OG&E Consumer Behavior Study Evaluation Report

August 2012

This material is based upon work supported by the Department of Energy under Award Number DE-OE0000206 and Project Number - 09-0111

Prepared by:

Mike Farrell, Director Customer Programs
Angela Nichols, Marketing Manager
Katie Chiccarelli, Business Analyst

Table of Contents

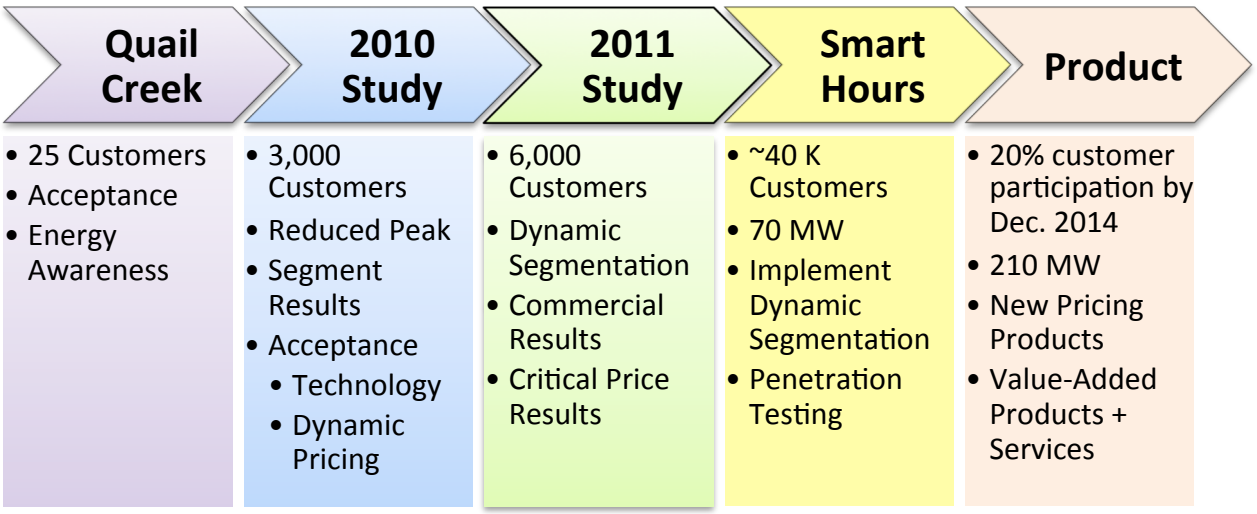
Chapter 1: Summary of Results and Recommendation Going Forward

1.1 Smart Grid Deployment Overview

In December 2009, Oklahoma Gas and Electric received funding from a Smart Grid Investment Grant from the Department of Energy. With this opportunity, the Company sought to enable a Smart Grid solution over a three-year deployment window, starting in 2010 through 2012. This solution included plans to deploy an advanced metering infrastructure (AMI) network and Smart Meters over the entire service territory, as well as supporting IT infrastructure.

This Smart Grid infrastructure enabled the consumer behavior study, referred to as Smart Study TOGETHER™ (SST). The goal of this two-year statistical study was to measure the impact of price responsive in-home equipment and the consumer acceptance of dynamic pricing on energy consumption. Beginning recruitment in early 2010, approximately 3,000 customers located in Norman, Oklahoma served as Phase I of this effort. Phase II was conducted in the summer of 2011, and engaged approximately 6,000 customers. To date the Company has deployed more than 600,000 Smart Meters with plans to finish this implementation by the end of 2012.

1.2 Smart Grid Enabled Demand Response Program History at OG&E



Quail Creek

Prior to Phase I of the study, the Company recruited 25 volunteers in northwest Oklahoma City to gain a conceptual understanding of the Home Area Network. The goal of this field focus group was to gain insight into customers' interest in energy awareness and acceptance of a demand response program. The Company installed programmable communicating thermostats and in-home displays to measure response to varying prices during the on-peak hours. In general, the concept was overwhelmingly accepted by customers. All participants saved money, and most participants elected to keep the in-home equipment at the end of the experiment, despite the fact that the in-home equipment was a prototype and experienced many difficulties during the test period. Overall, the results showed a

positive interest in demand response and encouraged the Company to begin planning Phase I of the study.

