



Evaluation Plan for 2011 Demand Side Management Programs

Submitted to Georgia Power Company

Submitted By Nexant

In partnership with Cadmus Group and abt SRBI

December 30, 2011

GEORGIA POWER
A SOUTHERN COMPANY

THE CADMUS GROUP, INC.

Nexant

CONTENTS

1 INTRODUCTION AND OVERVIEW

1.1 EVALUATION PROJECT INTRODUCTION

Nexant, Inc. (Nexant) and its partners, The Cadmus Group (Cadmus), and abt SRBI (SRBI), (collectively, the Evaluation Team) have been retained by the Georgia Power Company (Georgia Power or GPC) to evaluate all seven residential and commercial demand side management (DSM) programs that were certified in the 2010 Integrated Resource Plan (IRP) by the Georgia Public Service Commission (the Commission). The project includes both a process and impact evaluation of the 2011 program year activities, to be completed and delivered in a separate work product, with final evaluation results to be completed and submitted by December 31, 2012. The Georgia Power DSM programs to be discretely evaluated include:

1. Residential Water Heating Program
2. Residential Home Energy Improvement Program
3. Residential High-Efficiency New Home Program
4. Residential Lighting and Appliance Program
5. Residential Refrigerator Recycling Program
6. Commercial Prescriptive Incentive Program
7. Commercial Custom Incentive Program

The Evaluation Team will perform a process evaluation of each program, focusing on program design and theory, implementation and delivery, and market feedback. The programs will be evaluated through interviews with pertinent program actors including Georgia Power and sub-contractor implementation staff, contractors, trade allies, retailers, participants, and non-participants. For each population a unique survey instrument will be developed to ensure that responses produce comparable data and allow the Evaluation Team to draw meaningful conclusions. An overview of the process evaluation is provided in Section 2 of this plan.

The net and gross program energy impacts will be evaluated through a combination of engineering analysis and site inspections of implemented program projects. Because it is not cost-effective to complete analysis and site inspection on a census of the implemented program projects, energy savings will only be verified for a representative sample of projects. The gross program-reported savings will be adjusted by a realization rate which is the ratio of evaluation verified savings to the program-reported savings within the sample. The net savings, which are an estimation of the direct result influence attributable to the program, will be calculated by applying net-to-gross scaling factors to the gross program-reported savings. In order to estimate net-to-gross factors, the Evaluation Team will employ participant surveys to quantify the actual impact of the programs. Section 3 summarizes the audit, inspection and survey methods to be utilized in the calculation of net and gross program energy impacts.

1.2 EVALUATION GOALS AND OBJECTIVES

Over-arching project goals will follow the definition of impact evaluation established in the "Model Energy-Efficiency Program Impact Evaluation Guide – A Resource of the National Action Plan for Energy Efficiency," November 2007:

"Evaluation is the process of determining and documenting the results, benefits, and lessons learned from an energy-efficiency program. Evaluation results can be used in planning future programs and determining the value and potential of a portfolio of energy-efficiency programs in an integrated resource planning process. It can also be used in retrospectively determining the performance (and resulting payments, incentives, or penalties) of contractors and administrators responsible for implementing efficiency programs.

Evaluation has two key objectives:

1. To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.

2. To help understand why those effects occurred and identify ways to improve."

Georgia Power has outlined the following additional objectives for the program evaluation:

- Develop reliable estimates of program energy and peak demand savings for the seven programs listed above, including net-to-gross ratios and measure level per-unit savings;
- Assess of the rate of freeriders, freedrivers, and any snap back or take back effects resulting from the programs;
- Provide recommendations for program improvements and discuss methods to obtain deeper program savings;
- Calculate program cost-effectiveness using the verified benefits and the program costs, including lost revenue, results presented at the program, sector and portfolio levels;
    - Cost-effectiveness tests will include Total Resource Cost (TRC), Program Administrator Cost (PAC), Participant Test and Ratepayer Impact Measure (RIM) test.
- Report on the extent to which program objectives for customer satisfaction are being met;
- Confirm that implementation contractors are performing at a high quality level;
- Review Georgia Power's marketing and promotional efforts;

- Evaluate effectiveness of program incentives in compelling qualifying customers to take action; and
- Evaluate process flow effectiveness to ensure customers are able to participate in the program and receive rebates in a timely manner.

1.3 EVALUATION REPORTING

The Evaluation Team understands this evaluation project is part of a larger context within Georgia Power's on-going implementation, planning and commission approval of DSM programs. Consequently, the following milestone deadlines and interactions are understood:

- **Interim Process Evaluation Key Findings Report: September 30, 2011** – Commence the feedback loop to promote integration of evaluation findings for 2012 program year activities.
- **Impact Evaluation Data Collection Completion: June 30, 2012** – Commence integration of evaluation findings into 2013 (2014-2016 implementation years) IRP activities.
- **Cost effectiveness Analysis: August 31, 2012** – On-going integration of evaluation findings into 2013 IRP activities and if necessary, beyond.
- **Draft Impact Evaluation and Process Evaluation Report: September 16, 2012 –** Final integration of evaluation findings into 2013 IRP activities.
- **Final Evaluation Report: December 1, 2012 –C**ompliance with Commission filing deadline of December 31, 2012.

In order to ensure on-going quality control, the Evaluation Team will adhere to professional project management procedures based on planning, monitoring, and control, as well as consistent communication with Georgia Power. Project administration will be predicated on effective work planning, schedule and program controls, coordination of tasks, and internal reviews of work. This is accomplished in the following way:

- Closely adhering to the established processes and procedures as documented in process flow diagrams, administrative procedures and project schedules;
- Consistently communicating with the client and other project participants via oral and written channels;
- Prioritizing and scheduling projects/tasks to best suit the needs of the client and other stakeholders; and
- Providing internal reviews of work prior to interface with customers or submission to agency clients.

The Evaluation Team will provide regular progress reporting to Georgia Power staff in relation to the status and preliminary findings of the process and impact evaluation project. Monthly conference call meetings with Georgia Power will be scheduled to discuss monthly status reports outlining the progress of our activities toward meeting the goals of the evaluation. The following provides a schedule of monthly reporting:

- **First Friday of the Month –** Publish memo summarizing previous month activities and updating "needs list" and schedule
- **Second Thursday of the Month** – Georgia Power-Evaluation Team conference call reviewing memo and on-going activities
- **Fourth Thursday of the Month** – Georgia Power-Evaluation Team conference call updating progress

1.4 EVALUATION SCHEDULE

Table 1-1 summarizes the preliminary schedule of major milestones and activities. More detailed program tasks are included in the schedules provided within each program's evaluation plan.

Table 1-1: Overall Evaluation Schedule

ACTIVITIES AND DELIVERABLES	ANTICIPATED COMPLETION DATE
Evaluation Plan and Project Management	
Project Kick-off Meeting	April 14, 2011
Draft Evaluation Plan	May 6, 2011
Final Evaluation Plan	May 27, 2011
Monthly Update Meeting	End of each month
Monthly Reports	Second Thursday of each month
Process Evaluation	
Develop Evaluation Analysis Plans	May 20, 2011
Comment from GPC on Analysis Plans	May 27, 2011
Review Program Documentation	May and June, 2011
GPC Staff Interviews	May 25-27
1st Round Draft & Review of Survey Instruments	May - June, 2011
1st Round Final Survey Instruments Developed	July, 2011
Survey Implementation	May -July, 2011
Social Media Analytics Data Collection	June – July 2011
Analysis of results	August 2011
Interim Process Evaluation Key Findings	September 30, 2011
2nd Round Draft & Review of Survey Instruments	October- November 2011
2nd Round Final Survey Instruments Developed	December 2011
2nd Round Survey Implementation	January – June 2012
Analysis of Survey Results and Reporting	July – August 2012
Impact Evaluation	
General On-Site Data Collection Forms	June, 2011
Final Data Collection Forms Developed	July, 2011
Impact Evaluation – On-site Inspections	September 2011 through June 2012
Analysis of results	October 2011 through July 2012
All Tasks	
Completed Cost Effectiveness Analysis	August 15, 2012
Final Draft Report	September 1, 2012
Final report	**December 1, 2012**

1.5 SUMMARY OF PROGRAM EVALUATION ACTIVITIES

Table 1-2 and Table 1-3 summarize the major survey, interview, measurement and verification (M&V), and analysis activities for this process and impact evaluation of Georgia Power's programs.

