-125.385538	15.268242	-8.212179	0.000
HOUR2	-122.080010	14.856309	-8.217385	0.000
HOUR3	-126.717794	14.731182	-8.602011	0.000
HOUR4	-123.862392	14.736222	-8.405302	0.000
HOUR5	-116.901178	14.701631	-7.951579	0.000
HOUR6	-110.176002	14.568293	-7.562726	0.000
HOUR7	-52.955488	13.660247	-3.876613	0.000
HOUR8	-37.407149	11.807314	-3.168134	0.002
HOUR9	-32.178443	9.177278	-3.506317	0.000
HOUR10	-8.116669	5.814987	-1.395819	0.163
HOUR12	4.467073	5.928756	0.753459	0.451
HOUR13	5.402089	9.517614	0.567589	0.570
HOUR14	-54.893067	12.494628	-4.393333	0.000
HOUR15	-31.436966	14.881125	-2.112540	0.035
HOUR16	-19.038921	16.637228	-1.144357	0.253
HOUR17	-35.339573	17.832246	-1.981779	0.048
HOUR18	-42.558247	18.491746	-2.301473	0.021
HOUR19	-55.447746	18.717174	-2.962399	0.003
HOUR20	-80.222966	18.542004	-4.326553	0.000
HOUR21	-99.656950	18.155807	-5.488985	0.000
HOUR22	-123.113792	17.605166	-6.993049	0.000
HOUR23	-132.255490	16.799520	-7.872575	0.000
HOUR24	-130.993918	15.949826	-8.212875	0.000
WEEKEND	-30.426372	8.888009	-3.423306	0.001

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.988277	0.003075	321.383245	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	100357.728649	1.000000
1	99181.202566	0.988277

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.481
Standard Error of Estimate: 193.857
Variance of White Noise Error (sigsq): 3461.600
Variance of sigsq:1055685.999
-2*log(likelihood): 30267.805

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1795.328500	178.296159	10.069362	0.000
INTER	0.892092	0.846798	1.053489	0.292
JULY	57.584341	11.683360	4.928748	0.000
MAY	61.873126	14.133128	4.377879	0.000
JUNE	165.442070	11.884204	13.921174	0.000
TEMP	-10.369293	3.128422	-3.314544	0.001
HUMID	-17.888263	4.170127	-4.289621	0.000
TEMPHUM	0.145255	0.044259	3.281899	0.001
TLAG	-0.365764	2.715068	-0.134716	0.893
TLAG2	0.620465	2.717356	0.228334	0.819
TLAG3	-0.061386	2.693176	-0.022793	0.982
TLAG4	0.387282	2.678150	0.144608	0.885
TLAG5	2.838571	1.975594	1.436819	0.151
HLAG	-0.147205	3.415176	-0.043103	0.966
HLAG2	1.322593	3.414837	0.387308	0.699
HLAG3	2.483853	2.442892	1.016768	0.309
HOUR1	-131.165621	33.466764	-3.919280	0.000
HOUR2	-127.613264	32.325090	-3.947808	0.000
HOUR3	-121.177387	31.738057	-3.818047	0.000
HOUR4	-114.289667	31.532309	-3.624526	0.000
HOUR5	-99.377388	31.216905	-3.183448	0.001
HOUR6	-75.702348	30.853970	-2.453569	0.014
HOUR7	-57.660201	30.235759	-1.907020	0.057
HOUR8	-17.783139	29.122057	-0.610642	0.541
HOUR9	-5.983352	27.863043	-0.214742	0.830
HOUR10	1.037422	26.475284	0.039185	0.969
HOUR12	-16.182793	26.131007	-0.619295	0.536
HOUR13	-32.108011	26.623803	-1.205989	0.228
HOUR14	-40.210024	27.285661	-1.473669	0.141
HOUR15	-71.344764	28.187567	-2.531072	0.011
HOUR16	-89.295221	29.156394	-3.062629	0.002
HOUR17	-102.576689	29.969569	-3.422695	0.001
HOUR18	-112.425360	30.893151	-3.639168	0.000
HOUR19	-132.125769	32.046799	-4.122901	0.000
HOUR20	-139.464976	33.454940	-4.168741	0.000
HOUR21	-135.555904	34.673241	-3.909525	0.000
HOUR22	-139.070199	35.370921	-3.931766	0.000
HOUR23	-148.172878	35.276641	-4.200311	0.000
HOUR24	-137.147134	34.585509	-3.965451	0.000
WEEKEND	-392.007288	8.456668	-46.354818	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.952623	0.005795	164.395833	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	37580.401474	1.000000
1	35802.624067	0.952694

Total Time for Computation and Printing: 0.06(seconds)
Number of Iterations: 5

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2755
R-squared:	0.978
Standard Error of Estimate:	262.049
Variance of White Noise Error (sigsq):	1610.965
Variance of sigsq:	1883.998
-2*log(likelihood):	28159.140

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	925.988368	182.091256	5.085298	0.000
INTER	-0.085675	0.216558	-0.395622	0.692
JULY	-8.218289	39.088786	-0.210247	0.833
MAY	7.554334	65.513658	0.115309	0.908
JUNE	12.168348	53.848820	0.225972	0.821
TEMP	-0.588315	1.869942	-0.314617	0.753
HUMID	-1.242956	2.431289	-0.511234	0.609
TEMPHUM	0.015303	0.030760	0.497503	0.619
TLAG	-0.102218	0.406736	-0.251314	0.802
TLAG2	0.704698	0.406491	1.733611	0.083
TLAG3	0.259306	0.406023	0.638648	0.523
TLAG4	0.041592	0.399487	0.104112	0.917
TLAG5	0.231080	0.398959	0.579208	0.562
HLAG	0.053588	0.500775	0.107010	0.915
HLAG2	0.456592	0.500994	0.911372	0.362
HLAG3	0.297446	0.501277	0.593377	0.553
HOUR1	-73.545439	12.092746	-6.081781	0.000
HOUR2	-75.827137	11.790249	-6.431343	0.000
HOUR3	-72.411878	11.699438	-6.189347	0.000
HOUR4	-66.630922	11.716631	-5.686867	0.000
HOUR5	-54.190019	11.694116	-4.633956	0.000
HOUR6	-32.324101	11.594154	-2.787965	0.005
HOUR7	-28.739098	10.900724	-2.636439	0.008
HOUR8	-0.061378	9.420707	-0.006515	0.995
HOUR9	5.841458	7.306853	0.799449	0.424
HOUR10	7.288270	4.606369	1.582216	0.114
HOUR12	-9.271828	4.682434	-1.980130	0.048
HOUR13	-17.287463	7.561670	-2.286196	0.022
HOUR14	-20.046543	9.951117	-2.014502	0.044

HOUR15	-44.047984	11.858227	-3.714551	0.000
HOUR16	-55.965861	13.264964	-4.219074	0.000
HOUR17	-63.770663	14.214582	-4.486285	0.000
HOUR18	-70.696734	14.753560	-4.791842	0.000
HOUR19	-88.174250	14.939555	-5.902067	0.000
HOUR20	-91.174391	14.810249	-6.156169	0.000
HOUR21	-81.530808	14.499713	-5.622926	0.000
HOUR22	-80.454284	14.030940	-5.734062	0.000
HOUR23	-85.426439	13.357267	-6.395503	0.000
HOUR24	-75.340106	12.641105	-5.959930	0.000
WEEKEND	-3.750524	7.136973	-0.525506	0.599

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.988201	0.002918	338.645580	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	68669.678673	1.000000
1	67859.416049	0.988201

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2731
R-squared: 0.809
Standard Error of Estimate: 178.200
Variance of White Noise Error (sigsq): 5369.351
Variance of sigsq:760598.149
-2*log(likelihood): 31203.555

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	485.494753	164.645169	2.948734	0.003
INTER	-1.245200	0.723701	-1.720599	0.085
JULY	-68.088278	10.746639	-6.335774	0.000
MAY	-133.556263	13.201981	-10.116381	0.000
JUNE	-71.255926	10.931040	-6.518677	0.000
TEMP	17.873318	2.890201	6.184110	0.000
HUMID	16.757478	3.844198	4.359161	0.000
TEMPHUM	-0.228952	0.040839	-5.606168	0.000
TLAG	3.135184	2.498460	1.254847	0.210

TLAG2	1.347801	2.499290	0.539274	0.590
TLAG3	0.323394	2.477843	0.130514	0.896
TLAG4	1.582128	2.467271	0.641246	0.521
TLAG5	2.667122	1.817986	1.467075	0.142
HLAG	0.810008	3.145192	0.257538	0.797
HLAG2	0.392176	3.145032	0.124697	0.901
HLAG3	3.617335	2.250277	1.607507	0.108
HOUR1	-507.434956	30.814071	-16.467638	0.000
HOUR2	-652.380794	29.776584	-21.909189	0.000
HOUR3	-686.571493	29.235907	-23.483845	0.000
HOUR4	-576.266100	29.047996	-19.838412	0.000
HOUR5	-335.121492	28.780024	-11.644240	0.000
HOUR6	-212.806051	28.446276	-7.480981	0.000
HOUR7	-147.703839	27.873729	-5.299034	0.000
HOUR8	-84.238110	26.833766	-3.139258	0.002
HOUR9	-49.730254	25.663781	-1.937760	0.053
HOUR10	-6.725726	24.411294	-0.275517	0.783
HOUR12	-31.191192	24.117520	-1.293300	0.196
HOUR13	-35.615994	24.569135	-1.449623	0.147
HOUR14	-51.253624	25.184254	-2.035146	0.042
HOUR15	-103.000119	26.003828	-3.960960	0.000
HOUR16	-178.703394	26.893276	-6.644910	0.000
HOUR17	-233.360550	27.635280	-8.444298	0.000
HOUR18	-264.703108	28.479187	-9.294616	0.000
HOUR19	-288.197099	29.534694	-9.757917	0.000
HOUR20	-336.702579	30.824332	-10.923272	0.000
HOUR21	-324.400376	31.931951	-10.159115	0.000
HOUR22	-358.725679	32.573726	-11.012731	0.000
HOUR23	-384.765896	32.484691	-11.844530	0.000
HOUR24	-438.436167	31.849459	-13.765891	0.000
WEEKEND	-479.032422	7.782673	-61.551146	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.911548	0.007868	115.849294	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	31755.246038	1.000000
1	28935.655981	0.911209

Total Time for Computation and Printing: 0.09(seconds)
Number of Iterations: 8

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2731
R-squared: 0.980
Standard Error of Estimate: 278.733
Variance of White Noise Error (sigsq): 3269.496
Variance of sigsq: 7828.343
-2*log(likelihood): 29847.394

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1340.134628	247.255566	5.420038	0.000
INTER	-0.236686	0.434304	-0.544978	0.586
JULY	-11.839424	52.253699	-0.226576	0.821
MAY	-26.626046	82.523370	-0.322649	0.747
JUNE	-54.253362	68.747287	-0.789171	0.430
TEMP	9.026767	2.665182	3.386923	0.001
HUMID	6.836190	3.452906	1.979836	0.048
TEMPHUM	-0.096821	0.043742	-2.213484	0.027
TLAG	3.545910	0.580058	6.113029	0.000
TLAG2	2.209166	0.579227	3.813991	0.000
TLAG3	0.512965	0.577558	0.888161	0.375
TLAG4	1.100712	0.571167	1.927130	0.054
TLAG5	0.067850	0.570454	0.118941	0.905
HLAG	1.173627	0.715258	1.640846	0.101
HLAG2	0.220294	0.715633	0.307832	0.758
HLAG3	-0.880889	0.716329	-1.229728	0.219
HOUR1	-485.171476	17.287730	-28.064498	0.000
HOUR2	-638.057462	16.842585	-37.883583	0.000
HOUR3	-678.201450	16.693429	-40.626850	0.000
HOUR4	-571.806681	16.701312	-34.237231	0.000
HOUR5	-333.723198	16.662285	-20.028657	0.000
HOUR6	-213.400539	16.498285	-12.934711	0.000
HOUR7	-145.600362	15.509710	-9.387691	0.000
HOUR8	-82.061140	13.413503	-6.117801	0.000
HOUR9	-49.550396	10.413402	-4.758329	0.000
HOUR10	-5.481323	6.580995	-0.832902	0.405
HOUR12	-28.008954	6.696703	-4.182499	0.000
HOUR13	-24.031417	10.783534	-2.228529	0.026
HOUR14	-31.168375	14.180511	-2.197973	0.028
HOUR15	-78.632722	16.896463	-4.653798	0.000
HOUR16	-149.167427	18.896571	-7.893889	0.000
HOUR17	-199.985093	20.251075	-9.875283	0.000
HOUR18	-232.474139	21.023634	-11.057752	0.000
HOUR19	-256.431638	21.301397	-12.038255	0.000
HOUR20	-307.129375	21.131324	-14.534318	0.000
HOUR21	-293.822840	20.701844	-14.193076	0.000
HOUR22	-325.064531	20.047155	-16.214996	0.000
HOUR23	-350.490927	19.097478	-18.352734	0.000
HOUR24	-407.841163	18.080773	-22.556622	0.000
WEEKEND	-50.688029	10.188547	-4.975001	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.978732	0.003925	249.328897	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	77692.006220	1.000000
1	76039.687935	0.978732

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to    0.00001

DEPENDENT VARIABLE:                KWH
                Number of Observations:    2563
                             R-squared:     0.917
            Standard Error of Estimate:   404.284
 Variance of White Noise Error (sigsq):105115.392
                     Variance of sigsq:21512437.067
                    -2*log(likelihood): 36908.530

                COEFFICIENTS OF INDEPENDENT VARIABLES (beta)
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Var	Coef	Std. Error	t-Ratio	P-Value
CNST	13254.780066	381.566714	34.737779	0.000
INTER	-5.520372	1.234207	-4.472810	0.000
JULY	-169.954253	26.962406	-6.303379	0.000
MAY	-437.538150	31.987608	-13.678364	0.000
JUNE	-286.295344	27.452567	-10.428728	0.000
TEMP	-104.431431	6.728075	-15.521739	0.000
HUMID	-147.183304	9.012269	-16.331436	0.000
TEMPHUM	2.216140	0.096556	22.951757	0.000
TLAG	19.659481	5.815104	3.380762	0.001
TLAG2	6.636069	5.820706	1.140080	0.254
TLAG3	-5.547155	5.776257	-0.960337	0.337
TLAG4	9.338162	5.750963	1.623756	0.105
TLAG5	7.739075	4.228588	1.830179	0.067
HLAG	13.859932	7.291031	1.900956	0.057
HLAG2	7.779829	7.289516	1.067263	0.286
HLAG3	2.244692	5.225138	0.429595	0.668
HOUR1	-1771.928660	71.959012	-24.624138	0.000
HOUR2	-1725.183073	69.448209	-24.841290	0.000
HOUR3	-1527.321483	68.239873	-22.381658	0.000
HOUR4	-971.714694	67.757840	-14.340993	0.000
HOUR5	-272.038856	67.082816	-4.055269	0.000
HOUR6	134.122858	66.359892	2.021143	0.043
HOUR7	412.023371	65.064069	6.332579	0.000
HOUR8	427.817311	62.697443	6.823521	0.000
HOUR9	132.620632	60.194693	2.203195	0.028
HOUR10	47.640921	57.297497	0.831466	0.406
HOUR12	129.424296	56.510106	2.290286	0.022
HOUR13	353.246221	57.478409	6.145720	0.000
HOUR14	712.377773	58.838349	12.107372	0.000
HOUR15	942.748344	60.719546	15.526275	0.000
HOUR16	825.325385	62.779335	13.146450	0.000
HOUR17	627.802626	64.476399	9.736937	0.000

HOUR18	744.608484	66.422203	11.210235	0.000
HOUR19	640.012903	68.818321	9.300037	0.000
HOUR20	259.037206	71.768697	3.609334	0.000
HOUR21	-182.714464	74.266314	-2.460260	0.014
HOUR22	-741.723942	75.788687	-9.786737	0.000
HOUR23	-1348.461014	75.658336	-17.823033	0.000
HOUR24	-1761.071312	74.314931	-23.697409	0.000
WEEKEND	-351.397757	18.309403	-19.192201	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.597172	0.015844	37.691001	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	163445.420206	1.000000
1	97639.045788	0.597380