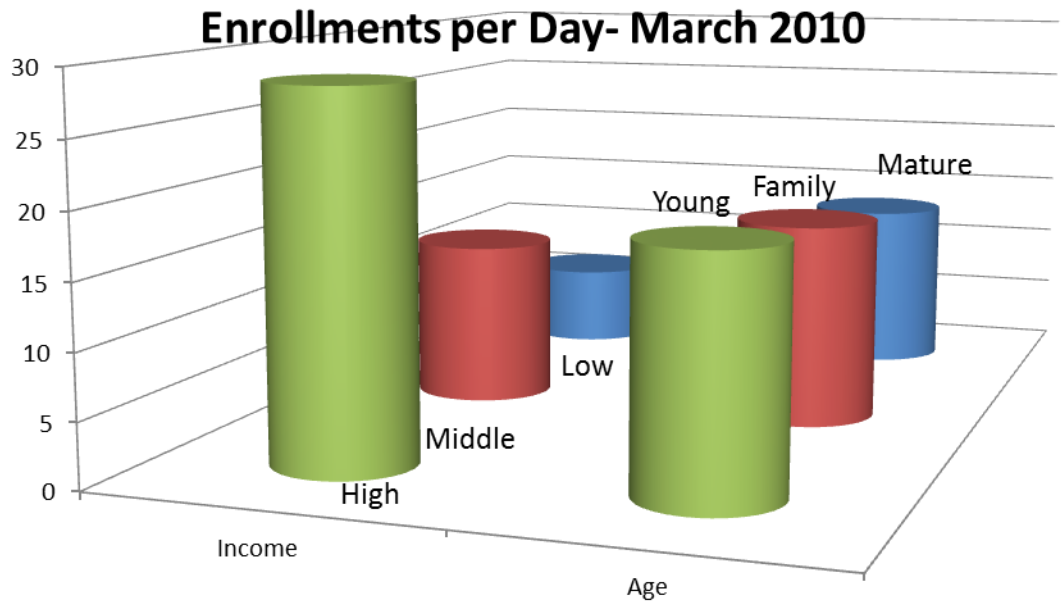
Phase I – 2010

Beginning in early 2010, the Company recruited 3,000 customers located in Norman, Oklahoma for the demand response study. The primary objective of the study was to determine the most effective combination of rate and technology in reducing on-peak energy consumption. The Company hypothesized that it could achieve 1.3 kW of max reduction per customer and 20% participation by 2014. The company tested two dynamic rates, VPP (variable peak pricing) and TOU-CP (time of use.) Below is a summary of those rates for residential participants.

In addition to the two rates, the Company tested four combinations of technology: a programmable communicating thermostat (PCT), an in-home display (IHD), a web portal and a combination of all three.

Study results obtained from the testing period, June 1 through Sept 30 of 2010, show that the initial hypothesis of 1.3 kW of max demand reduction is achievable. In particular the VPP/PCT combination provided the greatest amount of demand reduction, approximately 1.96kW or 58%, for the average VPP/PCT participant when compared to the control group. This result is likely explained by the automated response of the thermostat, which is lacking in the web and IHD treatments.

Phase I analysis also provides insight into enrollment patterns. Recruitment patterns in 2010 show that income is positively correlated with enrollment rate. During 2010 recruitment, the high income quota filled in one month, with about 28 enrollments per day. The middle income segment filled over the course of 3 months, with an average of 7 enrollments per day. Low income recruitment proved much more difficult, as only reached 80% of the target for that segment was reached. It is important to note that as demographic quotas were met, enrollments in that demographic group were discontinued. The first month of recruitment, March 2010, is a good indicator of enrollment rate by demographic segment because enrollment was not influenced by any restrictions during that time. See the chart below for daily enrollment rate across age and income groups.