Table 1-2: Summary of Program Process Evaluation Survey Instruments

Evaluation Tool	Impact	Process
Residential Water Heating		
- Program & Implementation Staff Interviews		√
- Participating Customer Surveys	√	√
Residential Home Energy Improvement		
Program & Implementation Staff Interviews		√
- Participating Customers – Bundled	√	√
- Participating Customers – Unbundled	√	√
- Participating and Nonparticipating Contractors		√
Residential High-Efficiency New Homes		
Program & Implementation Staff Interviews		√
- Participating Builders		√
- Non-participating Builders		√
- HERS Raters		√
- Participating Home Buyers	√	√
Residential Lighting and Appliances		
Program & Implementation Staff Interviews		√
- Retailer Interviews		√
- Participating CFL Gen Population Survey	√	√
- General Nonparticipating Population Survey, including questions for non-participating customers regarding all residential programs		√
- Appliance Participants Survey	√	√
Residential Refrigerator Recycling		
Program & Implementation Staff Interviews		√
- Market Actor Interviews		√
- Participating Customer Surveys	√	√
- Non-participating Customer Surveys		√
Commercial Custom and Prescriptive		
Program & Implementation Staff Interviews		√
- Participating Customer Surveys	√	√
- Non-participating Customer Surveys		√
- Trade Ally Surveys		√

Table 1-3: Summary of Program Impact Evaluation M&V Activities

Program	% of Portfolio Savings	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
		Target Confidence / Precision	Anticipated Sample Size[3]	Target Confidence / Precision	Anticipated Subset-Sample Size[3]
Residential Programs					
Water Heating	0.4%	90/15	31	80/20	11
Home Energy Improvement	2.2%	90/10	86[2]	90/15	31
High-Efficiency New Home	2.9%	90/10	68	80/20	11
Lighting and Appliance	13.0%	90/10	90[2]	90/20	74
Refrigerator Recycling	7.7%	90/10	68	90/15	31
Residential Totals	**26.2%**		**343**		**158**
Commercial Programs					
Prescriptive Incentive	16.3%	90/10	81[2]	90/10	67
Custom Incentive	57.6%	90/10[4]	68	90/10[4]	68
Commercial Totals	**73.8%**		**149**		**135**

(1) C/P = Statistical Confidence / Precision at assumed Cv of 0.5

(2) Oversampling to account for variety of measures

(3) Actual sample sizes will be determined on actual 2011 participation

(4) Final Target confidence/precision will be based on final participation quantity. Site inspections for the commercial custom program to be fixed at 68, unless population counts are less than 100.

The process and impact evaluation activities will be choreographed in a manner to maximize project efficiency and minimize customer fatigue caused by multiple interactions with the Evaluation Team. The plan described herein outlines the approach for each evaluation activity and program, including sample sizes, data collection plan, and timeline for delivery of the interim deliverables and final report.

2 PROCESS EVALUATION OVERVIEW

2.1 OVERVIEW

Process evaluations document program processes; determine whether the correct data are tracked properly and in the right format; identify operational and quality assurance issues; and assess market barriers and customer response (participant and non-participant). Process evaluations provide critical feedback so program managers can better understand why programs are, or are not, meeting specified goals. Process evaluations help program managers assess and improve the organization, delivery, and outcomes of the programs. Process evaluations can be useful at any stage of a program's life but are especially useful in providing feedback for pilot and new programs, so adjustments can be made quickly. The evaluation team will provide recommendations, where appropriate, on how program operations and delivery can be improved.

The next sections describe the general steps the Evaluation Team will take to conduct the process evaluation for each program. Some of these steps will be conducted concurrently. Where possible, the team will combine process and impact evaluation activities, such as in the design and conduct of surveys, which gather information for both types of evaluation.

2.2 STEP 1: DEVELOP A PROCESS EVALUATION ANALYSIS FRAMEWORK

We have begun working on the analysis framework based on the Georgia Power team's feedback at the kick-off meeting on proposed researchable issues. After receiving additional feedback from the program managers and confirming evaluation goals, the Evaluation Team will review priority issues and identify other areas to be investigated. From this combined set of inputs, the Evaluation Team will develop both a detailed list of researchable questions linked to specific areas of investigation, and the potential metrics to consider during the evaluation.

Table 2-1 shows a generic set of researchable questions linked to the tools the Evaluation Team will tailor to each program. We will provide these tables to Georgia Power for input and finalization before we develop the first set of tools. In Table 2-2 we present our data needs to implement a successful process evaluation. Table 2-3 at the end of Section 2 summarizes how all the tools work together to address investigative areas and how they are linked to the impact evaluation. We will create this type of table for each program.

Table 2-1: Researchable Questions and Indicators

#	Questions	Areas of Investigation / Indicators	Evaluation Tools
1	Are program process targets being met?	• Number of participants in 2011 • Number of audits (some may not lead to parts) • Number of blankets installed (may be more than 1/part)	Database analysis and program targets for 2011
2	Are customer satisfaction goals being met?	• Overall customer program satisfaction • Customer satisfaction w/program components • Customer satisfaction with GPC auditor - Professional - Timely - Knowledgeable	Customer surveys Market analytics tools
3	Are market transformation goals being met?	• Increased customer knowledge of EE (e.g., w/water heating equip, CFLs, EE appliances) • Increased perception of value added of EE equipment, CFLs and appliances • Larger inventory of EE equipment • Contractors/retailers note greater demand, more questions about EE water heating, CFLs, appliances, etc.	Customer survey Contractor interviews/surveys Manufacturer interviews Market analytics tools
4	Is the program design appropriate to meet goals?	• Compare current design with best practices in the industry • How effectively identified and addressed are market barriers? • Any design elements creating new barriers? • Incentive amount sufficient? • Program components sufficient (education, incentives)? • Utility's resources assigned sufficient?	Program description PM interviews Industry best practices Customer surveys
5	Is the enrollment process effective?	• Percent of rejected applications • Number of days to process applications • Customer satisfaction with application process • Trade ally satisfaction with application process	Materials review Database analysis Customer surveys Trade ally interviews interviews
6	Is the marketing process effective?	• Customer awareness and first source • Customer motivations and decision making • Customer approval of marketing materials	Customer surveys Best practices (market channels) Contractor interviews

#	Questions	Areas of Investigation / Indicators	Evaluation Tools
		• Were market channels appropriate? • Contractor awareness	Market analytics tools
7	Is the implementation process effective?	• Was program launch effective? • Was data tracking effective? • Were market channels appropriate?	PM Interviews Database review (data tracked, ramp up)
8	Are program partner activities effective?	• What training provided? How viewed by recipients? • What educational/program materials provided? How viewed? • Are partners satisfied with support provided by utility or implementation contractor?	Program partner interviews/surveys Market analytics tools
9	Did the program have clear goals and objectives?	• Were program goals and objectives communicated to and understood by GPC program staff? • Were program goals and objectives communication to and understood by implementation contractor? • Were program goals and objective revisions communication to all relevant program staff?	PM Interviews Program partner interviews/surveys

2.3 STEP 2: REVIEW DOCUMENTS AND DATABASES

The Evaluation Team will collect and review copies of additional program materials, including logic models, program procedure manuals, agreements between Georgia Power and its implementing contractors (ICF, JACO and APT), and all marketing materials. We have already conducted an initial review of the documents associated with Georgia Power's DSM program filings. We will review the marketing materials for ease of use, level of information provided, efficiency in communicating information, effectiveness in persuading the customer, and comparability with industry best practices.[1]

Table 2-2 shows the types of general and program-specific information the Evaluation team will review. This information will contribute to the planning process, design of questions and instruments, and final analysis. Data and information requests specific to each program within each specific program plan are described at the end of this report.

[1] We plan to use http://www.eebestpractices.com/ as a basis for defining best practices against which to benchmark the Georgia Power programs and will add experience from other programs in the Southeast.

Table 2-2: Process Data/Information to be Reviewed for All Programs

General Data – All Programs
Quarterly (or monthly) participation and measures expected for 2011 (up to 2013 if available) and participation and measures installed to date
Any previous evaluation efforts; verification measures/instruments, historical participation and savings data – year end reported
Process flow diagrams, program manuals or marketing plans (as available) and logic models. Timing of marketing pushes would be particularly important to track in parallel with social media analytics.
All database fields for each program and as follow up printout of reports by selected fields (participant, contractor information and rebate information at minimum)
Sample data extract or indicate data format; description of how data gets uploaded, how often, and how it is used for tracking or application processing
All program marketing materials (general and program-specific) -Print, radio, TV, and online advertising -Brochures, flyers, door hangers, postcards -Bill inserts, customer letters -Point of purchase materials -PowerPoint trainings -Contractor information packages -Educational literature to trade allies and customers -Application forms
Any and all analytics or metrics associated with marketing and outreach materials and GPC website, e.g., tracking codes, special 800 numbers, reply rates, in-bound call center referral data, and Google analytics
Name and contact information for any contractors and subcontractors
Contact information of key GPC counterparts for each program and their roles
GPC organization chart identifying all players in programs
Tracking data excerpts (participant, rebates processing, etc.)
Reports provided by implementation contractors to GPC

2.4 STEP 3: CONDUCT STAKEHOLDER INTERVIEWS

The Evaluation Team will assess program delivery and performance through interviews with Georgia Power program staff, program implementation staff, and trade allies. Our staff will interview Georgia Power staff in person and conduct in-person or telephone interviews with ICF, APT, and JACO staff and trade allies. These interviews will focus on program history and design, vision and goals, marketing and outreach, target audiences and market partners, barriers to participation, effectiveness of administrative processes and program delivery (including quality assurance), data management, program challenges, and areas for improvement. During these interviews, we also

will discuss the logic models that Georgia Power has developed for each program. Our interviews with trade allies will cover: awareness; satisfaction with program materials, processes and communications; and perception of customer satisfaction and knowledge.

2.5 STEP 4: DEVELOP LOGIC MODELS

A logic model is a graphic representation that shows relationships between program inputs, outputs, and final desired outcomes. A comprehensive way to identify and measure progress toward program goals is through using program logic models. A well-designed logic model serves as a roadmap to understanding the logical relationships between program activities and desired outcomes. It provides clarity about program design to ensure all elements are operating to achieve the ultimate program goals. Logic models can also be used for program planning, management, evaluation, and communication. Based upon our review and stakeholder interviews, we will revise the existing logic models, as needed, to reflect actual program theory, activities, and desired outcomes.