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 6

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2563
R-squared: 0.947
Standard Error of Estimate: 407.609
Variance of White Noise Error (sigsq):104274.420
Variance of sigsq:8484709.103
-2*log(likelihood): 36887.918

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	11287.897005	670.013635	16.847265	0.000
INTER	-3.967952	1.472941	-2.693897	0.007
JULY	-216.569418	52.843148	-4.098344	0.000
MAY	-469.696933	63.266636	-7.424086	0.000
JUNE	-337.709687	53.993739	-6.254608	0.000
TEMP	-79.836301	10.037535	-7.953775	0.000
HUMID	-111.586425	13.269593	-8.409182	0.000
TEMPHUM	1.676828	0.165112	10.155719	0.000
TLAG	21.292750	3.557830	5.984757	0.000
TLAG2	8.838600	3.644664	2.425080	0.015
TLAG3	-5.479393	3.625721	-1.511256	0.131
TLAG4	10.148418	3.508391	2.892613	0.004
TLAG5	6.037500	3.348210	1.803202	0.071
HLAG	19.393157	4.343365	4.465008	0.000
HLAG2	12.667378	4.339738	2.918927	0.004
HLAG3	-3.991006	4.132110	-0.965852	0.334
HOUR1	-1816.814117	82.225405	-22.095533	0.000
HOUR2	-1772.532726	78.808473	-22.491652	0.000

HOUR3	-1578.072035	77.016524	-20.490045	0.000
HOUR4	-1025.350165	76.133299	-13.467828	0.000
HOUR5	-326.805900	75.051617	-4.354415	0.000
HOUR6	79.182956	73.687701	1.074575	0.283
HOUR7	370.872509	69.798969	5.313438	0.000
HOUR8	403.045974	62.112009	6.489018	0.000
HOUR9	112.723048	51.799378	2.176147	0.030
HOUR10	42.349724	37.441991	1.131076	0.258
HOUR12	118.582607	36.703327	3.230841	0.001
HOUR13	346.581006	49.286634	7.031947	0.000
HOUR14	711.291963	58.021551	12.259100	0.000
HOUR15	931.896984	64.995294	14.337915	0.000
HOUR16	811.327255	70.597966	11.492219	0.000
HOUR17	615.122422	74.778259	8.225953	0.000
HOUR18	728.945028	78.241457	9.316609	0.000
HOUR19	619.988992	81.545731	7.602961	0.000
HOUR20	228.886536	85.234263	2.685382	0.007
HOUR21	-225.435987	88.577235	-2.545078	0.011
HOUR22	-786.337792	90.489092	-8.689863	0.000
HOUR23	-1390.861879	89.413324	-15.555421	0.000
HOUR24	-1805.010606	86.185536	-20.943312	0.000
WEEKEND	-299.672899	33.355999	-8.984078	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.610236	0.015648	38.996603	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	166144.793486	1.000000
1	101387.575110	0.610236

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2755
R-squared:	0.739
Standard Error of Estimate:	78.909
Variance of White Noise Error (sigsq):	3647.901
Variance of sigsq:	28981.610
-2*log(likelihood):	30414.071

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	755.588160	72.575314	10.411090	0.000
INTER	-0.276112	0.344689	-0.801048	0.423
JULY	-36.849006	4.755703	-7.748383	0.000
MAY	-38.217163	5.752879	-6.643137	0.000
JUNE	-44.281365	4.837456	-9.153854	0.000
TEMP	2.357351	1.273422	1.851194	0.064
HUMID	4.165008	1.697447	2.453690	0.014
TEMPHUM	-0.047523	0.018016	-2.637850	0.008
TLAG	-0.478436	1.105166	-0.432908	0.665
TLAG2	-3.880956	1.106098	-3.508692	0.000
TLAG3	-2.257120	1.096255	-2.058936	0.040
TLAG4	0.750071	1.090139	0.688050	0.491
TLAG5	1.607018	0.804164	1.998372	0.046
HLAG	1.076620	1.390145	0.774466	0.439
HLAG2	-0.946753	1.390007	-0.681114	0.496
HLAG3	3.118252	0.994377	3.135885	0.002
HOUR1	-178.299915	13.622621	-13.088518	0.000
HOUR2	-259.140494	13.157903	-19.694665	0.000
HOUR3	-306.702222	12.918952	-23.740488	0.000
HOUR4	-368.780438	12.835202	-28.731955	0.000
HOUR5	-402.257874	12.706817	-31.656855	0.000
HOUR6	-414.631926	12.559085	-33.014502	0.000
HOUR7	-365.145636	12.307442	-29.668686	0.000
HOUR8	-261.867060	11.854111	-22.090822	0.000
HOUR9	-156.862606	11.341630	-13.830693	0.000
HOUR10	-93.167363	10.776744	-8.645224	0.000
HOUR12	33.284524	10.636606	3.129243	0.002
HOUR13	70.578346	10.837199	6.512601	0.000
HOUR14	57.268489	11.106607	5.156254	0.000
HOUR15	37.530026	11.473727	3.270953	0.001
HOUR16	10.798781	11.868088	0.909901	0.363
HOUR17	3.926822	12.199090	0.321895	0.748
HOUR18	-1.734322	12.575033	-0.137918	0.890
HOUR19	-2.173283	13.044625	-0.166604	0.868
HOUR20	5.031668	13.617808	0.369492	0.712
HOUR21	1.409176	14.113716	0.099844	0.920
HOUR22	-4.425035	14.397706	-0.307343	0.759
HOUR23	-27.624158	14.359330	-1.923778	0.054
HOUR24	-93.029609	14.078005	-6.608153	0.000
WEEKEND	-30.111924	3.442280	-8.747668	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.643416	0.014585	44.116214	+DEN

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	6226.661983	1.000000
1	4006.466312	0.643437

Total Time for Computation and Printing: 0.06(seconds)
Number of Iterations: 6

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2755
R-squared:	0.848
Standard Error of Estimate:	79.148
Variance of White Noise Error (sigsq):	3638.456
Variance of sigsq:	9610.428
-2*log(likelihood):	30406.920

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	866.536985	131.541349	6.587563	0.000
INTER	-0.540375	0.353135	-1.530222	0.126
JULY	-32.795096	9.855788	-3.327496	0.001
MAY	-35.052134	12.020521	-2.916025	0.004
JUNE	-42.287028	10.071201	-4.198807	0.000
TEMP	0.691557	1.932941	0.357775	0.721
HUMID	2.168462	2.549415	0.850572	0.395
TEMPHUM	-0.014177	0.031756	-0.446440	0.655
TLAG	-0.439379	0.641419	-0.685011	0.493
TLAG2	-3.824770	0.656300	-5.827780	0.000
TLAG3	-2.321485	0.652433	-3.558199	0.000
TLAG4	0.682994	0.630820	1.082709	0.279
TLAG5	1.736861	0.609332	2.850433	0.004
HLAG	1.342072	0.780844	1.718746	0.086
HLAG2	-0.612516	0.780374	-0.784901	0.433
HLAG3	2.017396	0.751880	2.683135	0.007
HOUR1	-176.493787	15.425902	-11.441392	0.000
HOUR2	-256.998733	14.807508	-17.355975	0.000
HOUR3	-304.177715	14.464299	-21.029551	0.000
HOUR4	-365.873167	14.301576	-25.582717	0.000
HOUR5	-398.998894	14.092311	-28.313234	0.000
HOUR6	-411.321652	13.807989	-29.788673	0.000
HOUR7	-362.541855	13.047172	-27.787006	0.000
HOUR8	-260.703913	11.529657	-22.611593	0.000
HOUR9	-156.950095	9.475297	-16.564135	0.000
HOUR10	-93.105571	6.722846	-13.849130	0.000
HOUR12	33.259925	6.592713	5.044953	0.000
HOUR13	70.380770	9.036290	7.788680	0.000
HOUR14	57.015518	10.795696	5.281319	0.000
HOUR15	36.595802	12.210950	2.996966	0.003
HOUR16	9.606807	13.333532	0.720500	0.471
HOUR17	3.098288	14.171595	0.218627	0.827
HOUR18	-3.169965	14.848388	-0.213489	0.831
HOUR19	-4.249977	15.485956	-0.274441	0.784
HOUR20	2.902435	16.163590	0.179566	0.858
HOUR21	-0.031645	16.778222	-0.001886	0.998
HOUR22	-4.927639	17.083589	-0.288443	0.773
HOUR23	-27.131379	16.834198	-1.611682	0.107
HOUR24	-91.739698	16.182194	-5.669175	0.000
WEEKEND	-19.136315	6.461608	-2.961541	0.003

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.647444	0.014520	44.590674	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	6264.389324	1.000000
1	4055.843523	0.647444

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2751
R-squared: 0.679
Standard Error of Estimate: 413.795
Variance of White Noise Error (sigsq): 24690.349
Variance of sigsq:21948314.056
-2*log(likelihood): 35629.131

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	3368.229513	384.614049	8.757427	0.000
INTER	0.228029	1.258810	0.181147	0.856
JULY	-273.691360	24.957495	-10.966299	0.000
MAY	-27.703221	30.160945	-0.918513	0.358
JUNE	39.039079	25.360288	1.539378	0.124
TEMP	-28.269750	6.709269	-4.213537	0.000
HUMID	-46.814676	8.988629	-5.208211	0.000
TEMPHUM	0.593350	0.095813	6.192793	0.000
TLAG	6.913740	5.767152	1.198813	0.231
TLAG2	2.351728	5.770053	0.407575	0.684
TLAG3	0.260877	5.717180	0.045630	0.964
TLAG4	3.241852	5.690225	0.569723	0.569
TLAG5	2.578497	4.186763	0.615869	0.538
HLAG	1.155582	7.289777	0.158521	0.874
HLAG2	2.526078	7.288714	0.346574	0.729
HLAG3	4.189472	5.214493	0.803428	0.422
HOUR1	-670.463539	71.493405	-9.377977	0.000
HOUR2	-627.305173	69.082313	-9.080547	0.000
HOUR3	-655.529937	67.846995	-9.661886	0.000
HOUR4	-478.845383	67.423904	-7.102012	0.000
HOUR5	-367.954891	66.760818	-5.511540	0.000

HOUR6	-322.772979	65.992024	-4.891091	0.000
HOUR7	-103.166031	64.649044	-1.595786	0.111
HOUR8	23.605283	62.326396	0.378737	0.705
HOUR9	-6.748544	59.644448	-0.113146	0.910
HOUR10	36.443942	56.729459	0.642417	0.521
HOUR12	-70.401582	55.874764	-1.259989	0.208
HOUR13	-67.159598	56.891937	-1.180477	0.238
HOUR14	-156.795947	58.285950	-2.690116	0.007
HOUR15	-558.390805	60.198041	-9.275897	0.000
HOUR16	-839.603072	62.277312	-13.481685	0.000
HOUR17	-1014.695515	64.053635	-15.841342	0.000
HOUR18	-1105.497815	66.017417	-16.745548	0.000
HOUR19	-1154.385732	68.453842	-16.863710	0.000
HOUR20	-1105.783838	71.447622	-15.476846	0.000
HOUR21	-971.108088	74.032626	-13.117299	0.000
HOUR22	-890.270202	75.507041	-11.790559	0.000
HOUR23	-718.975980	75.296266	-9.548627	0.000
HOUR24	-683.089188	73.840698	-9.250850	0.000
WEEKEND	-907.011663	18.065744	-50.206161	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.925653	0.007214	128.313339	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	171226.037930	1.000000
1	158247.712141	0.924204

Total Time for Computation and Printing: 0.09(seconds)
Number of Iterations: 7

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2751
R-squared: 0.970
Standard Error of Estimate: 585.539
Variance of White Noise Error (sigsq): 15990.064
Variance of sigsq:185883.059
-2*log(likelihood): 34432.852

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1722.930906	543.658988	3.169139	0.002
INTER	0.042917	0.562146	0.076345	0.939
JULY	-7.556049	113.435944	-0.066611	0.947
MAY	33.154643	175.675038	0.188727	0.850
JUNE	32.925807	147.296422	0.223534	0.823
TEMP	-10.254986	5.870219	-1.746951	0.081
HUMID	-20.383669	7.623220	-2.673892	0.008

TEMPHUM	0.288471	0.096497	2.989444	0.003
TLAG	7.055903	1.267107	5.568514	0.000
TLAG2	2.484319	1.267001	1.960787	0.050
TLAG3	0.473904	1.267917	0.373766	0.709
TLAG4	1.864584	1.253322	1.487713	0.137
TLAG5	1.817103	1.251957	1.451410	0.147
HLAG	1.818400	1.578881	1.151702	0.250
HLAG2	1.625331	1.578849	1.029440	0.303
HLAG3	2.001559	1.581120	1.265912	0.206
HOUR1	-636.197207	37.998734	-16.742590	0.000
HOUR2	-596.660220	36.936668	-16.153602	0.000
HOUR3	-626.333498	36.530156	-17.145656	0.000
HOUR4	-450.807518	36.452720	-12.366910	0.000
HOUR5	-342.045143	36.238022	-9.438847	0.000
HOUR6	-299.048684	35.777071	-8.358669	0.000
HOUR7	-88.230622	33.393958	-2.642113	0.008
HOUR8	18.672318	28.876422	0.646629	0.518
HOUR9	-10.019271	22.503139	-0.445239	0.656
HOUR10	34.798177	14.341373	2.426419	0.015
HOUR12	-47.415752	14.614032	-3.244536	0.001
HOUR13	-38.054345	23.523357	-1.617726	0.106
HOUR14	-124.308693	30.949330	-4.016523	0.000
HOUR15	-524.188961	36.931332	-14.193611	0.000
HOUR16	-802.841270	41.383996	-19.399801	0.000
HOUR17	-975.239206	44.431755	-21.949149	0.000
HOUR18	-1063.954429	46.154005	-23.052267	0.000
HOUR19	-1112.162836	46.790333	-23.769073	0.000
HOUR20	-1061.723038	46.461420	-22.851713	0.000
HOUR21	-925.645580	45.576897	-20.309535	0.000
HOUR22	-844.116796	44.169416	-19.110889	0.000
HOUR23	-671.160086	42.071859	-15.952708	0.000
HOUR24	-637.918572	39.789524	-16.032325	0.000
WEEKEND	-22.439573	22.537267	-0.995665	0.320

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.976403	0.004117	237.140096	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	342855.949625	1.000000
1	334765.460584	0.976403

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2755
R-squared:	0.602
Standard Error of Estimate:	12.704
Variance of White Noise Error (sigsq):	38.964
Variance of sigsq:	19.470
-2*log(likelihood):	17907.471