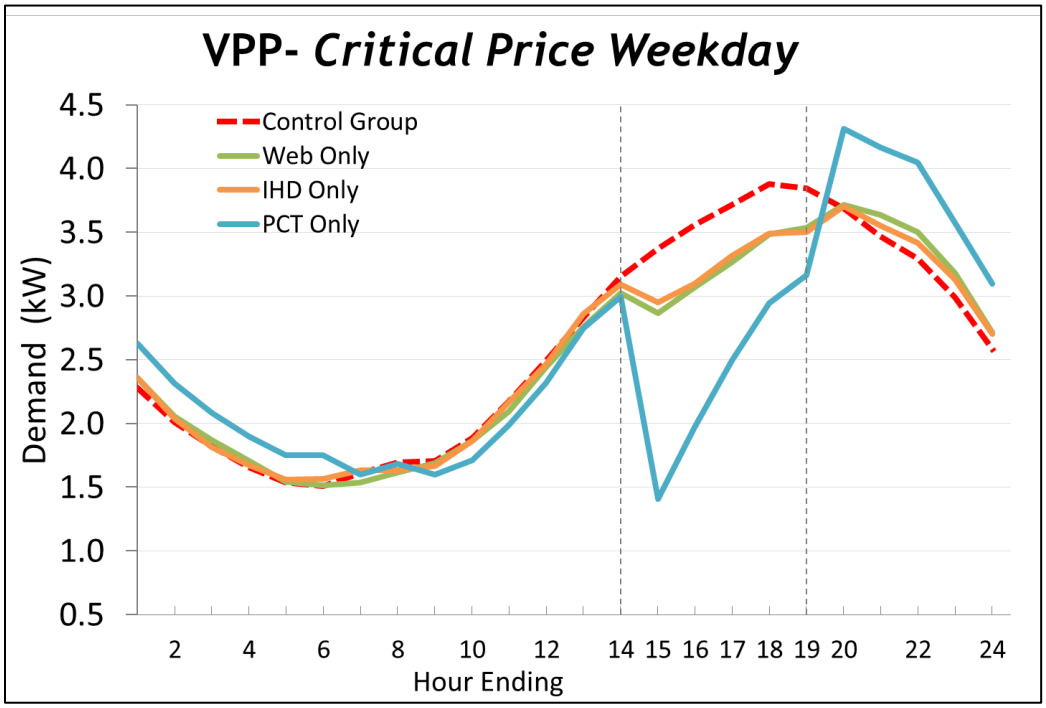
Note that there is less variance between age groups with the largest difference between the young segment at a rate of 18 enrollments per day, and the family age group with 13 enrollments per day. When compared to the low income enrollment rate of 6 per day, high income enrolled at a rate 4.4 times greater, and middle income enrolled twice as fast.

The detailed load impact analysis of Phase I can be reviewed in the Summer 2010 Interim Report "OG&E Smart Study TOGETHER Impact Results" provided by Global Energy Partners.

Phase II- 2011

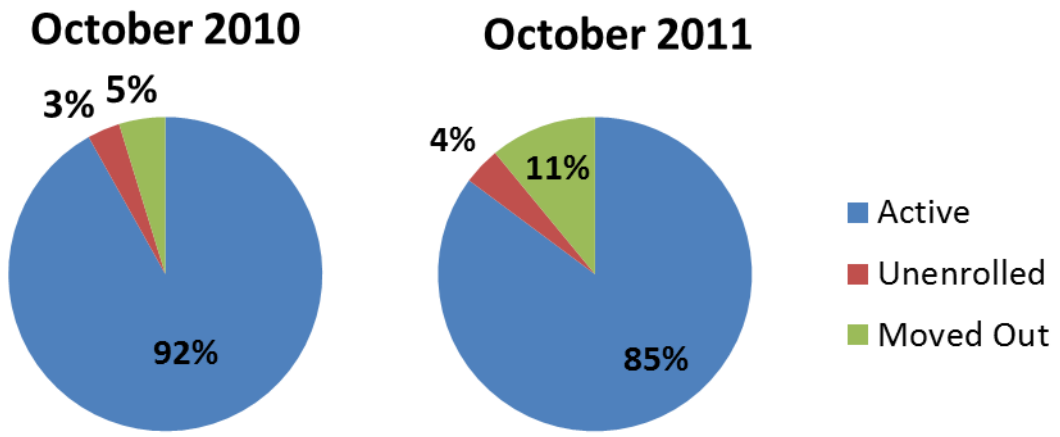
The second year of this study was a continuation of Phase I with a few changes. The Company engaged an additional 3,000 participants, located in Moore and south Oklahoma City. During phase II, the

Company was able to test responsiveness to Critical Price events, and also gain insight into Commercial participation. The results from this phase confirmed the success of the PCT/VPP combination measured in 2010, with a maximum demand reduction of 1.97kW. Below is a graph of a critically priced day which summarizes the response of each technology on the VPP rate. The difference between the PCT behavior and the control group summarize the success of this treatment.