2.6 STEP 5: DEVELOP AND IMPLEMENT SURVEYS

The Evaluation Team will collaborate with program staff to develop and implement surveys for each program. These surveys will collect information to support both process and impact evaluations. They will also be used to recruit customers for site visits, as part of the impact evaluation. The Evaluation Team will develop an analysis plan to ensure the surveys capture the information needed to meet the agreed-upon objectives. This analysis plan, which will be developed once we have received evaluation plan approval, will guide our development of specific questions.

We will begin survey design shortly after receiving approval of the final evaluation and sample plan. We will refine our survey instruments after our interviews with program managers to ensure that we include all key issues of concern. We will provide all surveys to Georgia Power to review at least two weeks before programming is scheduled to start to allow a one-week period for comments and a second week for editing.

We anticipate conducting telephone surveys for all residential programs. The survey process usually requires several steps: (1) one week for Computer Aided Technology Inc. (CATI) programming; (2) a field test with five to 10 customers to ensure the wording and flow of the questions are appropriate; (3) as a final check on CATI programming, two to four weeks of fielding the survey (depending on the target population); and (4) one week of post-survey effort to clean and sort the data.

Before making the survey calls, we will notify Georgia Power's call center and program representatives, so they can notify field staff. Our calling will occur primarily during evening hours (local time), unless respondents request to be contacted at a different time. To maximize the response rate, and minimize non-response bias, we will do at least 12 callbacks to attempt to reach each sampled respondent over the survey period.

The Team also will conduct a broad non-participant survey to identify CFL giveaway recipients. This survey will allow us to develop baseline information for Georgia Power's upstream lighting program, which will be introduced in 2012. The non-participant survey will contain modules asking about all of Georgia Power's residential energy-efficiency programs and about customer awareness of efficient lighting.

For commercial customers, field staff will use an electronic template and record answers on a tablet PC, which will allow for greater efficiency and reduced error. This approach will enable customers to complete the survey at a time that is convenient for them. We will survey non-participating commercial customers with a telephone survey. The Evaluation Team will work with Georgia Power to identify an appropriate non-participating customer list for the phone survey.

The Evaluation Team recommends implementing the surveys in two phases; the first set in mid-2011 and the second set early in 2012. We discuss the surveys associated with each program in greater detail in the individual program write-ups.

2.7 STEP 6: IMPLEMENT SOCIAL MEDIA ANALYTICS TOOL

The Evaluation Team will engage Radian 6—a social media analytics and data collection tool—as part of our process evaluation. This tool collects and categorizes online conversation within blogs and message boards, social networks such as Twitter (Georgia Power currently has 3,300 followers on Twitter), public Facebook pages, and from online article comments. This tool will be used to track themes or activity spikes that arise within data sets, which in turn will lead to insights about customers. With this tool, we will monitor total activity volume, sentiment (positive/negative/ neutral), and conversational themes for each topic. We then can analyze both the individual posts verbatim and the aggregated data to provide quantitative and qualitative insights related to Georgia Power and its DSM programs. For example, we will get an indication of how effective and memorable market collateral has been by observing the penetration of Georgia Power's various program marketing messages into online conversation. Assuming we will have access to market campaign timing details, we will be able to measure general chatter activity against marketing campaign timing to look for increases, which would indicate positive message penetration. We can also monitor general conversation topics and attitudes related to energy use.

The analytics tool also provides information useful for future outreach, such as the identification of online influencers within the realms of real estate, contractor trade groups, and energy-efficiency activities or measures. The Evaluation Team will gather as much of this type of information as possible and present it within the analysis and insight reports.

These insights and resulting recommendations will be presented as reports within the larger marketing review.[2]

We summarize below the steps involved in program set-up and implementation sequence:

1. Set up Radian 6 to search for specific keywords important to Georgia Power programs and target customer base. At maximum, the tool can collect data over the course of an entire year. For this evaluation, we will program the tool to pull historical data from August 2010 to July 2011. Evaluators will work closely with Georgia Power program managers to establish appropriate keywords to gather program and Georgia Power brand information.

2. Allow two weeks for past data to populate the Radian 6 database.

3. Review the material in the Radian 6 database. Once populated with topic-based data, the tool's dashboard functionality allows "slicing and dicing" of information by time period, topic, and comment characteristics, i.e., either positive or negative comments. Additionally, we can search within certain categories, such as Twitter or blogs. We will perform an initial analysis of "online buzz" from past months.

4. Review data weekly from a crisis management perspective and alert Georgia Power to any corporate reputation issues.

5. The final dataset will be pulled at the end of July 2011 for analysis and reporting

2.8 SUMMARY

Table 2-3 summarizes how each of our data collection tools will be used as a source to answer process and impact evaluation questions for a residential program. We will create this type of table for each program.

[2] An example of a social media analytics report can be found in Appendix J at this link: http://www.calmac.org/publications/2008_Flex_Alert_Final_Report_12-18-08.pdf

Table 2-3: Mapping Investigative Questions to Collective Tool

DSM Programs - Process Evaluation Questions	Materials and Database Review	Program Staff Interviews	Participant Survey	Non-participant Survey	Trade Ally Surveys	Social Media Metrics
Program Design						
Measures and incentives	X	X				
Marketing plan and outreach	X	X				
Education plan	X	X				
Program logic models	X	X				
Program management tools (org charts, flow charts, database)	X	X				
Benchmarking against national best practices	X					
Program Implementation Effectiveness						
Program management tools (Program Manual)	X	X	X			
Database management		X	X			
Education materials	X		X		X	X
Effectiveness of processes	X	X	X		X	
Effectiveness of partner activities		X	X		X	X
Program Marketing						
Program specific customer targeted materials	X		X			
Program specific contractor targeted materials	X				X	X
Overarching marketing campaign materials	X		X	X	X	X
Social media tactics	X					X
Energy Awareness (participants and non-participants)						
Perceived energy savings from taking actions			X	X		

DSM Programs - Process Evaluation Questions	Materials and Database Review	Program Staff Interviews	Participant Survey	Non-participant Survey	Trade Ally Surveys	Social Media Metrics
Level of agreement with statements concerning energy efficiency			X	X	X	
Awareness of Energy Star			X	X	X	X
Purchase of Energy Star appliances in 2011			X	X	X	
Energy-efficiency behaviors currently			X	X		X
Energy-efficiency behaviors prior to participation			X			
Source of Program Information						
Awareness of programs offered by GPC				X		X
Sources of program information			X	X		
Preferred means for receiving information			X	X		
Verification of Installation						
Is measure installed at residence			X			
If not installed, what happened to it			X			
If not installed, why not			X			
Post-measure Related Behavior						
Use of equipment			X			
Changes in equipment use due to program information (e.g., reducing water heater temperature, reducing use)			X			
Participation Decision-making Process (net to gross)						
Reason for purchasing equipment			X			

DSM Programs - Process Evaluation Questions	Materials and Database Review	Program Staff Interviews	Participant Survey	Non-participant Survey	Trade Ally Surveys	Social Media Metrics
Impact of program on decision (timing, efficiency, quantity)			X			
Consistency questions			X			
Other incentives received (e.g., stimulus money)			X			
Program Partners/Trade Allies						
Contractor satisfaction with process		X			X	X
Contractor awareness				X	X	X
Purchase of energy equipment outside the program since participation					X	
Reasons for purchase outside of program					X	
Impact program participation had on decision to install outside program.			X			
Customer Satisfaction						
Overall program satisfaction			X		X	
Satisfaction with specific aspects of the program			X		X	
Suggestions for program improvement		X	X		X	
Satisfaction with GPC			X	X		X
Demographics						
Main heating fuel	X		X	X		
Main water heating fuel	X		X	X		
Own/rent			X	X		
Type of residence			X	X		

DSM Programs - Process Evaluation Questions	Materials and Database Review	Program Staff Interviews	Participant Survey	Non-participant Survey	Trade Ally Surveys	Social Media Metrics
Number of years lived at residence			X	X		
Age of residence			X	X		
Square footage of residence			X	X		
Number of people in residence			X	X		
Respondent age			X	X		
Respondent education			X	X		
Household income			X	X		
Respondent gender			X	X		
On-site Recruitment						
Explain purpose of on-site visit and recruit			X			

3 IMPACT EVALUATION OVERVIEW

3.1 OVERVIEW

This section provides an overview of core activities central to an impact evaluation. Sections four through 10 provide further detail of sampling, Measurement and Verification (M&V), and analysis methods for each program.

Fundamentally, impact evaluations seek to quantify the net savings that have been realized by the programs under review by determining the gross savings realized by projects enrolled in the programs and the net-to-gross (NTG) ratios. The net and gross program energy impacts will be evaluated through a combination of engineering analysis and site inspections of implemented program projects. Because it is not cost-effective to complete analysis and site inspection on a census of the implement program projects, energy savings will only be verified for a representative sample of projects. The gross program-reported savings will be adjusted by a realization rate which is the ratio of evaluation verified savings to the program-reported savings within the sample. The net savings, which are an estimation of the direct result influence attributable to the program, will be calculated by applying NTG scaling factors to the gross program-reported savings. In order to estimate NTG factors, the Evaluation Team will employ participant surveys to quantify the actual impact of the programs.