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	101.514286	11.801131	8.602081	0.000
INTER	0.043125	0.038646	1.115882	0.265
JULY	0.074412	0.765653	0.097187	0.923
MAY	5.986498	0.926190	6.463576	0.000
JUNE	9.033577	0.778858	11.598485	0.000
TEMP	-0.369888	0.206452	-1.791642	0.073
HUMID	-0.964494	0.275932	-3.495403	0.000
TEMPHUM	0.007609	0.002941	2.586840	0.010
TLAG	0.006138	0.177872	0.034509	0.972
TLAG2	-0.070009	0.178017	-0.393272	0.694
TLAG3	-0.047004	0.176410	-0.266451	0.790
TLAG4	0.075487	0.175509	0.430101	0.667
TLAG5	0.125518	0.129470	0.969483	0.332
HLAG	-0.019834	0.223800	-0.088626	0.929
HLAG2	-0.012970	0.223779	-0.057960	0.954
HLAG3	0.309958	0.160091	1.936141	0.053
HOUR1	-12.936508	2.193754	-5.896972	0.000
HOUR2	-13.214491	2.119005	-6.236177	0.000
HOUR3	-13.057559	2.080594	-6.275881	0.000
HOUR4	-11.031139	2.067232	-5.336189	0.000
HOUR5	-11.266594	2.046645	-5.504910	0.000
HOUR6	-11.077949	2.022888	-5.476304	0.000
HOUR7	-2.526394	1.982354	-1.274441	0.203
HOUR8	0.119923	1.908879	0.062824	0.950
HOUR9	0.761540	1.826163	0.417016	0.677
HOUR10	0.518251	1.735057	0.298694	0.765
HOUR12	-0.289749	1.712825	-0.169165	0.866
HOUR13	2.305006	1.745070	1.320868	0.187
HOUR14	14.626622	1.788426	8.178489	0.000
HOUR15	7.629318	1.847590	4.129335	0.000
HOUR16	1.053972	1.910839	0.551575	0.581
HOUR17	0.150581	1.964483	0.076652	0.939
HOUR18	-4.358538	2.025034	-2.152329	0.031
HOUR19	-2.553029	2.100133	-1.215651	0.224
HOUR20	-6.742904	2.192446	-3.075517	0.002
HOUR21	-3.908534	2.272354	-1.720037	0.086
HOUR22	-8.631696	2.318162	-3.723508	0.000
HOUR23	-13.007004	2.312058	-5.625724	0.000
HOUR24	-14.564152	2.266925	-6.424628	0.000
WEEKEND	-29.352488	0.554296	-52.954583	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value

1	0.871045	0.009358	93.076571	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	161.391546	1.000000
1	140.501884	0.870565

Total Time for Computation and Printing: 0.09(seconds)
Number of Iterations: 8

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2755
R-squared:	0.924
Standard Error of Estimate:	17.740
Variance of White Noise Error (sigsq):	30.717
Variance of sigsq:	0.685
-2*log(likelihood):	17251.362

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	86.995797	22.577824	3.853152	0.000
INTER	-0.002731	0.024925	-0.109572	0.913
JULY	-0.399632	3.935213	-0.101553	0.919
MAY	3.193262	5.294882	0.603085	0.547
JUNE	5.187457	4.578917	1.132900	0.257
TEMP	-0.253851	0.258373	-0.982498	0.326
HUMID	-0.401028	0.335708	-1.194572	0.232
TEMPHUM	0.004149	0.004258	0.974381	0.330
TLAG	0.026681	0.056367	0.473347	0.636
TLAG2	-0.040809	0.056487	-0.722451	0.470
TLAG3	-0.015859	0.056308	-0.281652	0.778
TLAG4	0.050893	0.055571	0.915835	0.360
TLAG5	-0.067069	0.055525	-1.207913	0.227
HLAG	0.013201	0.068803	0.191861	0.848
HLAG2	-0.042206	0.068856	-0.612961	0.540
HLAG3	0.151925	0.069072	2.199512	0.028
HOUR1	-11.542387	1.684230	-6.853212	0.000
HOUR2	-12.364644	1.637789	-7.549594	0.000
HOUR3	-12.608224	1.619504	-7.785239	0.000
HOUR4	-10.846440	1.615798	-6.712746	0.000
HOUR5	-11.337517	1.606417	-7.057644	0.000
HOUR6	-11.304630	1.586434	-7.125813	0.000
HOUR7	-2.971502	1.489689	-1.994713	0.046
HOUR8	-0.263935	1.287397	-0.205014	0.838
HOUR9	0.577360	1.000785	0.576907	0.564
HOUR10	0.509248	0.635984	0.800725	0.423
HOUR12	0.421428	0.645925	0.652442	0.514
HOUR13	3.776974	1.033254	3.655417	0.000
HOUR14	16.713639	1.354429	12.339990	0.000
HOUR15	10.232932	1.612541	6.345842	0.000

HOUR16	4.057549	1.803897	2.249324	0.025
HOUR17	3.462177	1.934769	1.789453	0.074
HOUR18	-1.101038	2.011675	-0.547324	0.584
HOUR19	0.432316	2.042101	0.211701	0.832
HOUR20	-4.072617	2.032360	-2.003886	0.045
HOUR21	-1.397477	1.999454	-0.698929	0.485
HOUR22	-6.169957	1.944223	-3.173481	0.002
HOUR23	-10.563303	1.858100	-5.685001	0.000
HOUR24	-12.443067	1.761482	-7.063976	0.000
WEEKEND	-1.850694	0.984406	-1.880011	0.060

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.949944	0.005952	159.595295	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	314.699686	1.000000
1	298.947107	0.949944

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.859
Standard Error of Estimate: 379.555
Variance of White Noise Error (sigsq): 33301.767
Variance of sigsq:15513459.926
-2*log(likelihood): 36505.711

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	4540.107944	349.088437	13.005610	0.000
INTER	-4.482142	1.657958	-2.703411	0.007
JULY	-401.098828	22.875008	-17.534369	0.000
MAY	-582.683878	27.671440	-21.057230	0.000
JUNE	-399.170619	23.268242	-17.155169	0.000
TEMP	-37.370071	6.125180	-6.101057	0.000
HUMID	-61.121884	8.164747	-7.486072	0.000
TEMPHUM	0.822097	0.086656	9.486882	0.000
TLAG	10.190707	5.315867	1.917036	0.055
TLAG2	5.120562	5.320347	0.962449	0.336

TLAG3	4.685086	5.273006	0.888504	0.374
TLAG4	3.000235	5.243586	0.572172	0.567
TLAG5	9.520867	3.868041	2.461418	0.014
HLAG	11.729226	6.686620	1.754134	0.080
HLAG2	7.671810	6.685955	1.147452	0.251
HLAG3	11.401220	4.782970	2.383711	0.017
HOUR1	-1449.058403	65.525026	-22.114580	0.000
HOUR2	-1419.590331	63.289726	-22.430028	0.000
HOUR3	-1361.504498	62.140368	-21.910146	0.000
HOUR4	-649.595510	61.737529	-10.521890	0.000
HOUR5	-532.103365	61.119997	-8.705880	0.000
HOUR6	-551.832144	60.409401	-9.134872	0.000
HOUR7	-538.435234	59.198997	-9.095344	0.000
HOUR8	-329.143413	57.018466	-5.772576	0.000
HOUR9	-107.601120	54.553424	-1.972399	0.049
HOUR10	6.824158	51.836314	0.131648	0.895
HOUR12	-13.389370	51.162248	-0.261704	0.794
HOUR13	-78.517160	52.127101	-1.506264	0.132
HOUR14	-134.773641	53.422961	-2.522766	0.012
HOUR15	-211.880505	55.188814	-3.839193	0.000
HOUR16	-357.661649	57.085694	-6.265346	0.000
HOUR17	-591.546169	58.677820	-10.081257	0.000
HOUR18	-723.285071	60.486114	-11.957870	0.000
HOUR19	-785.568873	62.744857	-12.520052	0.000
HOUR20	-841.174478	65.501875	-12.841991	0.000
HOUR21	-733.361260	67.887203	-10.802644	0.000
HOUR22	-1023.615319	69.253199	-14.780766	0.000
HOUR23	-1379.838876	69.068608	-19.977800	0.000
HOUR24	-1480.760749	67.715430	-21.867405	0.000
WEEKEND	-795.397770	16.557423	-48.038743	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.876671	0.009166	95.646731	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	144061.644679	1.000000
1	126295.625012	0.876678

Total Time for Computation and Printing: 0.11(seconds)
Number of Iterations: 10

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.974
Standard Error of Estimate: 524.935
Variance of White Noise Error (sigsq): 26180.152
Variance of sigsq:497568.300
-2*log(likelihood): 35841.943

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	2215.152185	661.220724	3.350095	0.001
INTER	-0.803596	0.888125	-0.904823	0.366
JULY	-251.075132	116.310859	-2.158656	0.031
MAY	-418.601956	157.247060	-2.662065	0.008
JUNE	-358.524860	135.888144	-2.638382	0.008
TEMP	-9.315648	7.544006	-1.234841	0.217
HUMID	-14.286067	9.805215	-1.456987	0.145
TEMPHUM	0.325735	0.124354	2.619407	0.009
TLAG	10.959228	1.646405	6.656458	0.000
TLAG2	6.488551	1.649401	3.933883	0.000
TLAG3	4.771077	1.644955	2.900430	0.004
TLAG4	2.406250	1.622040	1.483471	0.138
TLAG5	2.776528	1.620970	1.712880	0.087
HLAG	12.653885	2.009324	6.297584	0.000
HLAG2	6.923791	2.011093	3.442800	0.001
HLAG3	6.032871	2.017088	2.990882	0.003
HOUR1	-1371.219931	49.177693	-27.882966	0.000
HOUR2	-1359.202973	47.826311	-28.419566	0.000
HOUR3	-1312.776389	47.299470	-27.754569	0.000
HOUR4	-608.866303	47.199636	-12.899809	0.000
HOUR5	-499.526362	46.932399	-10.643529	0.000
HOUR6	-527.355693	46.355716	-11.376282	0.000
HOUR7	-530.858064	43.527485	-12.195928	0.000
HOUR8	-325.765573	37.613409	-8.660889	0.000
HOUR9	-104.967656	29.236655	-3.590276	0.000
HOUR10	10.444850	18.572074	0.562395	0.574
HOUR12	-0.248257	18.848840	-0.013171	0.989
HOUR13	-42.058146	30.182293	-1.393471	0.164
HOUR14	-79.797664	39.577203	-2.016253	0.044
HOUR15	-142.417490	47.123596	-3.022212	0.003
HOUR16	-271.724558	52.719986	-5.154109	0.000
HOUR17	-497.770554	56.539446	-8.803952	0.000
HOUR18	-625.389912	58.782482	-10.639053	0.000
HOUR19	-683.589157	59.664928	-11.457135	0.000
HOUR20	-739.286630	59.370860	-12.452012	0.000
HOUR21	-630.779593	58.398397	-10.801317	0.000
HOUR22	-919.035195	56.774593	-16.187438	0.000
HOUR23	-1273.155470	54.251835	-23.467510	0.000
HOUR24	-1384.142772	51.429674	-26.913310	0.000
WEEKEND	-3.796065	28.752561	-0.132025	0.895

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.951310	0.005872	161.995236	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	275556.371559	1.000000
1	262139.669540	0.951310

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to   0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2227
R-squared: 0.048
Standard Error of Estimate: 392.288
Variance of White Noise Error (sigsq): 22737.628
Variance of sigsq:22053281.330
-2*log(likelihood): 28658.807

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	4843.884815	389.479462	12.436817	0.000
INTER	0.922654	1.734315	0.531999	0.595
JULY	-4.401193	37.167547	-0.118415	0.906
MAY	51.498324	41.798174	1.232071	0.218
JUNE	-39.192734	37.925343	-1.033418	0.302
TEMP	8.014663	7.074840	1.132840	0.257
HUMID	-2.356306	9.474869	-0.248690	0.804
TEMPHUM	-0.102937	0.103256	-0.996903	0.319
TLAG	2.089647	6.016041	0.347346	0.728
TLAG2	-0.070694	6.021199	-0.011741	0.991
TLAG3	-3.607197	5.980403	-0.603170	0.546
TLAG4	3.793325	5.952808	0.637233	0.524
TLAG5	5.696083	4.389433	1.297681	0.195
HLAG	1.205064	7.588537	0.158801	0.874
HLAG2	2.124202	7.587271	0.279969	0.780
HLAG3	-2.995642	5.515150	-0.543166	0.587
HOUR1	-48.487647	75.387729	-0.643177	0.520
HOUR2	-29.355100	72.582460	-0.404438	0.686
HOUR3	-16.870217	71.161868	-0.237068	0.813
HOUR4	-39.123167	70.664525	-0.553646	0.580
HOUR5	-8.297696	70.057134	-0.118442	0.906
HOUR6	-37.585830	69.187229	-0.543248	0.587
HOUR7	-82.862664	67.945153	-1.219552	0.223
HOUR8	-70.766722	65.433735	-1.081502	0.280
HOUR9	-59.465711	62.792674	-0.947017	0.344
HOUR10	-41.599289	59.723620	-0.696530	0.486
HOUR12	-56.751825	58.864157	-0.964115	0.335
HOUR13	-41.884364	59.914579	-0.699068	0.485
HOUR14	-32.759143	61.256891	-0.534783	0.593
HOUR15	-41.498451	63.208827	-0.656529	0.512
HOUR16	-87.297604	65.349586	-1.335855	0.182
HOUR17	-104.456359	67.053439	-1.557808	0.119
HOUR18	-174.294171	68.989237	-2.526397	0.012

HOUR19	-135.545153	71.321033	-1.900493	0.057
HOUR20	-108.756350	74.123704	-1.467228	0.142
HOUR21	-87.237673	76.827758	-1.135497	0.256
HOUR22	-76.355443	78.645130	-0.970886	0.332
HOUR23	-58.137202	78.835702	-0.737448	0.461
HOUR24	-74.343219	77.681706	-0.957024	0.339
WEEKEND	11.717287	18.994054	0.616892	0.537

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.923087	0.008150	113.266656	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	153889.959571	1.000000
1	142016.406536	0.922844

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 6

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2227
R-squared: 0.862
Standard Error of Estimate: 397.643
Variance of White Noise Error (sigsq): 22388.849
Variance of sigsq:450166.634
-2*log(likelihood): 28624.338

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	4579.751035	630.064287	7.268704	0.000
INTER	0.627199	0.835442	0.750739	0.453
JULY	17.634862	111.396149	0.158308	0.874
MAY	64.874384	140.207562	0.462702	0.644
JUNE	-22.268631	126.110721	-0.176580	0.860
TEMP	9.139603	7.639660	1.196336	0.232
HUMID	9.837128	9.849928	0.998701	0.318
TEMPHUM	-0.146500	0.127313	-1.150711	0.250
TLAG	1.705851	1.667391	1.023066	0.306
TLAG2	-0.410574	1.672747	-0.245449	0.806
TLAG3	-3.084758	1.665947	-1.851654	0.064
TLAG4	3.499839	1.646975	2.125010	0.034
TLAG5	0.111014	1.646797	0.067412	0.946
HLAG	0.545226	2.046092	0.266472	0.790
HLAG2	0.794293	2.048539	0.387737	0.698
HLAG3	-0.190435	2.063506	-0.092287	0.926
HOUR1	4.206398	50.299524	0.083627	0.933
HOUR2	7.367373	48.703558	0.151270	0.880
HOUR3	7.408061	48.032708	0.154230	0.877

HOUR4	-23.179577	47.839499	-0.484528	0.628
HOUR5	0.302098	47.450004	0.006367	0.995
HOUR6	-41.980961	46.674896	-0.899433	0.369
HOUR7	-96.248725	43.607516	-2.207159	0.027
HOUR8	-82.928443	37.592681	-2.205973	0.027
HOUR9	-63.764420	29.324741	-2.174424	0.030
HOUR10	-44.849053	18.850410	-2.379208	0.017
HOUR12	-28.662640	19.081177	-1.502142	0.133
HOUR13	10.472232	30.025320	0.348780	0.727
HOUR14	39.695036	38.984915	1.018215	0.309
HOUR15	54.220000	46.208093	1.173388	0.241
HOUR16	22.454637	51.580195	0.435334	0.663
HOUR17	14.062897	55.308795	0.254261	0.799
HOUR18	-53.546691	57.575378	-0.930028	0.352
HOUR19	-18.212359	58.567632	-0.310963	0.756
HOUR20	0.293183	58.473805	0.005014	0.996
HOUR21	12.574095	57.882174	0.217236	0.828
HOUR22	13.938356	56.891729	0.244998	0.806
HOUR23	24.196524	54.977135	0.440120	0.660
HOUR24	-4.231396	52.530638	-0.080551	0.936
WEEKEND	8.982573	29.111566	0.308557	0.758

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.926502	0.007974	116.193894	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	158119.570318	1.000000
1	146498.066121	0.926502

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations: 2755
R-squared: 0.786
Standard Error of Estimate: 89.076
Variance of White Noise Error (sigsq): 1963.259
Variance of sigsq: 47060.519
-2*log(likelihood): 28706.352