Aside from the load impacts, Phase I and II analysis show there is an apparent relationship between demographic segment and demand reduction. Focusing on 2010 results (Phase I) of the VPP/ PCT treatment, high income participants exhibited the greatest average baselines than other income groups, as well as the highest average demand reduction. Additionally, low income participants exhibited the highest percentage in demand reduction (68%) during Phase I, when compared to the other segments.

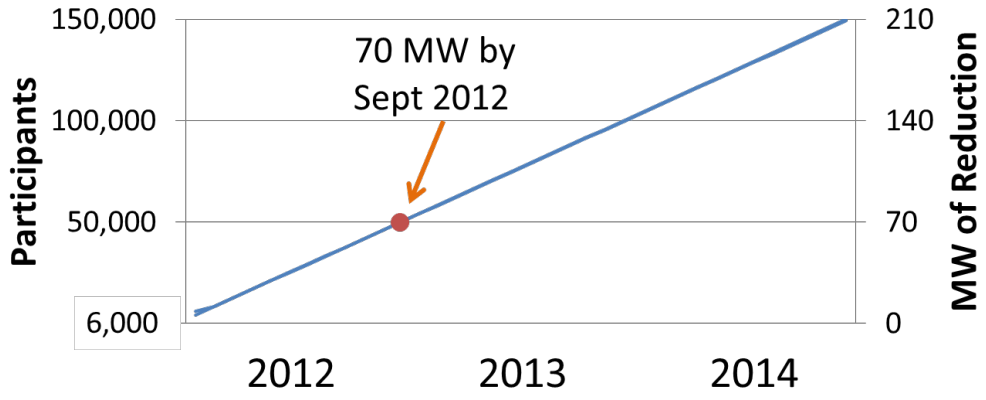
As of May 2012, 2.9% of enrollments have dropped out of the program, and 5% of enrollments have moved. During 2010 and 2011, customers did not have knowledge of their treatment group prior to enrollment due to randomized study design. The following pie charts show the status of unenrollments and move outs as of October each year. At the end of summer 2010, 92% of phase I enrollments remained on the program. During both phases, the unenrollment rates are below 5%.



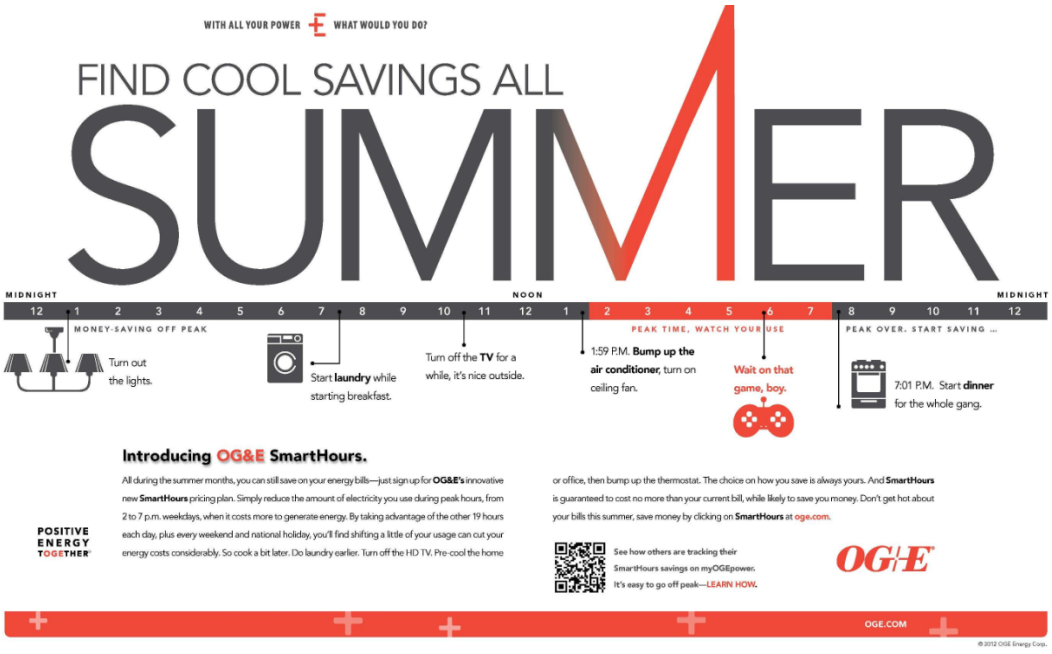
The detailed load impact analysis of Phase II can be reviewed in the final report: "OG&E Smart Study TOGETHER Impact Results- Final Report Summer 2011" provided by Global Energy Partners.