The Evaluation Team will rely on their collective experiences in evaluation projects and externally published protocols and guidelines for reference and guidance, recognizing these documents' regulatory environment may not be identical to Georgia Power's. Secondary sources may include:

- The 2004 California Evaluation Framework[3]
- Model Energy-Efficiency Program Impact Evaluation Guide[4]
- Impact Evaluation Framework For Technology Deployment Programs[5]
- Conference papers available through International Energy Program Evaluation Conference (IEPEC)[6]
- International Performance Measurement and Verification Protocol (IPMVP)[7]

[3] "The California Evaluation Framework"; TecMarket Works Framework Team; for California Public Utilities Commission; June 2004.

[4] "Model Energy Efficiency Program Impact Evaluation Guide, A Resource of the National Action Plan for Energy Efficiency"; Schiller Consulting; U.S. Environmental Protection Agency (EPA); November 2007.

[5] "Impact Evaluation Framework for Technology Deployment Programs"; U.S. Department of Energy (DOE) Energy Efficiency and Renewable Energy (EERE); July 2007.

[6] www.iepec.org

The evaluation generally will comprise the following steps and is described in further detail in this section:

- Obtaining Program Data Records
- Designing the Sample
- Verifying the Sample
  - Design Survey Instruments
  - Project File Review
  - Develop Program Specific M&V Approach
  - Establish the Baseline
  - Calculate Impacts and Load Shape Analysis
- Extrapolate the Sample to the population
- Estimating Net Savings
- Assess the Cost-Effectiveness

One guiding principle of the impact evaluation will BE to balance the cost of M&V efforts with the magnitude and uncertainty of program gross savings. Table 3-1 summarizes the composition of anticipated 2011 program savings based on program modifications during program start up. Even though these program modifications increased the expected annual gross savings (106,272 MWh) above the Commission approved target of 104,098 MWh, the annual target is still the Commission approved target (104,098 MWh) from the 2010 IRP Order for program participation year 2011.

[7] "International Performance Measurement and Verification Protocol"; Efficiency Valuation Organization (EVO); 2010.

Table 3-1: 2011 Georgia Power Program Goals

Program	Anticipated Participants	Anticipated Savings (MWh)	% of Portfolio Savings
Water Heating	800	435	0.4%
Residential Home Energy Improvement	3,031	2,384	2.2%
High-Efficiency New Home	2,023	3,046	2.9%
Lighting and Appliance	47,900	13,763	13.0%
Refrigerator Recycling	7,418	8,167	7.7%
Prescriptive Incentive	1,628	17,274	16.3%
Custom Incentive	137	61,203	57.6%
Totals	**62,937**	**106,272**	**100%**

3.2 OBTAINING PROGRAM DATA RECORDS

The first significant step of the evaluation activities is to obtain comprehensive program records for each of the seven (7) programs. Specifically, three (3) types of data records are desired for a complete review of the programs:

- Program tracking databases/spreadsheets
- Program project files
- Project documents from external sources, such as documents from customers, program consultants, or implementation contractors

The Evaluation Team will utilize these databases and spreadsheets to compile a comprehensive list of program participants and specific project data for each participant, including name, site address, reported savings, project schedule, incentives paid, etc. These databases are utilized by the Evaluation Team to:

- Determine aggregate reported program saving impacts
- Establish and execute program sampling strategy

Once participant projects have been selected as a probable candidate for audit within the sample populations, the Evaluation Team will request project specific files from each of the program managers. Project files are documents the program maintains for each project and include the application documents, savings calculations, any additional supporting documentation on the history of the project. This information is required to conduct a credible project audits.

Finally, depending on the program and the project, additional supporting information may be requested from third-party consultants, customers, and implementation contractors. This may include measurement and verification data, trend data, possible revisions to projects, equipment inventories, and equipment specifications. The information obtained from these other sources can be very useful as it can provide a more accurate and comprehensive understanding of the retrofit that occurred.

3.3 DESIGNING THE SAMPLE

In order to provide the most cost-effective sample, the Evaluation Team will employ a Value of Information (VOI) approach. VOI is used to balance cost and rigor and follows a process to allocate the bulk of the evaluation funds to programs and projects with high impact and high uncertainty. Because of the need for cost-effective yet reliable evaluation methods, coupled with the expectations for regulatory scrutiny, the sampling plans are guided by VOI algorithms to supplement the deterministic sample sizing that follows from more routine statistical sampling methods. The VOI metric will allow us to focus on the data points or samples with the greatest impact and uncertainty.

The greater the deviation of the observed value from the reported value, the greater is the variance in the sample pool. A greater variance in the sample pool indicates poor correlation between ex-ante and ex-post savings and the need to sample more data points in order to reduce the error ratios in the sample pools, which is critical to the sampling process. If a greater variance is expected for one end use type compared to another, the Coefficient of Variance (COV) is set at a higher value at the beginning of the sampling process, resulting in a larger sample pool. On the other hand, if the confidence in the program reported impacts is high, a lower COV can be used to reduce the sample pool, resulting in a significant decrease in the sample size. The COV will be initially set at 0.5 for each end use. As the evaluation continues, this may be adjusted if a large variance is seen in any of the sample pools, and additional site visit samples can be added.

3.3.1 Overall Sampling Approach

Because the Evaluation Team understands that Georgia Power will be utilizing net-to-gross values and per unit energy benefits of measures established from this evaluation for future program years, the confidence/precision targets and measurement and verification (M&V) were carefully selected. The proposed sampling methodology includes a nested approach providing a high level of measure verification coupled with an efficient use of on-site activities to provide an industry-standard level of measurement rigor. Verification of energy savings and attribution surveys will be conducted through participant telephone surveys with detailed desk review and analysis of the project documentation for the entire sample population. A smaller sub-set of the sample population will be selected for on-site inspections.

Table 3-2 summarizes the anticipated confidence/precision level and sample sizes by program. The samples will be drawn to meet the specified confidence/precision for each program and to meet a

90% confidence and 10% precision level for each programs' energy savings. More detailed program specific sample sizes and M&V activities are outlined in detail in Sections 4 through 10.

Table 3-2: Summary of Program Evaluation M&V Sampling, Confidence and Precision

Program	% of Portfolio Savings	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
		Target Confidence / Precision	Anticipated Sample Size[3]	Target Confidence / Precision	Anticipated Subset-Sample Size[3]
Residential Programs					
Water Heating	0.4%	90/15	31	80/20	11
Home Energy Improvement	2.2%	90/10	86[2]	90/15	31
High-Efficiency New Home	2.9%	90/10	68	80/20	11
Lighting and Appliance	13.0%	90/10	90[2]	90/20	74
Refrigerator Recycling	7.7%	90/10	68	90/15	31
Residential Totals	**26.2%**		**343**		**158**
Commercial Programs					
Prescriptive Incentive	16.3%	90/10	81[2]	90/10	67
Custom Incentive	57.6%	90/10[4]	68	90/10[4]	68
Commercial Totals	**73.8%**		**149**		**135**

(1) C/P = Statistical Confidence / Precision at assumed Cv of 0.5

(2) Oversampling to account for variety of measures

(3) Actual sample sizes will be determined on actual 2011 participation

(4) Final Target confidence/precision will be based on final participation quantity. Site inspections for the commercial custom program to be fixed at 68, unless population counts are less than 100.

The anticipated sample sizes for on-site activities were established upon the expected magnitude of programs impact, expected participation, level of certainty of savings, and variety of measures. For instance, the Residential Home Energy Improvement Program on-site sample size is larger than other residential program samples due to the large number of possible measures. Additionally, both commercial programs have higher confidence/precision targets due to the higher expected total savings achieved and uncertainty of performance.

Sample size will be calculated based on the following formulae, for an infinite population:

$$n = \frac{C_v^2 Z^2}{P^2}$$

where,

C_v = Coefficient of variance = 0.5 (assumed)

P = Precision = as applicable, criteria described above

Z = Z-Statistic based on 90% confidence = 1.645

Then, for a finite population:

$$n^* = \frac{Nn}{N+n}$$

where,

n* = Sample size for finite population

N = Population of participants

n = Sample of infinite population

3.4 VERIFYING THE SAMPLE

The next step in the impact evaluation process is to verify the gross impacts of the sample projects, which are the energy and demand savings that are found at a customer site as the direct result of a program's operation, while net impacts are the result of customer and market behavior that can add to or subtract from a program's direct results.

The impact evaluation activities will result in adjustment factors (realization rates), which are applied to the reported savings documented in the program tracking records. The ratio of the savings determined from the site inspections, M&V activities, or engineering calculations to the program-reported savings is the project realization rate; the program realization rate is the weighted average for all projects in the sample. The adjusted savings obtained by multiplying the program realization rates by the program-reported savings are termed the adjusted or verified gross savings, and they reflect the direct energy and demand impact of the program's operations. These verified savings do not account for customer or market behavior that may have resulted in greater or lesser savings; these market effects are captured through tasks carried out in net impact analysis.

Total program gross savings are adjusted using Equation 1.

Equation 1

$$kWh_{adj} = kWh_{rep} \cdot Realization\ Rate$$

Where

kWh_{ver} = kWh verified by the impact team for the program, the gross impact

kWh_{rep} = kWh reported for the program

Realization rate = kWh_{ver} / kWh_{rep} for the research sample

3.4.1 Design Survey Instruments

Standard data collection input forms will be developed for use by telephone/field survey engineers and for ease of input into a data collection database. The approach used for this project includes:

1. Select information to perform the needed impact evaluation tasks.
2. Build a database form within the database to allow for quick and easy population of tables with data and information.
3. The field data collection will be completed using direct input into the database via laptop computer.
4. Coordinate survey analysis plan and survey designs with process team.