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var Coef Std. Error t-Ratio P-Value

CNST	618.530379	81.926136	7.549854	0.000
INTER	0.387270	0.389099	0.995299	0.320
JULY	-54.060944	5.368442	-10.070137	0.000
MAY	-85.503529	6.494097	-13.166346	0.000
JUNE	-45.119991	5.460728	-8.262632	0.000
TEMP	1.529291	1.437493	1.063859	0.287
HUMID	-3.429836	1.916151	-1.789961	0.074
TEMPHUM	0.014887	0.020337	0.732036	0.464
TLAG	0.937432	1.247559	0.751413	0.452
TLAG2	0.294573	1.248610	0.235920	0.814
TLAG3	-0.307488	1.237500	-0.248475	0.804
TLAG4	0.913078	1.230596	0.741980	0.458
TLAG5	2.089179	0.907775	2.301429	0.021
HLAG	0.981505	1.569255	0.625459	0.532
HLAG2	0.766550	1.569099	0.488528	0.625
HLAG3	0.824070	1.122496	0.734141	0.463
HOUR1	-224.653192	15.377800	-14.608929	0.000
HOUR2	-251.309420	14.853207	-16.919540	0.000
HOUR3	-246.026123	14.583469	-16.870206	0.000
HOUR4	-208.653760	14.488928	-14.400911	0.000
HOUR5	-179.454129	14.344002	-12.510744	0.000
HOUR6	-134.059182	14.177235	-9.455947	0.000
HOUR7	-61.361734	13.893170	-4.416683	0.000
HOUR8	-25.386313	13.381430	-1.897130	0.058
HOUR9	-2.756075	12.802920	-0.215269	0.830
HOUR10	10.318853	12.165252	0.848223	0.396
HOUR12	-4.331723	12.007059	-0.360765	0.718
HOUR13	-4.021803	12.233496	-0.328753	0.742
HOUR14	-29.616330	12.537616	-2.362198	0.018
HOUR15	-53.222969	12.952037	-4.109235	0.000
HOUR16	-80.802585	13.397208	-6.031300	0.000
HOUR17	-109.149266	13.770857	-7.926105	0.000
HOUR18	-126.666182	14.195239	-8.923146	0.000
HOUR19	-151.454608	14.725334	-10.285309	0.000
HOUR20	-154.269234	15.372367	-10.035490	0.000
HOUR21	-180.382351	15.932170	-11.321895	0.000
HOUR22	-201.760757	16.252750	-12.413946	0.000
HOUR23	-209.425592	16.209429	-12.919986	0.000
HOUR24	-215.227925	15.891857	-13.543283	0.000
WEEKEND	-262.076590	3.885794	-67.444802	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.868563	0.009442	91.991949	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	7934.551597	1.000000
1	6872.413350	0.866138

Total Time for Computation and Printing: 0.09(seconds)
Number of Iterations: 8

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2755
R-squared:	0.962
Standard Error of Estimate:	136.371
Variance of White Noise Error (sigsq):	1394.500
Variance of sigsq:	1411.711
-2*log(likelihood):	27762.764

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	549.186191	155.889748	3.522914	0.000
INTER	0.148154	0.204011	0.726209	0.468
JULY	-41.939119	29.507726	-1.421293	0.155
MAY	-56.616879	41.751535	-1.356043	0.175
JUNE	-57.238208	35.769077	-1.600215	0.110
TEMP	0.914284	1.743993	0.524247	0.600
HUMID	-0.137786	2.266908	-0.060782	0.952
TEMPHUM	0.009132	0.028727	0.317901	0.751
TLAG	1.078779	0.379812	2.840299	0.005
TLAG2	0.563198	0.380213	1.481268	0.139
TLAG3	0.096775	0.379347	0.255110	0.799
TLAG4	0.692689	0.373915	1.852531	0.064
TLAG5	0.029962	0.373578	0.080203	0.936
HLAG	1.172696	0.465067	2.521567	0.012
HLAG2	0.486400	0.465364	1.045204	0.296
HLAG3	0.437069	0.466416	0.937078	0.349
HOUR1	-209.792533	11.335011	-18.508365	0.000
HOUR2	-241.993623	11.033268	-21.933087	0.000
HOUR3	-240.917879	10.924059	-22.053880	0.000
HOUR4	-206.313469	10.913975	-18.903605	0.000
HOUR5	-179.754316	10.865706	-16.543271	0.000
HOUR6	-137.051298	10.745640	-12.754131	0.000
HOUR7	-65.686690	10.093766	-6.507649	0.000
HOUR8	-28.605585	8.722214	-3.279624	0.001
HOUR9	-3.691675	6.774288	-0.544954	0.586
HOUR10	10.261360	4.291683	2.390987	0.017
HOUR12	3.180456	4.358642	0.729690	0.466
HOUR13	11.763108	7.001450	1.680096	0.093
HOUR14	-6.899505	9.193579	-0.750470	0.453
HOUR15	-23.619793	10.950752	-2.156911	0.031
HOUR16	-46.247945	12.251421	-3.774905	0.000
HOUR17	-71.486330	13.135827	-5.442088	0.000
HOUR18	-89.032890	13.649125	-6.522974	0.000
HOUR19	-115.800986	13.842244	-8.365767	0.000
HOUR20	-122.172687	13.755207	-8.881923	0.000
HOUR21	-150.556678	13.507102	-11.146483	0.000
HOUR22	-173.333424	13.109608	-13.221862	0.000
HOUR23	-182.270833	12.510292	-14.569671	0.000
HOUR24	-191.917544	11.851875	-16.193011	0.000
WEEKEND	-34.360665	6.652797	-5.164845	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.961777	0.005217	184.351769	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	18597.004855	1.000000
1	17886.169451	0.961777

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations: 2755
R-squared: 0.585
Standard Error of Estimate: 196.069
Variance of White Noise Error (sigsq): 724.902
Variance of sigsq:1104714.962
-2*log(likelihood): 25958.901

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1747.152756	180.331193	9.688578	0.000
INTER	1.101515	0.856464	1.286121	0.199
JULY	31.725188	11.816712	2.684773	0.007
MAY	605.238910	14.294440	42.340861	0.000
JUNE	310.943562	12.019848	25.869176	0.000
TEMP	4.229837	3.164130	1.336809	0.181
HUMID	-4.146463	4.217724	-0.983104	0.326
TEMPHUM	-0.015921	0.044765	-0.355658	0.722
TLAG	-0.104078	2.746057	-0.037901	0.970
TLAG2	-0.084245	2.748371	-0.030653	0.976
TLAG3	-0.474108	2.723916	-0.174054	0.862
TLAG4	0.358032	2.708718	0.132178	0.895
TLAG5	5.010743	1.998143	2.507700	0.012
HLAG	-0.184865	3.454157	-0.053520	0.957
HLAG2	0.355827	3.453813	0.103025	0.918
HLAG3	-1.295397	2.470774	-0.524288	0.600
HOUR1	18.627184	33.848747	0.550306	0.582
HOUR2	33.445367	32.694041	1.022980	0.306
HOUR3	47.032068	32.100309	1.465159	0.143
HOUR4	55.315483	31.892212	1.734451	0.083
HOUR5	62.691214	31.573208	1.985583	0.047
HOUR6	58.301724	31.206131	1.868278	0.062

HOUR7	57.198099	30.580863	1.870389	0.062
HOUR8	30.730289	29.454450	1.043316	0.297
HOUR9	18.501763	28.181066	0.656532	0.512
HOUR10	9.243815	26.777468	0.345209	0.730
HOUR12	-27.562508	26.429260	-1.042879	0.297
HOUR13	-54.215785	26.927682	-2.013385	0.044
HOUR14	-75.096330	27.597094	-2.721168	0.007
HOUR15	-84.941907	28.509294	-2.979446	0.003
HOUR16	-116.195631	29.489179	-3.940280	0.000
HOUR17	-127.894604	30.311635	-4.219324	0.000
HOUR18	-124.467547	31.245759	-3.983502	0.000
HOUR19	-100.530123	32.412574	-3.101578	0.002
HOUR20	-98.157735	33.836787	-2.900918	0.004
HOUR21	-62.425238	35.068994	-1.780069	0.075
HOUR22	-39.507335	35.774637	-1.104339	0.270
HOUR23	-26.111766	35.679281	-0.731847	0.464
HOUR24	-8.378927	34.980260	-0.239533	0.811
WEEKEND	4.363005	8.553190	0.510103	0.610

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.990622	0.002603	380.560577	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	38443.166488	1.000000
1	38061.507114	0.990072

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 7

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.996
Standard Error of Estimate: 290.591
Variance of White Noise Error (sigsq): 404.508
Variance of sigsq: 118.786
-2*log(likelihood): 24350.373

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	2404.075766	163.791997	14.677614	0.000
INTER	0.069532	0.108015	0.643729	0.520
JULY	3.885944	20.228524	0.192102	0.848
MAY	2.746455	35.188075	0.078051	0.938
JUNE	-0.270372	28.640644	-0.009440	0.992
TEMP	-1.959141	0.933761	-2.098119	0.036
HUMID	-1.642592	1.214130	-1.352896	0.176
TEMPHUM	0.021512	0.015357	1.400772	0.161

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TLAG          -0.333027      0.203146     -1.639350      0.101
TLAG2         -0.328216      0.202978     -1.616999      0.106
TLAG3         -0.156949      0.202790     -0.773948      0.439
TLAG4          0.009963      0.199426      0.049957      0.960
TLAG5         -0.062976      0.199155     -0.316216      0.752
HLAG           0.003679      0.250251      0.014702      0.988
HLAG2          0.116395      0.250373      0.464886      0.642
HLAG3         -0.080628      0.250438     -0.321946      0.748
HOUR1         27.542674      6.034759      4.564006      0.000
HOUR2         25.468191      5.885061      4.327600      0.000
HOUR3         24.998547      5.841557      4.279432      0.000
HOUR4         23.152873      5.852179      3.956282      0.000
HOUR5         21.813811      5.843077      3.733275      0.000
HOUR6         11.400305      5.795286      1.967169      0.049
HOUR7         12.076360      5.449634      2.215995      0.027
HOUR8         -4.674124      4.709999     -0.992383      0.321
HOUR9         -3.293768      3.652573     -0.901767      0.367
HOUR10        -1.280808      2.301099     -0.556607      0.578
HOUR12        -0.328635      2.339258     -0.140487      0.888
HOUR13        -0.259966      3.780192     -0.068771      0.945
HOUR14         1.626860      4.975968      0.326943      0.744
HOUR15        13.247005      5.929727      2.233999      0.026
HOUR16        -4.556795      6.632896     -0.686999      0.492
HOUR17        -8.001529      7.107051     -1.125858      0.260
HOUR18        -5.642550      7.375305     -0.765060      0.444
HOUR19         9.735207      7.466733      1.303811      0.192
HOUR20        -3.522869      7.399785     -0.476077      0.634
HOUR21        17.242093      7.241766      2.380924      0.017
HOUR22        26.680442      7.004890      3.808831      0.000
HOUR23        27.255834      6.666543      4.088451      0.000
HOUR24        28.463771      6.308538      4.511944      0.000
WEEKEND       -1.950424      3.563626     -0.547314      0.584

                     AUTOREGRESSIVE PARAMETERS (Phi)

Lag          Phi            Std. Error     T-Ratio        P-Value
-----------------------------------------------------------------
1            0.997602       0.001319     756.547194       0.000
                  AUTOCORRELATIONS AND AUTOCOVARIANCES

             Lag          Autocovariances       Autocorrelations
             ----------------------------------------------------
             0          84442.967149            1.000000
             1          84240.470111            0.997602
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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to    0.00001
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DEPENDENT VARIABLE: KWH

Number of Observations:	2659
R-squared:	0.325
Standard Error of Estimate:	90.890
Variance of White Noise Error (sigsq):	6524.043
Variance of sigsq:	52910.602
-2*log(likelihood):	30900.340

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	163.531350	84.014282	1.946471	0.052
INTER	0.117524	0.397409	0.295725	0.767
JULY	-9.216157	5.756906	-1.600887	0.110
MAY	19.451637	6.925117	2.808853	0.005
JUNE	2.933230	5.858134	0.500711	0.617
TEMP	2.817832	1.482477	1.900759	0.057
HUMID	8.458896	1.976346	4.280067	0.000
TEMPHUM	-0.074588	0.021005	-3.550967	0.000
TLAG	-2.029784	1.291909	-1.571151	0.116
TLAG2	-3.802319	1.293172	-2.940304	0.003
TLAG3	-1.088290	1.283021	-0.848224	0.396
TLAG4	0.802239	1.276315	0.628559	0.530
TLAG5	2.428344	0.940048	2.583213	0.010
HLAG	-0.543785	1.620033	-0.335663	0.737
HLAG2	-0.034585	1.619962	-0.021349	0.983
HLAG3	2.132211	1.160237	1.837737	0.066
HOUR1	-70.289959	15.963712	-4.403109	0.000
HOUR2	-85.394267	15.409307	-5.541733	0.000
HOUR3	-102.231023	15.132887	-6.755553	0.000
HOUR4	-141.924709	15.033243	-9.440725	0.000
HOUR5	-177.074063	14.886363	-11.895052	0.000
HOUR6	-202.101708	14.713952	-13.735379	0.000
HOUR7	-186.111252	14.415092	-12.910861	0.000
HOUR8	-140.557310	13.878950	-10.127374	0.000
HOUR9	-85.702404	13.292437	-6.447456	0.000
HOUR10	-31.510555	12.639715	-2.492980	0.013
HOUR12	16.543283	12.466860	1.326981	0.185
HOUR13	22.554688	12.698129	1.776221	0.076
HOUR14	39.034695	13.010461	3.000254	0.003
HOUR15	87.717307	13.441457	6.525878	0.000
HOUR16	107.545110	13.902177	7.735847	0.000
HOUR17	49.705547	14.280570	3.480642	0.001
HOUR18	34.990184	14.726361	2.376024	0.018
HOUR19	35.343099	15.280758	2.312915	0.021
HOUR20	29.421450	15.948421	1.844788	0.065
HOUR21	17.103001	16.514993	1.035605	0.300
HOUR22	5.040868	16.852676	0.299114	0.765
HOUR23	-25.735426	16.811842	-1.530792	0.126
HOUR24	-45.266537	16.492242	-2.744717	0.006
WEEKEND	-14.118949	4.004087	-3.526134	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value

1	0.458402	0.017235	26.596770	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	8261.001187	1.000000
1	3787.732281	0.458508

Total Time for Computation and Printing: 0.06(seconds)
Number of Iterations: 4

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2659
R-squared: 0.469
Standard Error of Estimate: 90.992
Variance of White Noise Error (sigsq): 6507.964
Variance of sigsq: 31856.789
-2*log(likelihood): 30893.774

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	196.851126	129.230035	1.523261	0.128
INTER	0.478993	0.454853	1.053071	0.292
JULY	-8.756277	9.279533	-0.943612	0.345
MAY	18.648266	11.200041	1.665018	0.096
JUNE	3.124219	9.457311	0.330350	0.741
TEMP	2.942019	1.995674	1.474198	0.141
HUMID	7.210059	2.652799	2.717907	0.007
TEMPHUM	-0.065987	0.031990	-2.062736	0.039
TLAG	-2.218345	0.924132	-2.400464	0.016
TLAG2	-3.587098	0.949257	-3.778848	0.000
TLAG3	-1.088361	0.943545	-1.153481	0.249
TLAG4	1.224588	0.910220	1.345375	0.179
TLAG5	1.393608	0.827929	1.683245	0.092
HLAG	0.377965	1.143240	0.330608	0.741
HLAG2	1.135500	1.142316	0.994033	0.320
HLAG3	0.523739	1.023768	0.511580	0.609
HOUR1	-54.997510	18.125267	-3.034301	0.002
HOUR2	-71.859648	17.369808	-4.137043	0.000
HOUR3	-89.665084	16.968945	-5.284069	0.000
HOUR4	-129.653956	16.802795	-7.716214	0.000
HOUR5	-165.057900	16.601087	-9.942596	0.000
HOUR6	-191.034777	16.347984	-11.685525	0.000
HOUR7	-176.236830	15.649054	-11.261820	0.000
HOUR8	-133.859507	14.273714	-9.378043	0.000
HOUR9	-82.940791	12.383996	-6.697417	0.000
HOUR10	-29.414373	9.482458	-3.101978	0.002
HOUR12	15.046134	9.273140	1.622550	0.105
HOUR13	23.021145	11.686467	1.969898	0.049
HOUR14	42.111553	13.149889	3.202427	0.001
HOUR15	91.282277	14.311106	6.378422	0.000
HOUR16	113.228905	15.287800	7.406488	0.000