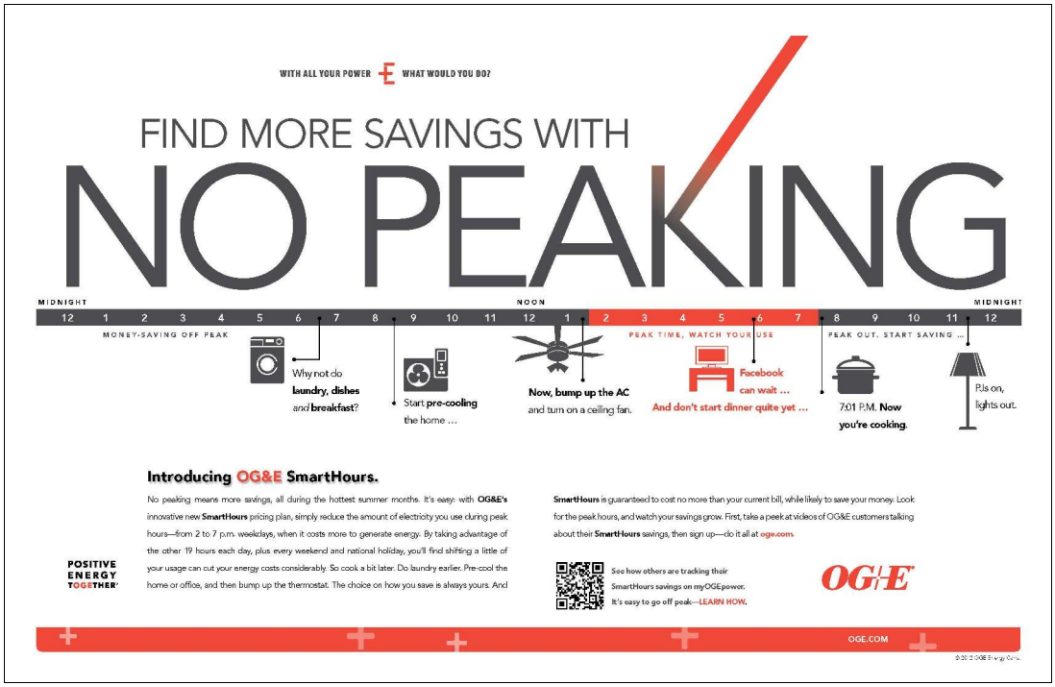
2012- SmartHours

Based on the positive results of the demand response study, the Company initiated the SmartHours campaign in January 2012. This program promotes participation in the VPP rate and signing up for a thermostat. First year targets include engaging close to 40,000 customers, with an estimated 70 mW of demand reduction potential by September 30, 2012. Below is a timeline of participation and demand reduction goals over the next three years. Please note that this timeline is based on the initial assumption of 1.3 kW per customer, and 20% participation (~150k customers).



SmartHours messages focus on customer education around on-peak versus off-peak consumption, and potential bill savings. Examples of these messages are below. As of August 20, 2012, more than 34,000 customers have signed up for the program.


WITH ALL YOUR POWER WHAT WOULD YOU DO?
FIND COOL SAVINGS ALL
SUMMER
MIDNIGHT
NOON
MIDNIGHT
12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
MONEY-SAVING OFF PEAK
PEAK TIME, WATCH YOUR USE
PEAK OVER. START SAVING ...
Turn out the lights.
Start laundry while starting breakfast.
Turn off the TV for a while, it's nice outside.
1:59 P.M. Bump up the air conditioner, turn on ceiling fan.
Wait on that game, boy.
7:01 P.M. Start dinner for the whole gang.
Introducing OG&E SmartHours.
All during the summer months, you can still save on your energy bills—just sign up for OG&E's innovative new SmartHours pricing plan. Simply reduce the amount of electricity you use during peak hours, from 2 to 7 p.m. weekdays, when it costs more to generate energy. By taking advantage of the other 19 hours each day, plus every weekend and national holiday, you'll find shifting a little of your usage can cut your energy costs considerably. So cook a bit later. Do laundry earlier. Turn off the HD TV. Pre-cool the home or office, then bump up the thermostat. The choice on how you save is always yours. And SmartHours is guaranteed to cost no more than your current bill, while likely to save you money. Don't get hot about your bills this summer, save money by clicking on SmartHours at oge.com.
POSITIVE ENERGY TOGETHER
See how others are tracking their SmartHours savings on myOGEpower.
It's easy to go off peak—LEARN HOW.
OG&E
OGE.COM