The Evaluation Team will provide Georgia Power with draft survey instruments for review to ensure that all program data and/or any requested secondary data is captured. All customer facing materials will have Georgia Power approval prior to commencement of activities. For the commercial programs, the participant attribution and process surveys will be integrated into on-site surveys for willing participants. These surveys will be administered utilizing a digital device, such as a handheld tablet or PC, which allows for expeditious interviews.

3.4.2 Project File Review (All Projects)

After participant sample projects have been selected, the Evaluation Team will perform a desk review of the project file requested from each program stream. The project specific documents for the sampled projects should include the customer applications, savings declarations performed by third-party contractors (if applicable), post project audits, etc.

The Evaluation Team will conduct an engineering file review to answer the following questions:

- Do sample projects meet all process and eligibility requirements, including the applicant, building, measure, and project cost eligibility?
- Are data files of sample projects complete, well-documented, and adequate to calculate and report savings? (This enables the inspector to build check lists for data collection and develop data logging plans.)
- Are measures properly installed as described in the program tracking and reporting system?
- Are the M&V Plans followed correctly for reporting savings, if applicable?

- Are program tracking and reporting system reported energy and demand benefits the same as noted in project applications and/or applicable ex-ante estimates?

The file review for all sampled and reviewed projects will conclude with a telephone survey with the participant. For those projects where no site inspection will be conducted, the participant will asked questions to verify measure installation and provide parameter data to be used for analysis. For those projects where site inspections will be conducted, the telephone survey will have limited questions only necessary to schedule the site inspections, as the more detailed surveys will be conducted on-site.

3.4.3 Develop Program Specific M&V Approach

Desk review of projects will be conducted in preparation for all anticipated site inspections. Upon review of the program documents, a unique M&V plan will be developed for each program and measure, including a metering protocol, as applicable. M&V methods for each measure type will be developed with adherence to the International Performance Measurement and Verification Protocol (IPMVP). The broad categories of the IPMVP are as follows:

- ***Option A, Retrofit Isolation: Key Parameter Measurement*** – This method uses engineering calculations, along with partial site measurements, to verify the savings resulting from specific measures.
- ***Option B, Retrofit Isolation: All Parameter Measurement –*** This method uses engineering calculations, along with on-going site measurements, to verify the savings resulting from specific measures.
- ***Option C, Whole-Facility –*** This method utilizes whole-facility energy usage information, most often focusing on a utility bill analysis, to evaluate savings.
- ***Option D, Calibrated Simulation –*** Computer energy models are employed to calculate savings as a function of the important independent variables. The models must include verified inputs that accurately characterize the project and must be calibrated to match actual energy usage.

Figure 3-1 presents a flowchart summarizing the selection of the IPMVP M&V Options.

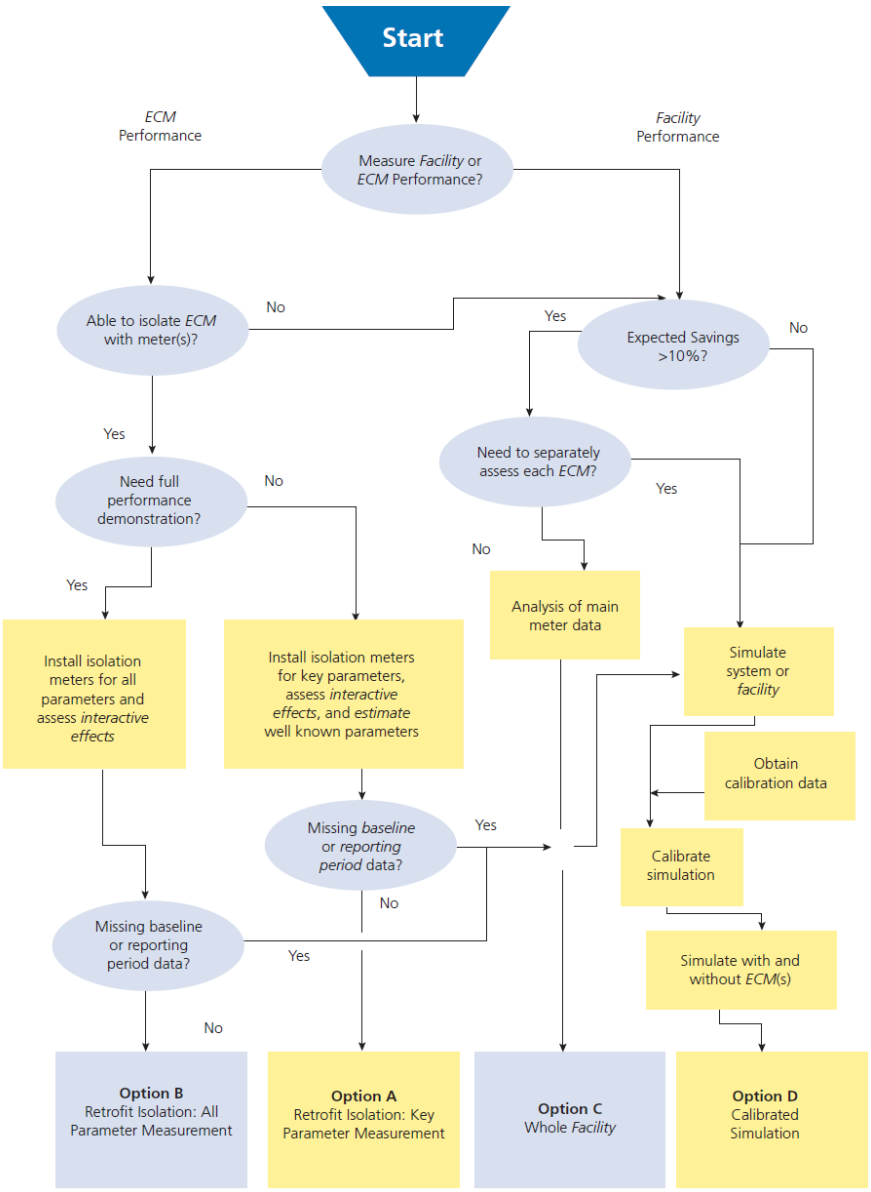

Figure 3-1: IPMVP Methodology Selection Process

3.4.4 On-site Inspections

On-site audits will build on the information obtained during the file review. When the participant's ability to self-report critical parameters is uncertain, site inspections provide a more accurate evaluation of the project and represent a significant portion of the effort. Because of the importance of the task, our team will work to ensure that site inspections are carefully planned and are cost effectively executed. On-site inspection activities will include:

- Collecting baseline and retrofit equipment information;

- Obtaining the operating parameters;
- Conducting a visual inspection;
- Gathering equipment nameplate information;
- Metering and data logging activities conducted per the program and site-specific M&V plan; and
- Conducting brief on-site interviews with relevant parties to understand the building operation, load shapes, equipment operating specifics, and other input parameters needed to calculate energy savings.

In cases where available, non-biased continuous or long-term metered data is available from the customer or in the project files, no additional measured data will be collected. Additionally, sites where measure performance has limited uncertainty, such as continuous 8760 operating schedules, no measurements may be necessary.

3.4.4.1 **Customer Interface Protocols**

Customers will be contacted by the Evaluation Team to arrange on-site inspections three business days after program staff dispatched notification letters. After several attempts to reach customers, alternative projects may be selected to replace the primary samples. A preliminary telephone survey will serve as a participant introduction to evaluation M&V activities; confirm that the customer participated in the program, and verify basic information such as building type and building size. On-site recruitments will be made during the telephone survey and will be scheduled with a field engineer.

When interfacing with premise customers, Evaluation Team members will adhere to the following protocols to ensure Georgia Power's relationship with its customers is protected.

- The inspector will attempt to schedule the inspection. Up to three attempts to call will be made, and no more than two email attempts. Voice messages will be considered an attempt.
- Inspectors will identify themselves as a contractor hired by Georgia Power to evaluate the savings of the respective program.
- Inspectors will make sure the contact understands that our work will have no effect on the incentive they received. Inspectors will also make sure the contact understands they have been selected as part of a study Georgia Power is performing on the effectiveness of the program, and their assistance would be greatly appreciated.
- All data will be kept confidential. All individual data and survey responses will be maintained in strict confidentiality, and the Evaluation Team will only provide reports to Georgia Power at an aggregated level such as by program sector, type of measure, location, etc.

3.4.5 Establish the Baseline Condition

As an author of the International Performance Measurement and Verification Protocol (IPMVP) and a leader in the field of energy measurement and verification, Nexant has extensive tools and experience in determining project baselines. In many cases, the assessment of an accurate baseline presents more challenges than evaluating installed equipment as the equipment or conditions have been replaced.

To provide an accurate and defensible evaluation of baseline characteristics, a triangulation approach will be utilized. The Evaluation Team will gather and review data from a variety of sources and reconcile the results to ensure that an accurate representation of the baseline characteristics is obtained. The following sources will be utilized:

- **Application or contract documents**. Efficiency projects receiving rebates or grants often include calculations of energy savings, which generally include a description of the baseline equipment.
- **End-user interviews.** As part of the evaluation process, the Evaluation Team will survey with staff involved with the project to assess baseline equipment, as well as operating conditions and parameters.
- **Observation of similar locations.** Projects may only involve upgrades to a portion of a building, leaving the remainder of the space untouched. In these scenarios, it is possible to observe the remaining equipment to gain an understanding of conditions and operation.
- **Utility bills.** Where appropriate and available, the Evaluation Team will gather historical utility bills to assess the feasibility and accuracy of claimed baseline characteristics.
- **Local code requirements.** If applicable, the Evaluation Team will benchmark all findings against local energy and building codes to validate results and provide an additional source in the event of non-characterized equipment. Applicable codes may include International Energy Conservation Code (IECC) 2009 and/or ASHRAE 90.1-2007.