HOUR17	57.034687	16.042418	3.555243	0.000
HOUR18	43.431395	16.752850	2.592478	0.010
HOUR19	45.786108	17.537358	2.610776	0.009
HOUR20	41.227543	18.457315	2.233670	0.026
HOUR21	29.767614	19.308163	1.541711	0.123
HOUR22	19.533878	19.808215	0.986150	0.324
HOUR23	-10.406810	19.641519	-0.529837	0.596
HOUR24	-29.617418	18.982201	-1.560273	0.119
WEEKEND	-16.085134	6.259475	-2.569726	0.010

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.462567	0.017193	26.903791	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	8279.515994	1.000000
1	3829.828878	0.462567

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2299
R-squared: 0.177
Standard Error of Estimate: 592.214
Variance of White Noise Error (sigsq): 60861.079
Variance of sigsq:110828647.780
-2*log(likelihood): 31849.118

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	5219.667302	583.287045	8.948711	0.000
INTER	-6.196897	2.610889	-2.373482	0.018
JULY	-228.353152	50.741820	-4.500295	0.000
MAY	-622.146512	58.298181	-10.671800	0.000
JUNE	59.188323	51.814562	1.142311	0.253
TEMP	-20.497765	10.568648	-1.939488	0.053
HUMID	-51.856889	14.150670	-3.664624	0.000
TEMPHUM	0.354293	0.153698	2.305117	0.021
TLAG	1.748027	9.013411	0.193936	0.846
TLAG2	-3.058109	9.020570	-0.339015	0.735
TLAG3	-0.146114	8.958902	-0.016309	0.987

TLAG4	4.037336	8.916794	0.452779	0.651
TLAG5	2.927565	6.575738	0.445207	0.656
HLAG	-1.445638	11.369552	-0.127150	0.899
HLAG2	-1.391804	11.368387	-0.122428	0.903
HLAG3	8.592660	8.256628	1.040698	0.298
HOUR1	-213.702595	112.406476	-1.901159	0.057
HOUR2	-250.577844	108.342957	-2.312821	0.021
HOUR3	-229.638667	106.174801	-2.162836	0.031
HOUR4	-160.248228	105.379923	-1.520671	0.128
HOUR5	-51.128546	104.422950	-0.489629	0.624
HOUR6	-162.615071	103.231089	-1.575253	0.115
HOUR7	-9.807783	101.272094	-0.096846	0.923
HOUR8	37.322435	97.575778	0.382497	0.702
HOUR9	25.364953	93.516778	0.271234	0.786
HOUR10	-5.907234	88.823048	-0.066506	0.947
HOUR12	-14.914317	87.442216	-0.170562	0.865
HOUR13	-38.739178	89.029904	-0.435125	0.664
HOUR14	-97.074413	91.100010	-1.065581	0.287
HOUR15	-95.053946	94.056776	-1.010602	0.312
HOUR16	-68.866249	97.336410	-0.707508	0.479
HOUR17	-15.093263	99.947736	-0.151012	0.880
HOUR18	-268.861151	102.848229	-2.614154	0.009
HOUR19	-274.722660	106.468513	-2.580318	0.010
HOUR20	-200.242781	110.827793	-1.806792	0.071
HOUR21	-150.185204	114.784938	-1.308405	0.191
HOUR22	-186.739038	117.459987	-1.589810	0.112
HOUR23	-227.358908	117.752209	-1.930825	0.054
HOUR24	-199.864880	115.898681	-1.724479	0.085
WEEKEND	-84.381587	27.959579	-3.017985	0.003

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.908776	0.008703	104.422577	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	350717.764840	1.000000
1	318814.090658	0.909033

Total Time for Computation and Printing: 0.06(seconds)
Number of Iterations: 7

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2299
R-squared: 0.862
Standard Error of Estimate: 601.267
Variance of White Noise Error (sigsq): 58978.199
Variance of sigsq:3026035.634
-2*log(likelihood): 31776.805

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	3212.679296	987.177016	3.254411	0.001
INTER	-0.493091	1.361305	-0.362219	0.717
JULY	-144.654965	158.777085	-0.911057	0.362
MAY	-427.806140	197.345040	-2.167808	0.030
JUNE	66.170726	175.878329	0.376230	0.707
TEMP	-1.436154	12.242905	-0.117305	0.907
HUMID	-1.368255	15.800263	-0.086597	0.931
TEMPHUM	-0.003643	0.204118	-0.017848	0.986
TLAG	2.737140	2.686214	1.018958	0.308
TLAG2	-3.023423	2.697672	-1.120752	0.263
TLAG3	-2.463005	2.686591	-0.916777	0.359
TLAG4	3.260544	2.655165	1.228001	0.220
TLAG5	2.853555	2.655130	1.074732	0.283
HLAG	-2.045913	3.282007	-0.623372	0.533
HLAG2	-4.596167	3.286560	-1.398473	0.162
HLAG3	0.005554	3.315093	0.001675	0.999
HOUR1	-215.946461	80.543867	-2.681104	0.007
HOUR2	-259.039841	77.939226	-3.323613	0.001
HOUR3	-241.627183	76.732180	-3.148968	0.002
HOUR4	-175.027978	76.301223	-2.293908	0.022
HOUR5	-70.305057	75.596032	-0.930010	0.352
HOUR6	-187.411228	74.377619	-2.519726	0.012
HOUR7	-62.379778	69.543044	-0.896995	0.370
HOUR8	-12.398804	60.005144	-0.206629	0.836
HOUR9	-7.410286	46.839786	-0.158205	0.874
HOUR10	-18.267603	30.167343	-0.605542	0.545
HOUR12	7.120920	30.491513	0.233538	0.815
HOUR13	-4.058700	47.871140	-0.084784	0.932
HOUR14	-58.000437	62.109321	-0.933844	0.350
HOUR15	-51.889802	73.614122	-0.704889	0.481
HOUR16	-17.312409	82.207752	-0.210593	0.833
HOUR17	30.550814	88.201920	0.346374	0.729
HOUR18	-234.798298	91.897027	-2.555015	0.011
HOUR19	-254.679763	93.586738	-2.721323	0.007
HOUR20	-194.637823	93.578492	-2.079942	0.038
HOUR21	-149.017796	92.737324	-1.606880	0.108
HOUR22	-190.666061	91.254233	-2.089394	0.037
HOUR23	-225.690858	88.221067	-2.558242	0.011
HOUR24	-201.947461	84.201533	-2.398382	0.017
WEEKEND	-38.252574	45.852070	-0.834261	0.404

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.914801	0.008424	108.596936	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	361521.596505	1.000000
1	330720.383505	0.914801

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2467
R-squared:	0.172
Standard Error of Estimate:	461.290
Variance of White Noise Error (sigsq):	16252.010
Variance of sigsq:	37927479.875
-2*log(likelihood):	30918.440

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	7000.924323	450.113457	15.553688	0.000
INTER	0.564818	1.422436	0.397078	0.691
JULY	-234.084780	31.983651	-7.318889	0.000
MAY	-305.350471	37.856597	-8.065978	0.000
JUNE	-84.425929	32.603437	-2.589479	0.010
TEMP	-20.726010	8.009837	-2.587569	0.010
HUMID	-47.736852	10.753711	-4.439105	0.000
TEMPHUM	0.450346	0.115596	3.895866	0.000
TLAG	0.193115	6.838406	0.028240	0.977
TLAG2	0.946516	6.843435	0.138310	0.890
TLAG3	-5.053039	6.787480	-0.744465	0.457
TLAG4	-0.454243	6.756303	-0.067232	0.946
TLAG5	9.678992	4.996587	1.937121	0.053
HLAG	-2.028366	8.652621	-0.234422	0.815
HLAG2	-0.822744	8.652880	-0.095083	0.924
HLAG3	-7.229655	6.268642	-1.153305	0.249
HOUR1	23.906307	84.884015	0.281635	0.778
HOUR2	-123.332788	81.913322	-1.505650	0.132
HOUR3	39.044518	80.265459	0.486442	0.627
HOUR4	39.789932	79.714072	0.499158	0.618
HOUR5	-86.300870	78.978065	-1.092719	0.275
HOUR6	6.516533	78.020945	0.083523	0.933
HOUR7	-204.795746	76.506251	-2.676850	0.007
HOUR8	-158.087553	73.622682	-2.147267	0.032
HOUR9	35.949697	70.330155	0.511156	0.609
HOUR10	97.773232	66.715381	1.465528	0.143
HOUR12	78.152985	65.742212	1.188779	0.235
HOUR13	34.213491	67.039632	0.510347	0.610
HOUR14	-126.239358	68.699145	-1.837568	0.066
HOUR15	-17.287141	70.998209	-0.243487	0.808
HOUR16	-19.242057	73.491813	-0.261826	0.793
HOUR17	-147.502026	75.566041	-1.951962	0.051
HOUR18	-74.837855	77.779203	-0.962183	0.336
HOUR19	-287.955999	80.549168	-3.574910	0.000

HOUR20	-273.522267	83.896458	-3.260236	0.001
HOUR21	-110.610440	87.031356	-1.270926	0.204
HOUR22	-58.900943	89.036957	-0.661534	0.508
HOUR23	-166.122938	89.162246	-1.863153	0.063
HOUR24	-12.301218	87.621234	-0.140391	0.888
WEEKEND	-72.309451	20.917300	-3.456921	0.001

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.960796	0.005582	172.121733	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	212788.031554	1.000000
1	204472.446168	0.960921

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 6

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2467
R-squared: 0.942
Standard Error of Estimate: 488.183
Variance of White Noise Error (sigsq): 14904.962
Variance of sigsq:180103.693
-2*log(likelihood): 30704.783

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	5174.048150	546.084972	9.474804	0.000
INTER	-0.600263	0.546838	-1.097697	0.272
JULY	-243.049012	107.084668	-2.269690	0.023
MAY	-184.152927	158.053940	-1.165127	0.244
JUNE	-242.130931	135.132544	-1.791803	0.073
TEMP	-3.964505	6.125572	-0.647206	0.518
HUMID	-5.632464	7.932489	-0.710050	0.478
TEMPHUM	0.094043	0.101691	0.924797	0.355
TLAG	-0.262315	1.316755	-0.199213	0.842
TLAG2	-0.002000	1.318052	-0.001517	0.999
TLAG3	-4.106097	1.313674	-3.125658	0.002
TLAG4	-0.763266	1.296734	-0.588606	0.556
TLAG5	-0.202064	1.295183	-0.156012	0.876
HLAG	-1.668913	1.640922	-1.017058	0.309
HLAG2	-2.121088	1.640992	-1.292564	0.196
HLAG3	0.246878	1.645357	0.150045	0.881
HOUR1	95.446908	39.338923	2.426271	0.015
HOUR2	-80.615952	38.270907	-2.106455	0.035
HOUR3	58.874046	37.904600	1.553216	0.121
HOUR4	43.398840	37.954798	1.143435	0.253

HOUR5	-97.434474	37.874009	-2.572595	0.010
HOUR6	-19.771363	37.524645	-0.526890	0.598
HOUR7	-247.108326	35.241816	-7.011793	0.000
HOUR8	-194.221117	30.424484	-6.383711	0.000
HOUR9	18.186196	23.570321	0.771572	0.440
HOUR10	87.566420	14.873970	5.887226	0.000
HOUR12	129.176439	15.118066	8.544508	0.000
HOUR13	131.238292	24.288258	5.403364	0.000
HOUR14	9.449893	31.876632	0.296452	0.767
HOUR15	160.352886	37.887930	4.232295	0.000
HOUR16	184.313434	42.326859	4.354527	0.000
HOUR17	72.322837	45.371149	1.594027	0.111
HOUR18	150.564695	47.124145	3.195065	0.001
HOUR19	-69.852561	47.803557	-1.461242	0.144
HOUR20	-74.031088	47.431127	-1.560812	0.119
HOUR21	67.034443	46.568825	1.439470	0.150
HOUR22	95.635445	45.286902	2.111768	0.035
HOUR23	-30.882690	43.354620	-0.712328	0.476
HOUR24	96.965341	41.141414	2.356879	0.019
WEEKEND	17.591247	23.255551	0.756432	0.449

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.968225	0.005035	192.299229	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	238322.275103	1.000000
1	230749.479410	0.968225

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations: 2539
R-squared: 0.814
Standard Error of Estimate: 81.737
Variance of White Noise Error (sigsq): 2410.969
Variance of sigsq: 36294.504
-2*log(likelihood): 26977.533

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value

CNST	1549.866249	76.677299	20.212844	0.000
INTER	1.021881	0.332892	3.069711	0.002
JULY	-1.130365	5.473549	-0.206514	0.836
MAY	-1.331556	6.481073	-0.205453	0.837
JUNE	40.023451	5.572192	7.182713	0.000
TEMP	-6.805134	1.358775	-5.008287	0.000
HUMID	-10.750902	1.814948	-5.923532	0.000
TEMPHUM	0.148365	0.019368	7.660518	0.000
TLAG	1.221572	1.180108	1.035135	0.301
TLAG2	0.597889	1.180840	0.506325	0.613
TLAG3	0.293255	1.171506	0.250323	0.802
TLAG4	0.484775	1.167256	0.415312	0.678
TLAG5	2.374721	0.857818	2.768328	0.006
HLAG	2.593319	1.477699	1.754971	0.079
HLAG2	0.468850	1.477613	0.317302	0.751
HLAG3	0.897404	1.059544	0.846972	0.397
HOUR1	-264.069770	14.587031	-18.103051	0.000
HOUR2	-365.970626	14.077788	-25.996317	0.000
HOUR3	-415.647949	13.832550	-30.048541	0.000
HOUR4	-385.109807	13.736317	-28.035885	0.000
HOUR5	-198.208577	13.604181	-14.569681	0.000
HOUR6	-119.653088	13.449861	-8.896232	0.000
HOUR7	-141.247436	13.191515	-10.707447	0.000
HOUR8	-82.820324	12.719098	-6.511494	0.000
HOUR9	-32.460546	12.215827	-2.657253	0.008
HOUR10	-7.832325	11.630256	-0.673444	0.501
HOUR12	-0.230575	11.475410	-0.020093	0.984
HOUR13	2.523935	11.670460	0.216267	0.829
HOUR14	-10.026348	11.943761	-0.839463	0.401
HOUR15	-25.551916	12.322927	-2.073526	0.038
HOUR16	-44.394133	12.740481	-3.484494	0.001
HOUR17	-87.767915	13.077032	-6.711608	0.000
HOUR18	-129.057464	13.468664	-9.582054	0.000
HOUR19	-162.384860	13.954903	-11.636402	0.000
HOUR20	-176.006226	14.545499	-12.100391	0.000
HOUR21	-146.854633	15.052658	-9.756060	0.000
HOUR22	-171.174802	15.358628	-11.145188	0.000
HOUR23	-184.040667	15.329212	-12.005879	0.000
HOUR24	-187.613202	15.053184	-12.463357	0.000
WEEKEND	-147.971206	3.706040	-39.927045	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.799582	0.011919	67.087305	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	6680.982639	1.000000
1	5338.203903	0.799015

Total Time for Computation and Printing: 0.14(seconds)
Number of Iterations: 15

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2539
R-squared:	0.937
Standard Error of Estimate:	94.900
Variance of White Noise Error (sigsq):	2265.156
Variance of sigsq:	4041.694
-2*log(likelihood):	26818.777