WITH ALL YOUR POWER WHAT WOULD YOU DO?
FIND MORE SAVINGS WITH
NO PEAKING
MIDNIGHT
NOON
MIDNIGHT
12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11 12
MONEY-SAVING OFF PEAK
PEAK TIME, WATCH YOUR USE
PEAK OUT. START SAVING ...
Why not do laundry, dishes and breakfast?
Start pre-cooling the home ...
Now, bump up the AC and turn on a ceiling fan.
Facebook can wait ...
And don't start dinner quite yet ...
7:01 P.M. Now you're cooking.
P.Is on, lights out.
Introducing OG&E SmartHours.
No peaking means more savings, all during the hottest summer months. It's easy with OG&E's innovative new SmartHours pricing plan, simply reduce the amount of electricity you use during peak hours—from 2 to 7 p.m. weekdays, when it costs more to generate energy. By taking advantage of the other 19 hours each day, plus every weekend and national holiday, you'll find shifting a little of your usage can cut your energy costs considerably. So cook a bit later. Do laundry earlier. Pre-cool the home or office, and then bump up the thermostat. The choice on how you save is always yours. And SmartHours is guaranteed to cost no more than your current bill, while likely to save your money. Look for the peak hours, and watch your savings grow. First, take a peek at videos of OG&E customers talking about their SmartHours savings, then sign up—do it all at oge.com.
POSITIVE ENERGY TOGETHER
See how others are tracking their SmartHours savings on myOGEpower.
It's easy to go off peak—LEARN HOW.
OG&E
OGE.COM

Chapter 2: Smart Study Together Research Summary

Throughout the SST in 2010 and 2011, the Company researched study participants through multiple surveys and focus groups. The Smart Grid Awareness survey was conducted quarterly throughout each year. Participants were surveyed mid summer and end of summer to further understand the customer experience with our SST rate plans. Transactional surveys were conducted throughout the summer on a monthly basis to gain insight into the performance of our call center and field service. Please see Chapter_2_Research_Summary for a detailed explanation of these findings.

Chapter 3: Load impact Results 2010

To assess the impact of our SST rate plans and enabling technology, OG&E conducted a statistical analysis of particpants energy consumption. The study included a randomized sample of approximately 2,816 residential participant and control group customers, and 465 small business (general service) participant customers in the area of Norman, Okla. The ultimate goal is to determine if the demand reductions achieved through a combination of price response programs, in-home technology, and energy awareness will allow OG&E to delay capital investments in incremental generation resources. Please see Chapter_3_Load_Impact_Results_2010.docx for a detailed report.

Chapter 4: Load Impact Results 2011

The statistical analysis completed in 2010 was repeated in 2011 with additional study participants in southern parts of Oklahoma City and Moore, Okla. Key differences in this second year of the study include pre-participation data for the new 2011 recruits that did not participate in 2010. Also, additional commercial recruitment enabled a sufficient sample size to gain insight into that customer class. Please see Chapter_4_Load_Impact_Results_2011.docx for the detailed report.

Chapter 5: Appendices

Due to the volume of data and analysis conducted throughout the study, additional graphs, charts and detailed explanations of various topics are included in the appendix. Please see Chapter_5_Appendix for this information.

- Appendix A- Description of Differencing Estimation
- Appendix B- Regression Description and Statistics
- Appendix C- Individual Load Shapes for First Year Recruits
- Appendix D- Individual Load Shapes for Second Year Recruits- Residential
- Appendix E- Individual Load Shapes for Second Year Recruits- Commercial
- Appendix F- Individual Load Shapes for Second Year Recruits- Pretreatment Load Shapes
- Appendix G- Marketing Samples