Each of these sources will be carefully evaluated and weighed to provide a complete assessment of the baseline conditions. The weight applied to each source will depend on the nature of the project, as well as he Evaluation Team's assessment of the quality of the source. Several types of baselines may be appropriate, depending on the nature of the program:

- **Codes and standards.** In the case of new building construction, the baseline condition may require that the facility was constructed to meet but not exceed local building codes. Similarly, in the case of new appliance purchases, the baseline condition may require that the customer purchase a standard efficiency appliance.

- **Pre-project existing conditions.** For projects that improve efficiency of existing buildings, the baseline condition is that the building would have continued to operate under its pre-project efficiency.

- **Base level of knowledge.** In the case of education programs, the baseline condition is what the customer would have done without having the new information.

Each of these sources will be carefully evaluated and weighed to provide a complete assessment of the baseline conditions. The weight applied to each source will depend on the nature of the project, as well as the assessment of the quality of the source.

3.4.6 Calculate Impacts and Load Shape Analysis

The general approach will be to try to avoid 'reinventing the wheel' when there are calculations and methods that are available for review that are presented in a transparent and complete way. The Evaluation Team will utilize standard, published savings formulas and approaches to calculating energy impacts, including those published by:

- California Database for Energy Efficient Resources (DEER)
- Northwest Power and Conservation Council (NPCC) Regional Technical Forum (RTF)
- Technical Reference Manuals (TRM) available in the United States
- ASHRAE
- IESNA

Tools used to perform analysis may include DOE-2 computer simulation modeling, commonly available tools such as Motor Master, Energy Star Calculators, and others. In some cases, we may conclude that savings estimates and reports are either not adequately supported or are not appropriate to the project and/or measure. In these cases, we will provide ground-up methods and calculations.

In order to calculate the demand (kW) benefits of implemented energy-efficiency measures, the Evaluation Team will work with Georgia Power to utilize pre-existing load shapes based on EnerSim simulation modeling. However, in certain cases, the Evaluation Team will to need construct project specific load shapes due to unique load profile characteristics. For this scenario, the Evaluation Team will work with Georgia Power staff to develop the proper load shape output format, likely constructed from 8760 load shapes.

3.4.6.1 **Entirely Stipulated and Deemed Savings**

In cases where sufficient data is not available or the specific end use technology does not warrant a metering approach, an entirely stipulated or deemed savings approach may be used. The IPMVP

recognizes that there are instances when measurement and verification of the savings is not justified and the likelihood performance can be demonstrated to the participant in another manner, such as in cases where the cost of measurement is too high compared to the savings, where the parameters preclude accurate measurements, or where the confidence of the savings projections is high. When utilized, deemed values and parameters will be clearly identified for transparency. Entirely deemed values and parameter application will only be utilized for residential room air conditioner and Energy Star freezers, as noted in section 7.4, because these measures are not available to participants in 2011.

3.5 COST-EFFECTIVENESS

The Evaluation Team will also work with Georgia Power staff in the completion of a benefit-cost analysis to compare the value of the savings impacts resulting from the DSM programs to the costs incurred by the programs. The Evaluation Team understands that multiple cost-effectiveness tests need to be completed, including the Total Resource Cost Test, the Participant Test, the Ratepayer Impact Test, and the Program Administrator Test. Results will be presented at the program, sector and portfolio levels. The Evaluation Team will provide the measure level inputs including, verified gross and net demand and energy savings, time of use characteristics, incremental equipment and installation costs, and measure life data. It is expected that the calculation of other costs-effectiveness components including avoided cost benefits, additional resource savings, program administrative costs, incentive payments and bill savings will be generated by Georgia Power with review by the Evaluation Team. Table 3-3 summarizes the allocation of costs-effectiveness components as a cost or benefit to each cost-effectiveness test.

Table 3-3: Cost Effectiveness Component Inputs

Component	Participant Cost Test (PCT)	Program Administrator Cost Test (PACT)	Ratepayer Impact Measure (RIM)	Total Resource Cost (TRC)
Energy & Capacity Related Avoided Costs		Benefit	Benefit	Benefit
Additional Resource Savings				Benefit
Incremental Equipment and Installation Costs	Cost			Cost
Program Admin Costs		Cost	Cost	Cost
Incentive Payments	Benefit	Cost	Cost	
Bill Savings	Benefit		Cost	

Benefits and costs will be stated in present value terms using appropriate discount and inflation rates. Measure life inputs may be obtained from several deemed databases in the U.S. and Canada, such as DEER, RTF, or applicable TRMs. All these inputs will be carefully choreographed to feed the benefit/cost model to produce the cost-effectiveness results required for the impact assessment evaluation.

Finally, levelized program costs (cost per lifetime kWh saved) will be provided across the measure lifetime for each program.

4 RESIDENTIAL WATER HEATING PROGRAM

4.1 PROGRAM OVERVIEW

The Residential Water Heating Program offers free in-home assessments of existing water heating systems for potential energy-efficiency improvements and the opportunity for customers with electric water heaters to have insulating blankets installed on existing water heaters. All Georgia Power customers with existing electric water heating systems are eligible to participate. The program is marketed through the Georgia Power Website, local newspapers, Internet advertisements, direct mail and in-store promotional advertisements. Georgia Power personnel carry out the audits and installations and provide customer education. Contractors may be involved if the installation work is being done as part of a full-home audit and weatherization activity that is offered and carried out through the Home Energy Improvement program. Customers also can obtain a reimbursement for the blanket and insulation costs if they obtain a full-home audit through the residential Home Energy Improvement program.

4.1.1 Planned Targets

The Residential Water Heating Program evaluation will focus on whether the program has helped decrease water heater energy consumption and increase the number of water heater insulation blankets installed. Table 4-1 shows estimated program participation levels and energy and demand savings for 2011 consistent with Georgia Power program approved dockets.

Table 4-1: Residential Water Heating Program 2011 Goals

Measure	Unit	Energy Savings (kWh/Unit)	2011 Program Participation
WH audit/improvements*	home	544	800
	Incremental Energy Savings (kWh):		435,200

*WH improvements include insulation blanket, pipe insulation, and recommendation of temperature setbacks where appropriate

4.1.2 Preliminary Program Logic Model

Georgia Power staff drafted an initial program logic model (see Figure 4-1) as part of the initial program design. It presents the program objectives, strategies, tools and market actors as well as presumed market barriers and anticipated short- and long-term effects including market and savings metrics. The model shows how the program expects to decrease residential water heater energy consumption and increase the demand for high-efficiency water heaters through increased customer awareness.

Residential Water Heating Program Logic Chart								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Actors**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2-5 years)**	**Program Activities/ 2011 Outputs**	**Impact Evaluation/ Savings Verification**
Reduce energy consumed by residential water heaters Identify and implement low-cost and no-cost energy conservation measures related to residential water heaters Increase awareness of energy-efficiency opportunities for residential water heating	Initial cost of identifying and implementing water heater improvements Customer's lack of information regarding energy savings potential Customer's lack of knowledge of qualified contractor s Customer's concern for giving up performance by putting in low flow shower heads or faucet aerators	Free insulation blanket installations on qualifying equipment Increase customer awareness of water heater energy savings potential through direct educational and advertising material Increase public awareness of free in-home audits	Increase in customer awareness of water heater related energy conservation measures Increase customer awareness of free in-home audits	Decrease in residential water heater energy consumption Increased availability of high-efficiency water heaters and new water heating technologies from increased customer awareness and demand	Customer product awareness survey Increased customer awareness of properly operating water heaters	Increased customer product awareness of energy-efficiency water heating technologies Increased customer awareness of properly operating high-efficiency water heater	Customer outreach: mass media advertisement, bill inserts and existing promotional resources. Contractor and vendor education and training; professional organizations. Energy and demand savings	M&V surveying and monitoring Number of audits conducted and measures installed Energy and demand savings Customer awareness and satisfaction survey

Figure 4-1: Preliminary Residential Water Heating Program Logic Model

4.1.3 Program Measures

Customers may have a free in-home energy audit performed by Georgia Power personnel, which includes the direct installation of insulation and recommendations on improving the efficiency of water heating systems. Typical energy conservation opportunities include:

- Educating the customer about the benefits of reducing temperature set-point to 120º F;
- Educating the customer about the benefits of installing low-flow showerheads and faucet aerators;
- Installing a water heater blanket;
- Insulating water heater piping, particularly the exposed hot water piping leaving the water heater; and
- Receiving two (2) free compact fluorescent bulbs.