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1354.612408	163.565203	8.281788	0.000
INTER	0.119441	0.371479	0.321528	0.748
JULY	-15.883919	19.547903	-0.812564	0.417
MAY	-0.266205	23.901435	-0.011138	0.991
JUNE	38.966739	20.620803	1.889681	0.059
TEMP	-5.131188	2.150441	-2.386110	0.017
HUMID	-6.343563	2.784728	-2.277983	0.023
TEMPHUM	0.109160	0.035597	3.066564	0.002
TLAG	1.377604	0.498785	2.761919	0.006
TLAG2	0.891877	0.502135	1.776170	0.076
TLAG3	0.583926	0.499419	1.169211	0.242
TLAG4	0.447049	0.493850	0.905232	0.365
TLAG5	1.264440	0.493078	2.564382	0.010
HLAG	2.891219	0.596658	4.845688	0.000
HLAG2	0.574505	0.597759	0.961098	0.337
HLAG3	0.206097	0.600464	0.343229	0.731
HOUR1	-256.009025	14.597340	-17.538060	0.000
HOUR2	-360.333460	14.094459	-25.565611	0.000
HOUR3	-411.724747	13.838329	-29.752491	0.000
HOUR4	-382.132441	13.689131	-27.915025	0.000
HOUR5	-196.261996	13.488872	-14.549919	0.000
HOUR6	-119.863199	13.201747	-9.079344	0.000
HOUR7	-142.246396	12.351314	-11.516701	0.000
HOUR8	-83.104457	10.694812	-7.770539	0.000
HOUR9	-31.944798	8.428908	-3.789910	0.000
HOUR10	-6.966743	5.535388	-1.258583	0.208
HOUR12	3.122915	5.564034	0.561268	0.575
HOUR13	9.378831	8.522763	1.100445	0.271
HOUR14	-0.240189	10.925025	-0.021985	0.982
HOUR15	-13.350304	12.893104	-1.035461	0.301
HOUR16	-30.285459	14.379844	-2.106105	0.035
HOUR17	-72.166900	15.428862	-4.677396	0.000
HOUR18	-113.485849	16.114453	-7.042488	0.000
HOUR19	-148.607180	16.494045	-9.009747	0.000
HOUR20	-163.760489	16.659209	-9.830028	0.000
HOUR21	-135.541673	16.671099	-8.130338	0.000
HOUR22	-159.682683	16.505481	-9.674525	0.000
HOUR23	-171.896365	15.989561	-10.750537	0.000
HOUR24	-176.529074	15.270815	-11.559898	0.000
WEEKEND	-42.056013	8.047597	-5.225909	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.865151	0.009953	86.924596	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	9006.099760	1.000000
1	7791.637483	0.865151

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.569
Standard Error of Estimate: 595.325
Variance of White Noise Error (sigsq):167465.876
Variance of sigsq:93891813.777
-2*log(likelihood): 40956.216

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	2502.368612	553.015362	4.524953	0.000
INTER	-9.485815	1.811011	-5.237856	0.000
JULY	-57.756507	35.879448	-1.609738	0.108
MAY	-138.111573	43.402378	-3.182120	0.001
JUNE	-155.782485	36.498251	-4.268218	0.000
TEMP	-16.772392	9.674598	-1.733653	0.083
HUMID	-43.843992	12.930512	-3.390739	0.001
TEMPHUM	0.250733	0.137837	1.819059	0.069
TLAG	1.409299	8.335299	0.169076	0.866
TLAG2	-1.195190	8.342097	-0.143272	0.886
TLAG3	4.297528	8.266766	0.519856	0.603
TLAG4	-2.907296	8.224584	-0.353489	0.724
TLAG5	1.696333	6.067099	0.279595	0.780
HLAG	1.866951	10.487524	0.178016	0.859
HLAG2	9.111795	10.486562	0.868902	0.385
HLAG3	16.185604	7.502038	2.157494	0.031
HOUR1	-1371.386957	102.801994	-13.340081	0.000
HOUR2	-1365.692121	99.299158	-13.753310	0.000
HOUR3	-1364.433774	97.499148	-13.994315	0.000
HOUR4	-1362.211161	96.873001	-14.061825	0.000
HOUR5	-1350.003127	95.908252	-14.075985	0.000
HOUR6	-858.367403	94.794996	-9.054986	0.000
HOUR7	-7.316599	92.895534	-0.078762	0.937

HOUR8	205.269057	89.452408	2.294729	0.022
HOUR9	286.320985	85.576241	3.345800	0.001
HOUR10	142.247714	81.306885	1.749516	0.080
HOUR12	-54.959579	80.265082	-0.684726	0.494
HOUR13	-175.429793	81.776084	-2.145246	0.032
HOUR14	-538.044189	83.807817	-6.419976	0.000
HOUR15	-992.776280	86.580325	-11.466534	0.000
HOUR16	-1322.849562	89.544252	-14.773138	0.000
HOUR17	-1354.759360	92.058057	-14.716358	0.000
HOUR18	-1337.723257	94.895534	-14.096799	0.000
HOUR19	-1340.740749	98.414796	-13.623366	0.000
HOUR20	-1332.575303	102.740665	-12.970281	0.000
HOUR21	-1330.319203	106.485271	-12.492988	0.000
HOUR22	-1340.017583	108.631899	-12.335397	0.000
HOUR23	-1358.319923	108.345872	-12.536887	0.000
HOUR24	-1368.676590	106.230877	-12.883981	0.000
WEEKEND	-553.972731	25.974962	-21.327181	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.726082	0.013100	55.425044	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	354411.576189	1.000000
1	257378.266554	0.726213

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 8

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.799
Standard Error of Estimate: 605.916
Variance of White Noise Error (sigsq):165116.719
Variance of sigsq:19792036.998
-2*log(likelihood): 40917.246

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	3480.204163	1064.101640	3.270556	0.001
INTER	-7.725521	1.900413	-4.065181	0.000
JULY	-22.618843	88.226378	-0.256373	0.798
MAY	-83.247843	108.136462	-0.769841	0.441
JUNE	-112.852608	90.588553	-1.245771	0.213
TEMP	-34.377281	15.171687	-2.265884	0.024
HUMID	-49.175532	19.909930	-2.469900	0.014
TEMPHUM	0.585296	0.251085	2.331072	0.020
TLAG	2.441930	4.219060	0.578785	0.563

TLAG2	-0.828426	4.289822	-0.193114	0.847
TLAG3	2.736790	4.266357	0.641482	0.521
TLAG4	-4.174692	4.156268	-1.004433	0.315
TLAG5	4.194499	4.095834	1.024089	0.306
HLAG	-0.022839	5.082802	-0.004493	0.996
HLAG2	7.173446	5.083325	1.411172	0.158
HLAG3	3.077213	5.024339	0.612461	0.540
HOUR1	-1369.885727	111.863901	-12.246004	0.000
HOUR2	-1361.628447	107.575265	-12.657449	0.000
HOUR3	-1356.952288	105.158815	-12.903838	0.000
HOUR4	-1351.289981	103.897249	-13.006023	0.000
HOUR5	-1336.108346	102.244249	-13.067809	0.000
HOUR6	-846.485507	99.952477	-8.468880	0.000
HOUR7	-13.729975	93.934848	-0.146165	0.884
HOUR8	189.390593	81.966006	2.310599	0.021
HOUR9	272.420986	65.792597	4.140602	0.000
HOUR10	137.354254	44.998632	3.052410	0.002
HOUR12	-45.767786	44.449826	-1.029651	0.303
HOUR13	-168.114561	63.867779	-2.632228	0.009
HOUR14	-537.370852	78.817426	-6.817919	0.000
HOUR15	-996.456213	90.970815	-10.953581	0.000
HOUR16	-1326.043455	100.422200	-13.204684	0.000
HOUR17	-1363.242656	107.345353	-12.699596	0.000
HOUR18	-1361.900555	112.515937	-12.104068	0.000
HOUR19	-1376.968109	116.691882	-11.800033	0.000
HOUR20	-1377.090614	120.519892	-11.426252	0.000
HOUR21	-1367.667072	123.700038	-11.056319	0.000
HOUR22	-1368.338798	124.838149	-10.960903	0.000
HOUR23	-1372.016088	122.343579	-11.214451	0.000
HOUR24	-1374.160429	117.300736	-11.714849	0.000
WEEKEND	-332.987546	52.724982	-6.315555	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.741792	0.012777	58.057645	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	367133.884159	1.000000
1	272336.825334	0.741792

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2539
R-squared:	0.831
Standard Error of Estimate:	57.273
Variance of White Noise Error (sigsq):	1573.056
Variance of sigsq:	8748.860
-2*log(likelihood):	25893.645

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	270.977703	54.175206	5.001877	0.000
INTER	0.088694	0.175138	0.506425	0.613
JULY	-12.134011	3.835306	-3.163766	0.002
MAY	17.050687	4.541264	3.754612	0.000
JUNE	13.434249	3.904398	3.440799	0.001
TEMP	-0.340846	0.954942	-0.356928	0.721
HUMID	-3.139335	1.282372	-2.448069	0.014
TEMPHUM	0.044291	0.013729	3.226050	0.001
TLAG	1.829355	0.827045	2.211916	0.027
TLAG2	0.370960	0.827766	0.448145	0.654
TLAG3	-0.282768	0.821508	-0.344206	0.731
TLAG4	-0.372681	0.817898	-0.455657	0.649
TLAG5	0.773065	0.601111	1.286061	0.199
HLAG	1.355509	1.035507	1.309029	0.191
HLAG2	0.225287	1.035322	0.217601	0.828
HLAG3	-1.032043	0.742424	-1.390099	0.165
HOUR1	-233.778070	10.223122	-22.867581	0.000
HOUR2	-229.010789	9.866143	-23.211786	0.000
HOUR3	-230.577573	9.694655	-23.783988	0.000
HOUR4	-216.551918	9.628136	-22.491572	0.000
HOUR5	-173.427561	9.535462	-18.187640	0.000
HOUR6	-28.589196	9.427418	-3.032559	0.002
HOUR7	-38.958623	9.244860	-4.214084	0.000
HOUR8	-30.813462	8.912041	-3.457509	0.001
HOUR9	-23.777437	8.560265	-2.777652	0.006
HOUR10	-11.965897	8.149634	-1.468274	0.142
HOUR12	9.485459	8.043059	1.179335	0.238
HOUR13	13.810704	8.179292	1.688496	0.091
HOUR14	19.119776	8.370425	2.284206	0.022
HOUR15	18.881655	8.636076	2.186370	0.029
HOUR16	14.277142	8.926008	1.599499	0.110
HOUR17	7.745318	9.164609	0.845133	0.398
HOUR18	-0.731827	9.439411	-0.077529	0.938
HOUR19	-8.649878	9.778105	-0.884617	0.376
HOUR20	-17.395638	10.191984	-1.706796	0.088
HOUR21	-12.727457	10.547405	-1.206691	0.228
HOUR22	-96.934435	10.761785	-9.007283	0.000
HOUR23	-225.878121	10.741302	-21.028932	0.000
HOUR24	-231.320594	10.548768	-21.928683	0.000
WEEKEND	-57.219908	2.597440	-22.029348	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.721224	0.013747	52.463276	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	3280.164567	1.000000
1	2366.026817	0.721313

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 8

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH

Number of Observations:	2539
R-squared:	0.920
Standard Error of Estimate:	58.855
Variance of White Noise Error (sigsq):	1553.419
Variance of sigsq:	1900.835
-2*log(likelihood):	25861.682

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	265.501235	105.338201	2.520465	0.012
INTER	-0.059449	0.184752	-0.321779	0.748
JULY	-9.760480	9.444770	-1.033427	0.302
MAY	23.769602	11.375299	2.089580	0.037
JUNE	15.552254	9.708198	1.601971	0.109
TEMP	-0.891721	1.513120	-0.589326	0.556
HUMID	-3.896300	1.983084	-1.964768	0.050
TEMPHUM	0.053185	0.025138	2.115669	0.034
TLAG	1.847554	0.421204	4.386358	0.000
TLAG2	0.438727	0.427964	1.025151	0.305
TLAG3	-0.130321	0.425971	-0.305939	0.760
TLAG4	-0.365816	0.415770	-0.879852	0.379
TLAG5	0.759852	0.409285	1.856533	0.063
HLAG	1.406839	0.505942	2.780632	0.005
HLAG2	0.286966	0.505873	0.567270	0.571
HLAG3	-0.750398	0.500331	-1.499802	0.134
HOUR1	-233.749863	11.156894	-20.951158	0.000
HOUR2	-228.576097	10.720722	-21.320962	0.000
HOUR3	-229.826015	10.488410	-21.912379	0.000
HOUR4	-215.511537	10.357059	-20.808178	0.000
HOUR5	-172.126782	10.189590	-16.892415	0.000
HOUR6	-27.321823	9.960683	-2.742967	0.006
HOUR7	-37.230619	9.353376	-3.980447	0.000
HOUR8	-28.996790	8.171542	-3.548509	0.000
HOUR9	-22.192090	6.591152	-3.366952	0.001
HOUR10	-11.224284	4.527752	-2.478997	0.013
HOUR12	9.213910	4.477032	2.058040	0.040
HOUR13	13.088150	6.414168	2.040506	0.041
HOUR14	18.109007	7.896776	2.293215	0.022
HOUR15	17.884790	9.104084	1.964480	0.050
HOUR16	13.077870	10.043011	1.302186	0.193
HOUR17	6.615844	10.726892	0.616753	0.537

HOUR18	-1.803345	11.235725	-0.160501	0.872
HOUR19	-9.915607	11.630730	-0.852535	0.394
HOUR20	-18.670747	11.991675	-1.556976	0.120
HOUR21	-13.870988	12.283560	-1.129232	0.259
HOUR22	-97.791710	12.404664	-7.883463	0.000
HOUR23	-226.403233	12.168169	-18.606188	0.000
HOUR24	-231.397246	11.684750	-19.803355	0.000
WEEKEND	-26.528928	5.309291	-4.996699	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.742657	0.013290	55.880098	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	3463.888263	1.000000
1	2572.479989	0.742657

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2227
R-squared: 0.374
Standard Error of Estimate: 215.876
Variance of White Noise Error (sigsq): 6814.203
Variance of sigsq:2022416.204
-2*log(likelihood): 25975.237

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	1544.340368	216.958882	7.118125	0.000
INTER	0.182738	0.672877	0.271577	0.786
JULY	-122.928157	20.483361	-6.001367	0.000
MAY	-83.302175	23.027896	-3.617446	0.000
JUNE	-79.383432	20.894444	-3.799260	0.000
TEMP	-0.908860	3.922187	-0.231723	0.817
HUMID	-9.874190	5.270131	-1.873614	0.061
TEMPHUM	0.136761	0.057651	2.372212	0.018
TLAG	3.610434	3.309421	1.090957	0.275
TLAG2	0.131277	3.312205	0.039634	0.968
TLAG3	-1.026187	3.289236	-0.311983	0.755
TLAG4	-0.595532	3.275879	-0.181793	0.856