4.2 KEY EVALUATION ISSUES

The Evaluation Team's program evaluation approach will seek to: identify how well the program functions, determine ways to improve its effectiveness, and quantify the impacts from the water heater audits provided by Georgia Power. Understanding that this program is strongly linked to the Residential Home Energy Improvement Program (RHEIP), and that it is not actively marketed on its own, the evaluation will address the following key questions:

- Is the program, as implemented, reaching its participation and energy savings goals?
- Are RHEIP participants and customers who participated in Georgia Power's free in-home audit aware of the opportunity to participate in the water heating program?
- Are RHEIP contractors aware of the water heating program?
- Are customers modifying their water heating practices based on audit findings and recommendations (e.g., are they changing temperature set points, reducing water use?)
- Are customers receiving and using the program-provided giveaways (e.g., CFL bulbs and or low-flow showerheads?)
- What percentage of audits results in direct installation of water heater blankets and pipe insulation? What criteria are used by Georgia Power's auditors to determine whether a blanket or insulation will be installed?
- Are customers satisfied with the program overall? With the auditor?
- How can the program achieve deeper energy savings? Are there additional measures that could be offered by the program? What can be done to increase program participation?

4.3 PROCESS EVALUATION

4.3.1 Data Collection Methods

The Evaluation Team plans to collect the data for the process evaluation to address these questions using the methods shown in Table 4-2.

Table 4-2: Methods for Data Collection for Residential Water Heating Program

Target Population	Surveys[8]	Interviews
Participating Customers	70	
GPC Program & Implementation Staff		6-8

The surveys will collect information to be used in both the impact and process evaluations, including:

- Verification of measure installation and temperature setpoints
- Customer motivations for participating in the program
- Customer satisfaction with the program and with the utility overall
- Any changes in behavior that may impact energy use
- Whether customers have taken additional energy-efficiency actions after participating in the program

4.3.1.1 Program Materials Review

Activities for the Residential Water Heating program overlap with those of the RHEIP, and our Evaluation Team will take this overlap into account during the materials review. By coordinating our review of these two programs, we will identify where efficiencies may be gained or where distinctions should be made. We will review the following materials, as available:

- Program manuals
- Program logic model
- Process flow diagrams

[8] Note: We provide an estimate target of 70 completed surveys here. The Evaluation Team will finalize survey numbers following a review of each programs database. Depending on the number of participants and the extent of linkages with the HEIP program the evaluation team will determine whether to implement this survey independently or in coordination with the HEIP participant survey.

- Program information materials provided to trade allies
- Customer education materials
- Database dictionaries, process relevant data extracts (fields to be specified)

4.3.1.2 **Marketing Materials Review**

We will review all Residential Water Heating Program marketing materials available at the time of the evaluation and will focus on where overlap with the RHEIP may occur. Specifically, we will review the following:

- Marketing plan
- Direct mail and bill inserts
- Newspaper and Internet advertisements
- Relevant sections of the Georgia Power Website
- In-store promotional material
- Materials distributed at sales events

4.3.1.3 **Social Media Analytics and Data Collection**

Our Evaluation Team will work with the program manager to develop a plan that is useful for their programs. This plan will include identifying what and when to track in terms of public conversation data regarding the Residential Water Heating Program. Typically, we develop and track Boolean keyword strings such as: "efficiency" AND "water heating" OR "hot water" OR "water heater savings." We also track marketing messages specific to the program. If marketing pushes are planned, we time the tracking to match those campaigns to see customer awareness and response. (A full description of our media analytics approach to collecting and analyzing online data is in Section 2.7.)

4.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

4.3.3 Survey and Interview Groups

4.3.3.1 Stakeholder Interviews

The Evaluation Team will interview stakeholders who, for this program, are the Georgia Power staff responsible for overall management of the program and the Georgia Power auditors. At the end of May 2011, we will interview the Georgia Power program staff in person, and in early June, we will interview the Georgia Power auditors by phone. These interviews will focus on assessing program process flow, program design versus program implementation, customer interaction, data management, administrative process effectiveness, quality control, changes in implementation, program marketing, and suggestions for improvement.

We will coordinate our interviews with relevant stakeholders from the RHEIP. The interviews will include questions about how these programs are coordinated, particularly in terms of marketing and implementation efforts. We will also solicit suggestions for improving coordination and clarifying distinctions, where needed, to maximize participation in both programs.

4.3.3.2 Participating Customers

The participant surveys will address process issues and inform the impact evaluation, as discussed in more detail below.

4.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision level. We plan to survey up to 70 customers who have received the free audit and water heater blanket. We also will include some questions in the RHEIP surveys to explore the how these two programs interact.

4.4 IMPACT EVALUATION

The impact evaluation of the Residential Water Heating Programs measures will follow an engineering analysis approach based on observed parameter performance. Engineering activities will include installation verification, determination of operational parameters, and savings calculations.

4.4.1 Data Collection Methods

Two (2) different measure verification methods, desk review and on-site inspections will be used to assess measure adoption rates and savings values after a participant sample is selected.

4.4.1.1 Telephone Surveys and Desk Reviews

Data from telephone surveys will be used to collect information that can be used in savings calculations. Impact evaluation questions that will be asked over the telephone include:

- How many people occupy your home?
- How many bathrooms do you have in your home?
- Do any of the occupants remain in the home the entire day (do not work outside of the home?)
- What capacity is your water heater? The survey will also attempt to gather the make and model number of the tank.
- If your hot water heater temperature setpoint was higher than 120°F, have you reduced it to 120°F?
- Have you installed low-flow showerheads and/or faucet aerators?
- During the free in-home audit, did the auditor install a water heater blanket?
- Was hot water pipe insulation installed? If so, approximately what length was installed?
- Have you installed the two free CFLs that you were given? If so, what bulb did it replace? Approximately how many hours per day are the CFLs in use? Is the space conditioned?

The Evaluation Team will request project documentation from Georgia Power, including assessment reports, work order forms, and any other project records that may exist. This documentation will be used to confirm and augment the data gathered over the telephone.

4.4.1.2 **Field Inspections**

The telephone surveys will be used to recruit a sub-set sample for on-site inspection verification. These on-site inspections will be a more rigorous way to verify energy savings, and will allow the Evaluation Team to note any discrepancies between what they find on-site and the information gathered through the telephone surveys and project documentation. Table 4-3 summarizes the data points to be gathered during on-site inspections.

Table 4-3: RWHP Site Inspection Checklist

Measure	Baseline Information	Retrofit Information
All Water Heating Measures	Number of Occupants Number of Bathrooms Tank Make, Model Number, and Capacity (Gallons) Annual Energy Consumption (If displayed) Temperature Setpoint	
Temperature Setback Education	Previous Temp Setpoint Tank Insulation Water Heater Efficiency	Current Temp Setpoint Room Air Temperature
Low-Flow Showerheads and Faucet Aerator Education	Baseline GPM	Retrofit Aerator GPM Quantity Water Heater Efficiency
Water Heater Blanket	Confirm No Jacket Insulation Water Heater Efficiency	Jacket Insulation Type and Thickness Room Air Temperature
Water Pipe Insulation	Confirm No Pipe Insulation Water Heater Efficiency Length of Un-insulated Pipe Pipe Diameter	Pipe Insulation Type and Thickness Length of Insulated Pipe Room Air Temperature
CFLs	Lamp type and wattage Operating hours	Lamp type and wattage CFL Spillover Presence of Air Conditioning

Other data points needed for savings calculations, such as annual water use, will be estimated from questions asked on-site and a review of available research. The evaluation team will conduct interviews with program staff, implementers and auditors to understand any available documented baseline data noted above. The evaluation team will also utilize other methods as described in section 3.4.5 to determine the baseline conditions.

4.4.1.3 **Program Spillover**

On-site and telephone survey scripts will inquire regarding the fate of the distributed CFL's lamps provided with audit:

Customers will be asked: (i) if they received bulbs through the audit; (ii) if the bulbs were installed (& by whom); and (iii) if the bulbs were still installed and functioning.

Additionally customer will be surveyed to determine if additional CFL lamps were purchased as a result of the program:

Customers will be asked: (i) how many CFLs they had installed in their home prior to participating in the program; (ii) how many CFLs they have purchased after participating in the program and the relative influence of the program on the additional purchases; and (iii) how many CFLs they have currently installed in their home.

4.4.2 Sampling Approach

Table 4-4 summarizes the anticipated confidence/precision level and sample sizes for the Residential Water Heating Program (RWHP). The samples will be selected to meet a 90% confidence and 15% precision level for aggregate program and an 80% confidence and 20% precision level for more detailed site inspections. The lower confidence/precision level is due to the small composition of the portfolio impacts and certainty of savings.

Table 4-4: RWHP Sampling Approach

Program	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size	Target Confidence / Precision	Anticipated Subset-Sample Size
Residential Programs				
Water Heating	90/15	31	80/20	11

[1] C/P = Statistical Confidence / Precision at assumed Cv of 0.5

4.5 RESIDENTIAL WATER HEATING EVALUATION TIMELINE

Table 4-5: Residential Water Heating Evaluation Timeline

Residential Water Heating Program	Timeline
Program Manager Interviews	May 25-27, 2011
GPC Auditor Interviews	June 1-8, 2011
Materials & Logic Model Review	April - June, 2011
Draft Surveys for Review*	June 13
Comments from GPC on Surveys*	June 17
Programming Surveys*	June 27 – July 1
Field Testing Surveys*	July 5-6
Implementing Surveys*	July 7 - 17
Cleaning, Coding & Analyzing Survey Data	July 18- 29
Analysis of all results and Report Writing	August 2011
Interim Process Evaluation Report	September 30th, 2011
On-Site Inspections	September 2011- June 2012

* The survey timing will be kept flexible (either summer 2011 or winter 2012) to allow for priority programs to be surveyed in the first round of surveys. Priority will be given depending on participation to date and importance of program to the portfolio.