TLAG5	3.390037	2.415606	1.403390	0.161
HLAG	0.887945	4.175784	0.212641	0.832
HLAG2	0.359900	4.175197	0.086199	0.931
HLAG3	-1.481966	3.035002	-0.488292	0.625
HOUR1	-29.938077	41.499550	-0.721407	0.471
HOUR2	22.452069	39.957318	0.561901	0.574
HOUR3	-0.956991	39.176704	-0.024428	0.981
HOUR4	-7.886315	38.905616	-0.202704	0.839
HOUR5	-12.196426	38.573033	-0.316190	0.752
HOUR6	-18.847130	38.094656	-0.494745	0.621
HOUR7	1.394128	37.411188	0.037265	0.970
HOUR8	-16.610695	36.018345	-0.461173	0.645
HOUR9	-5.922213	34.560359	-0.171359	0.864
HOUR10	14.526277	32.867345	0.441967	0.659
HOUR12	41.939781	32.402310	1.294345	0.196
HOUR13	26.486839	32.978956	0.803144	0.422
HOUR14	22.613214	33.717292	0.670671	0.503
HOUR15	12.644405	34.792429	0.363424	0.716
HOUR16	-16.301675	35.964882	-0.453266	0.650
HOUR17	-43.065781	36.910684	-1.166757	0.243
HOUR18	-39.874876	37.975896	-1.050005	0.294
HOUR19	-79.984324	39.248055	-2.037918	0.042
HOUR20	-24.200218	40.790953	-0.593274	0.553
HOUR21	-16.547937	42.280618	-0.391384	0.696
HOUR22	-38.316659	43.282975	-0.885259	0.376
HOUR23	5.634874	43.389482	0.129867	0.897
HOUR24	16.011150	42.758038	0.374459	0.708
WEEKEND	-234.639500	10.455902	-22.440866	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.923777	0.008114	113.843283	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	46602.470991	1.000000
1	43051.942786	0.923812

Total Time for Computation and Printing: 0.08(seconds)
Number of Iterations: 9

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2227
R-squared: 0.919
Standard Error of Estimate: 250.466
Variance of White Noise Error (sigsq): 6001.551
Variance of sigsq: 32347.206
-2*log(likelihood): 25692.000

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	863.624755	345.197638	2.501827	0.012
INTER	0.704631	0.350475	2.010501	0.045
JULY	11.387151	66.242459	0.171901	0.864
MAY	24.955180	89.804192	0.277884	0.781
JUNE	-3.211839	79.579383	-0.040360	0.968
TEMP	6.819715	3.991539	1.708543	0.088
HUMID	6.819428	5.143863	1.325741	0.185
TEMPHUM	-0.060831	0.066371	-0.916529	0.359
TLAG	3.442106	0.862603	3.990370	0.000
TLAG2	0.522530	0.864127	0.604691	0.545
TLAG3	-0.540918	0.860813	-0.628380	0.530
TLAG4	-0.670940	0.851577	-0.787879	0.431
TLAG5	-0.310460	0.851002	-0.364817	0.715
HLAG	1.347567	1.069931	1.259489	0.208
HLAG2	0.433943	1.070176	0.405488	0.685
HLAG3	-1.201819	1.074930	-1.118044	0.264
HOUR1	-25.746510	26.047118	-0.988459	0.323
HOUR2	15.168074	25.281841	0.599959	0.549
HOUR3	-17.816855	25.006046	-0.712502	0.476
HOUR4	-32.186720	24.977815	-1.288612	0.198
HOUR5	-41.884671	24.847941	-1.685640	0.092
HOUR6	-54.646366	24.518456	-2.228785	0.026
HOUR7	-31.788716	22.923959	-1.386703	0.166
HOUR8	-39.621558	19.758907	-2.005251	0.045
HOUR9	-19.131860	15.373500	-1.244470	0.213
HOUR10	8.984354	9.807422	0.916077	0.360
HOUR12	55.203879	9.960421	5.542324	0.000
HOUR13	55.497849	15.803810	3.511675	0.000
HOUR14	64.896331	20.603906	3.149710	0.002
HOUR15	65.032887	24.455712	2.659210	0.008
HOUR16	42.891604	27.301117	1.571057	0.116
HOUR17	20.099993	29.263475	0.686863	0.492
HOUR18	24.002598	30.418668	0.789075	0.430
HOUR19	-19.110420	30.876315	-0.618935	0.536
HOUR20	27.218384	30.713642	0.886199	0.376
HOUR21	23.057599	30.259805	0.761988	0.446
HOUR22	-7.309535	29.604840	-0.246903	0.805
HOUR23	29.736401	28.504080	1.043233	0.297
HOUR24	30.793650	27.188582	1.132595	0.258
WEEKEND	8.507966	15.272066	0.557093	0.578

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.950964	0.006554	145.091536	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	62733.465281	1.000000
1	59657.267586	0.950964

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to    0.00001

DEPENDENT VARIABLE:                KWH
                Number of Observations:    2755
                            R-squared:      0.697
            Standard Error of Estimate:     93.285
 Variance of White Noise Error (sigsq):   3547.774
                     Variance of sigsq: 56605.112
                    -2*log(likelihood): 30337.029

                COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var              Coef          Std. Error     t-Ratio       P-Value
-------------------------------------------------------------------
CNST          167.993300      86.655110       1.938643       0.053
INTER          -0.290301       0.283778      -1.022990       0.306
JULY           19.903515       5.622154       3.540194       0.000
MAY            15.728549       6.800965       2.312694       0.021
JUNE           15.985420       5.719118       2.795085       0.005
TEMP            2.832390       1.515968       1.868371       0.062
HUMID           1.610556       2.026155       0.794883       0.427
TEMPHUM        -0.014887       0.021598      -0.689271       0.491
TLAG            2.470241       1.306105       1.891303       0.059
TLAG2           1.010585       1.307170       0.773109       0.440
TLAG3          -0.767046       1.295366      -0.592146       0.554
TLAG4           0.265830       1.288757       0.206268       0.837
TLAG5          -0.178628       0.950688      -0.187893       0.851
HLAG            0.855883       1.643350       0.520816       0.603
HLAG2           1.336764       1.643199       0.813513       0.416
HLAG3          -1.981393       1.175537      -1.685522       0.092
HOUR1        -245.809941      16.108627     -15.259522       0.000
HOUR2        -237.849533      15.559748     -15.286208       0.000
HOUR3        -229.452447      15.277694     -15.018788       0.000
HOUR4        -224.042678      15.179579     -14.759479       0.000
HOUR5        -160.154393      15.028407     -10.656778       0.000
HOUR6          10.382558      14.853965       0.698976       0.485
HOUR7           2.019873      14.556327       0.138763       0.890
HOUR8          -3.469139      14.016805      -0.247499       0.805
HOUR9         -12.061090      13.409426      -0.899449       0.368
HOUR10         -6.506213      12.740436      -0.510674       0.610
HOUR12          5.271830      12.577190       0.419158       0.675
HOUR13          9.244041      12.813958       0.721404       0.471
HOUR14         10.150311      13.132322       0.772926       0.440
HOUR15          9.695794      13.566762       0.714673       0.475
HOUR16          5.567702      14.031196       0.396809       0.692
HOUR17          6.152899      14.425098       0.426541       0.670
HOUR18          7.227847      14.869719       0.486078       0.627
HOUR19         10.652548      15.421172       0.690774       0.490
```

HOUR20	18.385509	16.099017	1.142027	0.254
HOUR21	13.669034	16.685780	0.819203	0.413
HOUR22	-65.747150	17.022148	-3.862447	0.000
HOUR23	-200.935532	16.977328	-11.835521	0.000
HOUR24	-236.742992	16.645918	-14.222285	0.000
WEEKEND	-116.955722	4.070164	-28.734892	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.770557	0.012143	63.456118	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	8702.055735	1.000000
1	6686.603519	0.768394

Total Time for Computation and Printing: 0.11(seconds)
Number of Iterations: 9

convergence tolerance set to 0.00001

DEPENDENT VARIABLE: KWH
Number of Observations: 2755
R-squared: 0.879
Standard Error of Estimate: 97.592
Variance of White Noise Error (sigsq): 3471.754
Variance of sigsq: 8749.966
-2*log(likelihood): 30277.246

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	17.157670	172.311092	0.099574	0.921
INTER	0.132400	0.275373	0.480803	0.631
JULY	22.438181	15.825994	1.417805	0.156
MAY	28.191405	19.468029	1.448087	0.148
JUNE	16.310926	16.351132	0.997541	0.319
TEMP	3.027595	2.389328	1.267132	0.205
HUMID	2.445373	3.124204	0.782719	0.434
TEMPHUM	-0.038839	0.039597	-0.980874	0.327
TLAG	2.627618	0.605582	4.338998	0.000
TLAG2	1.273832	0.613179	2.077424	0.038
TLAG3	-0.417862	0.609922	-0.685108	0.493
TLAG4	0.368538	0.596995	0.617323	0.537
TLAG5	0.077164	0.593032	0.130118	0.896
HLAG	0.888031	0.725764	1.223581	0.221
HLAG2	1.390202	0.726337	1.913990	0.056
HLAG3	-0.425996	0.725081	-0.587515	0.557
HOUR1	-261.987151	16.883586	-15.517270	0.000
HOUR2	-252.149197	16.262602	-15.504850	0.000
HOUR3	-242.728838	15.913376	-15.253132	0.000
HOUR4	-236.798497	15.724332	-15.059368	0.000

HOUR5	-172.187886	15.473335	-11.128039	0.000
HOUR6	-1.039379	15.121370	-0.068736	0.945
HOUR7	-5.247992	14.181414	-0.370061	0.711
HOUR8	-6.025376	12.311397	-0.489414	0.625
HOUR9	-11.837557	9.769394	-1.211698	0.226
HOUR10	-6.298025	6.543290	-0.962517	0.336
HOUR12	3.055591	6.504336	0.469778	0.639
HOUR13	5.153124	9.633470	0.534919	0.593
HOUR14	4.704734	12.117808	0.388250	0.698
HOUR15	3.375659	14.143256	0.238676	0.811
HOUR16	-1.822262	15.700175	-0.116066	0.908
HOUR17	-2.740774	16.824809	-0.162901	0.871
HOUR18	-2.188253	17.621502	-0.124181	0.901
HOUR19	0.735974	18.188771	0.040463	0.968
HOUR20	6.525752	18.623405	0.350406	0.726
HOUR21	-0.169916	18.933254	-0.008975	0.993
HOUR22	-80.673261	18.959268	-4.255083	0.000
HOUR23	-216.053960	18.492729	-11.683184	0.000
HOUR24	-251.409012	17.695536	-14.207482	0.000
WEEKEND	-53.924003	8.546708	-6.309331	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.797171	0.011503	69.303046	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	9524.215963	1.000000
1	7592.427226	0.797171

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------------------------ INITIAL ESTIMATES ----------------------

convergence tolerance set to    0.00001

DEPENDENT VARIABLE:                  KWH
                Number of Observations:    2227
                             R-squared:     0.729
            Standard Error of Estimate:   134.131
 Variance of White Noise Error (sigsq):  3874.652
                     Variance of sigsq:301421.548
                    -2*log(likelihood): 24718.363
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COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value

CNST	909.382673	133.497125	6.812002	0.000
INTER	0.649208	0.551893	1.176328	0.240
JULY	-52.678035	12.709514	-4.144772	0.000
MAY	-51.739258	14.292618	-3.619999	0.000
JUNE	-22.355614	12.968004	-1.723906	0.085
TEMP	-3.296651	2.429526	-1.356911	0.175
HUMID	-5.802388	3.245798	-1.787661	0.074
TEMPHUM	0.042571	0.035407	1.202309	0.229
TLAG	-0.439342	2.055849	-0.213703	0.831
TLAG2	-0.216825	2.057063	-0.105405	0.916
TLAG3	0.015126	2.041904	0.007408	0.994
TLAG4	0.001881	2.035398	0.000924	0.999
TLAG5	2.024407	1.500756	1.348925	0.178
HLAG	-0.621124	2.594262	-0.239422	0.811
HLAG2	1.183606	2.594286	0.456236	0.648
HLAG3	1.122790	1.885747	0.595408	0.552
HOUR1	-144.454742	25.779162	-5.603547	0.000
HOUR2	-185.183381	24.821042	-7.460742	0.000
HOUR3	-210.862990	24.335426	-8.664857	0.000
HOUR4	-220.843676	24.164237	-9.139278	0.000
HOUR5	-142.917938	23.958350	-5.965266	0.000
HOUR6	-73.933048	23.661191	-3.124655	0.002
HOUR7	-4.387058	23.240328	-0.188769	0.850
HOUR8	12.865798	22.379902	0.574882	0.565
HOUR9	0.356058	21.471399	0.016583	0.987
HOUR10	18.001959	20.420437	0.881566	0.378
HOUR12	14.224645	20.125783	0.706787	0.480
HOUR13	-6.469848	20.484835	-0.315836	0.752
HOUR14	-0.715793	20.944769	-0.034175	0.973
HOUR15	-21.005422	21.612505	-0.971911	0.331
HOUR16	-31.663754	22.349588	-1.416749	0.157
HOUR17	-53.784751	22.928491	-2.345761	0.019
HOUR18	-46.545957	23.589331	-1.973178	0.049
HOUR19	-67.366300	24.386175	-2.762479	0.006
HOUR20	-50.770274	25.344673	-2.003193	0.045
HOUR21	-32.636996	26.269910	-1.242372	0.214
HOUR22	-49.948290	26.892747	-1.857315	0.063
HOUR23	-61.635293	26.958723	-2.286284	0.022
HOUR24	-99.786017	26.564066	-3.756429	0.000
WEEKEND	-468.268584	6.494619	-72.101007	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.885547	0.009844	89.957920	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	17991.228707	1.000000
1	15933.924072	0.885650

Total Time for Computation and Printing: 0.05(seconds)
Number of Iterations: 5

convergence tolerance set to 0.00001

DEPENDENT VARIABLE:		KWH
	Number of Observations:	2227
	R-squared:	0.971
	Standard Error of Estimate:	232.098
	Variance of White Noise Error (sigsq):	1926.287
	Variance of sigsq:	3332.358
	-2*log(likelihood):	23160.201

COEFFICIENTS OF INDEPENDENT VARIABLES (beta)

Var	Coef	Std. Error	t-Ratio	P-Value
CNST	717.064890	209.259681	3.426675	0.001
INTER	-0.468929	0.333280	-1.407013	0.160
JULY	-16.440141	43.046216	-0.381918	0.703
MAY	-53.035437	70.042196	-0.757193	0.449
JUNE	-55.558076	58.394773	-0.951422	0.341
TEMP	-2.769482	2.256703	-1.227225	0.220
HUMID	-3.550217	2.900021	-1.224204	0.221
TEMPHUM	0.044947	0.037336	1.203865	0.229
TLAG	-0.174645	0.487174	-0.358486	0.720
TLAG2	0.163970	0.486641	0.336943	0.736
TLAG3	0.550386	0.484572	1.135818	0.256
TLAG4	-0.171541	0.480001	-0.357376	0.721
TLAG5	0.603328	0.479447	1.258382	0.208
HLAG	-0.828354	0.611171	-1.355355	0.175
HLAG2	0.663563	0.611188	1.085692	0.278
HLAG3	0.279486	0.611454	0.457085	0.648
HOUR1	-116.231077	14.655784	-7.930731	0.000
HOUR2	-159.571840	14.261124	-11.189289	0.000
HOUR3	-186.630214	14.150756	-13.188709	0.000
HOUR4	-196.943258	14.180741	-13.888080	0.000
HOUR5	-119.796941	14.155184	-8.463114	0.000
HOUR6	-51.839120	14.017082	-3.698282	0.000
HOUR7	13.299223	13.119777	1.013677	0.311
HOUR8	26.578142	11.311951	2.349563	0.019
HOUR9	10.649112	8.780573	1.212804	0.225
HOUR10	23.312298	5.560147	4.192748	0.000
HOUR12	17.082292	5.657107	3.019616	0.003
HOUR13	-1.126026	9.045915	-0.124479	0.901
HOUR14	6.742074	11.831911	0.569821	0.569
HOUR15	-10.492754	14.052951	-0.746658	0.455
HOUR16	-18.280750	15.685603	-1.165448	0.244
HOUR17	-38.460617	16.799989	-2.289324	0.022
HOUR18	-30.107278	17.436662	-1.726665	0.084
HOUR19	-50.579849	17.665699	-2.863167	0.004
HOUR20	-31.983123	17.517182	-1.825814	0.068
HOUR21	-10.155910	17.185491	-0.590958	0.555
HOUR22	-23.513948	16.740702	-1.404597	0.160
HOUR23	-31.625517	16.060318	-1.969171	0.049
HOUR24	-68.820367	15.293775	-4.499894	0.000
WEEKEND	-43.317774	8.672527	-4.994827	0.000

AUTOREGRESSIVE PARAMETERS (Phi)

Lag	Phi	Std. Error	T-Ratio	P-Value
1	0.981958	0.004007	245.054703	0.000

AUTOCORRELATIONS AND AUTOCOVARIANCES

Lag	Autocovariances	Autocorrelations
0	53869.262373	1.000000
1	52897.351325	0.981958

APPENDIX H

Duke Energy Kentucky
1697-A Monmouth Street
Newport, Kentucky 41071

KY.P.S.C. Electric No. 2
Second Revised Sheet No. 78
Cancels and Supersedes
First Revised Sheet No. 78
Page 1 of 1

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 2008 revenue month is $0.001416 per kilowatt-hour. (C) (I)

The DSMR to be applied to non-residential distribution service customer bills beginning with the January 2008 revenue month is $0.01405 per kilowatt-hour. (C) (I)

The DSMR to be applied for transmission service customer bills beginning with the January 2008 revenue month is $0.000154 per kilowatt-hour. (C) (I)

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

Issued: Effective:

Issued by Sandra P. Meyer, President

APPENDIX I

Duke Energy Kentucky
1697-A Monmouth Street
Newport, Kentucky 41071

KY.P.S.C. Gas No. 2
Second Revised Sheet No. 62
Cancels and Supersedes
First Revised Sheet No. 62
Page 1 of 1

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 2008 revenue month is $(0.0109294) per hundred cubic feet. (C) (R)

The DSMR to be applied to non-residential service customer bills beginning with the January 2008 revenue month is $0.00 per hundred cubic feet. (C)

Appendix J
Kentucky DSM Rider

Comparison of Revenue Requirement to Rider Recovery

Residential Programs	(1) Projected Program Costs 7/2006 to 6/2007 (A)	(2) Projected Lost Revenues 7/2006 to 6/2007 (A)	(3) Projected Shared Savings 7/2006 to 6/2007 (A)	(4) Program Expenditures 7/06 through 6/07 (B)	(5) Program Expenditures (C) Gas	(6) Program Expenditures (C) Electric	(7) Lost Revenues 7/06 through 6/07 (B)	(8) Shared Savings 7/06 through 6/07 (B)	(9) 2006 Reconciliation Gas (D)	(10) 2006 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	$ 12,233	$ (8,996)	$ 383,198.00	$ 241,031	$ 142,167	$ 7,107	$ (1,710)			NA	NA	NA	NA
Refrigerator Replacement	$ 100,000	$ 5,411	$ 4,700	$ 61,127.63		$ 61,128	$ 2,378	$ (1,387)						
Residential Home Energy House Call	$ 150,000	$ 30,729	$ 26,686	$ 155,479.00	$ 97,796	$ 57,683	$ 25,180	$ 39,446			NA	NA	NA	NA
Res. Comprehensive Energy Education	$ 81,500	$ -	$ -	$ 83,132.00	$ 52,290	$ 30,842	$ -	$ -			NA	NA	NA	NA
Payment Plus	$ 150,000	$ -	$ -	$ 59,765.00		$ 59,765	$ -	$ -						
Power Manager	$ 875,000	$ -	$ 70,463	$ 723,951.77		$ 723,952	$ -	$ 348,926						
Program Development Funds	$ 140,000	$ -	$ -	$ 96,855.60	$ 60,922	$ 35,934	$ -	$ -			NA	NA	NA	NA
Energy Star Products	$ 240,430	$ 196,415	$ 51,220	$ 153,599.00	$ 96,613	$ 56,986	$ 416,013	$ 134,677			NA	NA	NA	NA
Energy Efficiency Website	$ 25,160	$ 13,499	$ 5,913	$ 2,495.79	$ 1,569	$ 927	$ 1,448	$ 1,086			NA	NA	NA	NA
Personalized Energy Report Pilot Program	$ 109,246	$ -	$ -	$ 57,772.00	$ 36,338	$ 21,434	$ -	$ -			NA	NA	NA	NA
Home Energy Assistance Pilot Program (I)	$ -	$ -	$ -	$ 4,781.00	$ 3,007	$ 1,774	$ -	$ -			$ 51,447	$ 70,760	NA	NA
Revenues collected except for HEA											$ 829,463	$ 1,528,236		
Total	$ 2,371,136	$ 258,287	$ 149,986	$ 1,782,157	$ 589,566	$ 1,192,591	$ 452,126	$ 521,038	$ (1,092,283)	$ (1,391,358)	$ 880,910	$ 1,598,996	$ (1,383,627)	$ (824,599)

(A) Amounts identified in report filed on September 30, 2006 and updated February 20, 2007.
(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2006 through June 30, 2007 and lost revenues for this period and from prior period DSM measure installations.
(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, 2006 and June 30, 2007.
(G) Column (5) + Column (9) - Column(11).
(H) Column (6) + Column (7) + Column (8) + Column (10) - Column(12).
(I) Revenues and expenses for the Home Energy Assistance Pilot Program. This was discontinued December 31, 2006. These values close out the programs.

Commercial Programs	(1) Projected Program Costs 7/2006 to 6/2007 (A)	(2) Projected Lost Revenues 7/2006 to 6/2007 (A)	(3) Projected Shared Savings 7/2006 to 6/2007 (A)	(4) Program Expenditures 7/06 through 6/07 (B)	(5) Lost Revenues 7/06 through 6/07 (B)	(6) Shared Savings 7/06 through 6/07 (B)	(7) 2006 Reconciliation (C)	(8) Rider Collection (D)	(9) ((Over)/Under Collection (E)
High Efficiency Program									
Lighting	$ 209,520	$ 188,899	$ 10,698	$ 310,077	$ 161,175	$ 149,211			
HVAC	$ 142,760	$ 29,368	$ 14,588	$ 8,869	$ 1,958	$ (13,763)			
Motors	$ 100,678	$ 20,842	$ 25,718	$ 2,427	$ 136	$ 95			
Other	$ 450,814	$ 298,836	$ 448,830	$ -	$ -	$ -			
Total for High Efficiency Program	$ 903,772	$ 537,945	$ 499,834	$ 321,373	$ 163,269	$ 135,543	$ 582,465	$ 249,171	$ 817,936
PowerShare®	$ 265,000	$ -	$ 107,641	$ 47,008	$ -	$ 5,569	$ -	$ 34,384	$ 12,624

(A) Amounts identified in report filed on September 30, 2006 and updated February 20, 2007.
(B) Actual program expenditures, lost revenues, and shared savings for the period July 1, 2006 through June 30, 2007 and lost revenues for this period and from prior period DSM measure installations.
(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, 2006 and June 30, 2007.
(E) Column (4) + Column (5) + Column (6) + Column (7) - Column (8)

2008 Projected Program Costs, Lost Revenues, and Shared Savings

Residential Program Summary

	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 - Current Programs/Measures									
Residential Conservation & Energy Education	$ 499,800	$ 16,525	$ (3,499)	$ 512,826	37.1%	62.9%	$ 185,426	$ 198,452	$ 314,374
Refrigerator Replacement	$ 100,000	$ 6,145	$ 300	$ 106,445	100.0%	0.0%	$ 100,000	$ 106,445	$ -
Home Energy House Call	$ 150,000	$ 49,810	$ 35,700	$ 235,510	37.1%	62.9%	$ 55,650	$ 141,160	$ 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)	$ 150,000	$ -	$ -	$ 150,000	37.1%	62.9%	$ 55,650	$ 55,650	$ 94,350
Power Manager	$ 875,000	$ -	$ 174,000	$ 1,049,000	100.0%	0.0%	$ 875,000	$ 1,049,000	$ -
Program Development Funds	$ 140,000	$ -	$ -	$ 140,000	37.1%	62.9%	$ 51,940	$ 51,940	$ 88,060
Energy Star Products	$ 243,000	$ 690,225	$ 63,450	$ 996,675	100.0%	0.0%	$ 243,000	$ 996,675	$ -
CFL's (Compact Fluorescent Lights)									
Torchieres (Floor lamps)									
Energy Efficiency Web Site	$ 31,110	$ 26,781	$ 2,955	$ 60,846	37.1%	62.9%	$ 11,542	$ 41,278	$ 19,568
Personalized Energy Report Pilot Program	$ 153,000	$ 121,547	$ 73,134	$ 347,681	37.1%	62.9%	$ 56,763	$ 251,444	$ 96,237
Total Costs, Net Lost Revenues, Shared Savings	$ 2,423,410	$ 911,033	$ 346,040	$ 3,680,483			$ 1,665,207	$ 2,922,280	$ 758,203
Home Energy Assistance Pilot Program	$ -							$ -	$ -

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	$ 104,760	$ 273,388	$ 5,349	$ 383,497	100.0%	0.0%	$ 104,760	$ 383,497	NA
HVAC	$ 71,380	$ 15,925	$ 7,294	$ 94,598	100.0%	0.0%	$ 71,380	$ 94,598	NA
Motors	$ 50,339	$ 10,610	$ 12,859	$ 73,808	100.0%	0.0%	$ 50,339	$ 73,808	NA
Other	$ 225,407	$ 149,418	$ 224,415	$ 599,240	100.0%	0.0%	$ 225,407	$ 599,240	NA
Total for the High Efficiency Program	$ 451,885	$ 449,341	$ 249,916	$ 1,151,143			$ 451,885	$ 1,151,143	

High Efficiency School Incentive 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	$ 104,760	$ 34,963	$ 5,349	$ 145,072	100.0%	0.0%	$ 104,760	$ 145,072	NA
HVAC	$ 71,380	$ 13,323	$ 7,294	$ 91,996	100.0%	0.0%	$ 71,380	$ 91,996	NA
Motors	$ 50,339	$ 10,421	$ 12,859	$ 73,619	100.0%	0.0%	$ 50,339	$ 73,619	NA
Other	$ 225,407	$ 149,418	$ 224,415	$ 599,240	100.0%	0.0%	$ 225,407	$ 599,240	NA
Total for the High Efficiency School Incentive Program	$ 451,885	$ 208,125	$ 249,916	$ 909,927			$ 451,885	$ 909,927	

	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
PowerShare® Program	$ 265,000		$ 107,641	$ 372,641	100.0%	0.0%	$ 265,000	$ 372,641	NA
Total C&I DSM Program				$ 2,433,710				$ 2,433,710	

Appendix J Page 3 of 6

Duke Energy Kentucky
Demand Side Management Cost Recovery Rider (DSMR)
Summary of Calculations for 2006 Programs

January, 2008 through December, 2008

	Program Costs (A)
Electric Rider DSM	
Residential Rate RS	$ 2,922,280
Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP	$ 2,061,069
Transmission Level Rates & Distribution Level Rates Part B	$ 372,641
Gas Rider DSM	
Residential Rate RS	$ 758,203

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

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

Year	2008
Projected Annual Electric Sales MWH	
Rates RS	1,450,570
Rates DS, DP, DT, GS-FL, EH, & SP	2,334,985
Rates DS, DP, DT, GS-FL, EH, SP, & TT	2,507,773
Projected Annual Gas Sales MCF	
Rate RS	6,387,044

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

January, 2008 through December, 2008

Rate Schedule Riders	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	$ (867,891)	$ 2,922,280	$ 2,054,389	1,450,570	mWh	$ 0.001416	$/kWh
Distribution Level Rates Part A DS, DP, DT, GS-FL, EH & SP	$ 860,878	$ 2,061,069	$ 2,921,947	2,334,985	mWh	$ 0.001251	$/kWh
Transmission Level Rates & Distribution Level Rates Part B TT	$ 13,287	$ 372,641	$ 385,928	2,507,773	mWh	$ 0.000154	$/kWh
Distribution Level Rates Total DS, DP, DT, GS-FL, EH & SP						$ 0.001405	$/kWh
Gas Rider DSM							
Residential Rate RS	$ (1,456,267)	$ 758,203	$ (698,065)	6,387,044	MCF	$ (0.109294)	$/MCF
Total Rider Recovery			$ 4,664,200				

Customer Charge	New Numbers	Annual Revenues	Number of Customers	Monthly Customer Charge
Electric No.4				
Residential Rate RS	$ -	$ -	-	$ -
Gas No. 5				
Residential Rate RS	$ -	$ -	-	$ -
Total Customer Charge Revenues		$ -		
Total Recovery		$ 4,664,200		

(A) (Over)/Under of Appendix J page 1multiplied by 1.0525 for 2007 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.

Reconciliation of Lost revenues and Shared Savings Based Upon Impact Evaluation Studies

Applicable Programs	Case 2005-00402 As Filed Lost Revenues	Shared Savings	New Values Lost Revenues	Shared Savings	Increase (Decrease) in values Lost Revenues	Shared Savings	Comments
Residential Conservation and Energy Education	$ 77	$ 383					No new values.
Refrigerator Replacement	$ 270	$ 751					Previous actual.
Residential Home Energy House Call	$ 1,025	$ 10,991					No new values.
Power Manager	$ -	$ 21,023	$ -	$ 54,193		$ 33,170	Based upon higher UCT test result
Energy Star Products							
Energy Efficiency Website							
Personal Energy Report (PER)							
C&I High Efficiency Incentive (for Businesses and Schools)							
PowerShare							

Applicable Programs	Case 2006-00426 As Filed Lost Revenues	Shared Savings	New Values Lost Revenues	Shared Savings	Increase (Decrease) in values Lost Revenues	Shared Savings	Comments
Residential Conservation and Energy Education	$ 3,931.00	$ (1,885.00)					No new values.
Refrigerator Replacement	$ 2,394.00	$ 1,653.00	$ 1,932.00	$ 143.00	$ (462)	$ (1,510)	
Residential Home Energy House Call	$ 15,426.00	$ 34,926.00					No new values.
Power Manager	$ -	$ 64,386.00	$ -	$ 215,573	$ -	$ 151,187	Based upon evaluation report
Energy Star Products	$ 45,936.00	$ 72,630.00	$ 95,594.00	$ 72,908	$ 49,658	$ 278	Based upon evaluation report
Energy Efficiency Website							
Personal Energy Report (PER)							
C&I High Efficiency Incentive (for Businesses and Schools)							
Lighting	$ 62,745.00	$ 45,681.00	$ 49,461.00	$ 79,233	$ (13,284)	$ 33,552	Based upon evaluation report
HVAC	$ 1,436.00	$ 18,277.00	$ 1,221.00	$ 3,476	$ (215)	$ (14,801)	Based upon evaluation report
Motors							
PowerShare							

Lost Revenues and Shared Savings for Appendix K Page 1 of 6

	Reconciliation of 2005 & 2006 Increase (Decrease) in values Lost Revenues	Shared Savings	Case No. 2007-00369 Lost Revenues	Shared Savings	Total Lost Revenues	Total Shared Savings
Residential Conservation and Energy Education	$ -	$ -	$ 7,107	$ (1,710)	$ 7,107	$ (1,710)
Refrigerator Replacement	$ (462)	$ (1,510)	$ 2,840	$ 123	$ 2,378	$ (1,387)
Residential Home Energy House Call	$ -	$ -	$ 25,180	$ 39,446	$ 25,180	$ 39,446
Power Manager	$ -	$ 184,357		$ 164,569	$ -	$ 348,926
Energy Star Products	$ 49,658	$ 278	$ 366,355	$ 134,399	$ 416,013	$ 134,677
Energy Efficiency Website	$ -	$ -	$ 1,448	$ 1,086	$ 1,448	$ 1,086
Personal Energy Report (PER)	$ -	$ -	$ -	$ -	$ -	$ -
C&I High Efficiency Incentive (for Businesses and Schools)						
Lighting	$ (13,284)	$ 33,552	$ 174,459	$ 115,659	$ 161,175	$ 149,211
HVAC	$ (215)	$ (14,801)	$ 2,173	$ 1,038	$ 1,958	$ (13,763)
Motors	$ -	$ -	$ 136	$ 95	$ 136	$ 95
PowerShare	$ -	$ -	$ -	$ 5,569	$ -	$ 5,569