5 RESIDENTIAL HOME ENERGY IMPROVEMENT PROGRAM

5.1 PROGRAM OVERVIEW

Georgia Power's Residential Home Energy Improvement (RHEIP) Program promotes a comprehensive, whole-building approach to improving the energy-efficiency and comfort of existing homes and includes multiple participation paths to appeal to a wide range of residential customers. The program incorporates elements of the proposed federal Home Star Energy-Efficiency Retrofit Program and provides financial incentives for implementing eligible energy-efficiency measures. The program builds on Georgia Power's existing tools and residential trade ally networks, established from the pilot Home Performance with ENERGY STAR® program that has been available to Georgia Power customers in the metro-Atlanta region since 2007. The program offers financial incentives, customer education and awareness campaigns, and contractor partnerships and training.

The RHEIP goals include:

- Increasing the awareness of energy-efficiency practices and services among Georgia Power's customers and local contractors to ensure the sustainability of the program's energy-efficiency efforts
- Increasing achievable energy savings in existing homes by helping customers save energy while lowering their utility bills
- Encouraging the use of ENERGY STAR® rated and similar energy-efficiency measures and increasing their market share

5.1.1 Planned Targets

The RHEIP has established the following unit energy savings, participation goals, and estimated energy and demand savings consistent with Georgia Power program approved dockets:

Table 5-1: Residential Home Energy Improvement Program 2011 Goals

Measure	Unit	Energy Savings (kWh/Unit)	2011 Program Participation
Whole-House - Single Family (HP)	home	4,551	99
Whole-House - Single Family (Gas)	home	416	217
Whole-House Multi-family (HP)	dwelling/unit	1,063	42
Whole-House Multi-family (Gas)	dwelling/unit	149	17
Unbundled - Single Family (HP)	home	2,440*	562
Unbundled - Single Family (Gas)	home	228*	1,230
Unbundled Multi-family (HP)	dwelling/unit	570*	239
Unbundled Multi-family (Gas)	dwelling/unit	82*	94
Unbundled Home Assessments	home/unit	0	531
		Incremental Energy Savings (kWh):	2,383,583

*Average energy and demand savings for unbundled participants are based on participants installing a combination of measures that result in approximately 10% reduction in annual energy consumption.

5.1.2 Preliminary Program Logic Model

Georgia Power staff drafted an initial program logic model (see Figure 5-1) as part of program design. The logic model presents the program objectives, strategies, tools and market actors as well as presumed market barriers and anticipated short- and long- term effects including market and savings metrics.

Residential Home Energy Improvement Program Logic Model								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Players**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**Program Activities/ 2011 Outputs**	**Impact Evaluation/ Savings Verification**
Increase achievable energy savings in homes by helping customers save energy while lowering their utility bills. Increase awareness of energy-efficiency practices and services amongst Georgia Power's customers and local contractors. Encouraging the use of ENERGY STAR® rated and similar energy-efficiency measures and bringing them into the mainstream market.	Expensive implementation costs Lack of customer information or awareness of specific measures, products and practices Competition for funds with other home investments Heavy customer reliance on contractors for material selection Limited equipment options Concern over reduced product performance or lost features	Program Incentives and awareness/promotion of other available rebates, tax credits, and incentives Provide educational material on products and practices to customers to help them understand the long term economic and environmental benefits of energy-efficiency measures Train registered contractors on both technical and economic aspects of the energy-efficiency measures to be conveyed to their customers Recruit distributors to stock and supply the eligible energy efficient products	Increase in customer awareness of energy-efficiency products and measures and their economic and environmental benefits Increase in customer awareness of other incentives either through state or federal activities Registration of contractors with Georgia Power Increase in awareness among manufacturers and trade allies about energy-efficiency product demand in the market	Increase in demand for and sales of energy-efficiency products among consumers Increase in competition among manufacturers and vendors & contractors to provide energy-efficiency products and to meet market demands Increase in contractor training by Georgia Power Increase in energy-efficiency businesses and equipment options available in the market	Awareness as indicated by customer surveys Number of contractors registered with Georgia Power	Increased sales and installation of various energy-efficiency products Increase in the number of qualified contractors participating in the program	Recruitment of distributors to stock and supply eligible products Contractors' registration and training Marketing & Outreach activities Energy and demand savings	Number and performance of installed energy-efficiency measures Customer awareness and satisfaction surveys Contractor registration and training counts Sales records of eligible energy-efficiency measures M&V surveying and monitoring Energy and demand savings

Figure 5-1: Residential Home Energy Improvement Program Logic Model

5.1.3 Program Measures

The RHEIP offers customers two participation options:

- Whole-House – Consists of the installation of a combination of energy savings measures that target whole home energy reduction with rebates based on the overall reduction in the homes electrical energy consumption.

For customers participating in the Whole-House program option, all home improvements must be installed by program-registered contractors. All energy savings measures that demonstrate an improvement in energy-efficiency and contribute to an overall reduction in their home's electrical energy consumption are eligible, including envelope improvements, high-efficiency appliances, and HVAC and electric water heating improvements or replacement. Reduction in whole home energy consumption is determined by a comparison of the simulated energy consumption of the home before and after the retrofit of the home.

- Individual Improvements - includes installation of one or more individual energy savings measures, with rebates provided per measure installed.

The Individual Improvements participation option includes the energy-efficiency measures listed in Table 5-2. Home energy assessments and energy savings measures requiring performance testing must be performed by program-registered contractors. Other measures may be installed by any contractor or directly by the homeowner. The program will conduct verification inspections on samples of participating homes.

Table 5-2: RHEIP Participation Options and Incentives

Whole-House Reduction Levels & Rebates for Homes Served by Georgia Power		
Energy Reduction Levels	**Rebate Cap (% Cost)**	**Installers Permitted Program Participating Contractor**
BPI Assessment	50% up to $200	X
20% Home Energy Reduction	50% up to $1,250	X
25% Home Energy Reduction	50% up to $1,450	X
30% Home Energy Reduction	50% up to $1,850	X
Programmable Thermostat	50% up to $100	X
Electric Water Heater Wrap	50% up to $50	X
Maximum Potential Rebate	$2,200	

Individual Improvements & Rebates for Homes Served by Georgia Power				
Improvements	**Rebate Cap (% Cost)**	**Installers Permitted**		
		Program Participating Contractor	**Industry-Specific State Licensed Contractor**	**Home Owner**
BPI Assessment	50% up to $200	X		
Air Sealing	50% up to $400	X		
Attic Insulation	50% up to $300	X	X	X
Knee Wall Insulation	50% up to $150	X	X	X
Floor/Foundation/Un-Vented Crawlspace Insulation	50% up to $200	X	X	X
Rim Joist Insulation	50% up to $100	X	X	X
Duct Sealing	50% up to $400	X	X	
Replace Central A/C with ≥ 16 SEER	$50	X	X	
Replace Heat Pump with ≥ 15 SEER	$100	X	X	
Solar Water Heater	$250	X	X	
Heat Pump Water Heater	$250	X	X	
Programmable Thermostat	50% up to $200	X	X	X
Electric Water Heater Tank Wrap	50% up to $200	X	x	X

5.2 KEY EVALUATION ISSUES

The Evaluation Team's program evaluation approach will seek to identify how the program is functioning, determine ways to improve its effectiveness, and quantify the impacts from the installation of eligible measures, including quantification of interactive effects where multiple measures are installed. The evaluation will address the following key questions:

- Is the program, as implemented, reaching its participation and energy savings goals?
- Are the participation paths, eligible measures, and contractor requirements clearly understood?
- What are the program's non-energy benefits? How much influence do they have relative to energy and bill savings?
- How do federal program incentives affect program participation? How does branding the program without the ENERGY STAR label affect perceptions of the program?
- How can the program achieve deeper energy savings? Are there additional measures that could be offered by the program? What can be done to increase program participation?

5.3 PROCESS EVALUATION

5.3.1 Data Collection Methods

The Evaluation Team plans to collect the data to address these questions using the methods shown in Table 5-3.

Table 5-3: Methods for Data Collection for the Residential Home Energy Improvement Program

Target Population	Surveys	Interviews
Participating Customers (whole- house)	70	
Participating Customers (unbundled)	70	
Participating and Non-participating Contractors	60 (30 each)	
Program staff (GPC and ICF)		10-14

The surveys will collect information to be used in both the impact and process evaluations, including:

- Verification of measure installation, temperature setpoints, occupancy patterns, and baseline conditions
- Customer motivations for participating in the program
- Customer satisfaction with the program and with the utility overall
- Any changes in behavior that may impact energy use

- Whether customers have taken additional energy-efficiency actions after participating in the program
- Contractor motivations for participating in the program (for participants; non-participants will be asked whether they are aware of the program and, if so, why they have chosen not to participate in it)
- Contractor assessment of the BPI training requirement

5.3.1.1 **Program Materials Review**

Activities for the RHEIP overlap with those of the Residential Water Heating Program, and our Evaluation Team will take this overlap into account during the materials review. By coordinating our review of these two programs, we will identify where efficiencies may be gained or where distinctions should be made.

We will review the following materials, as available:

- Program manuals
- Program logic model
- Process flow diagrams
- Program information materials provided to trade allies
- Customer education materials
- Contracts with implementation partners
- Database dictionaries, process relevant data extracts (fields to be specified)

5.3.1.2 **Marketing Materials Review**

As above, we will review all RHEIP marketing materials available at the time of the evaluation and in collaboration with the Residential Water Heating, where overlaps occur. Specifically, we will review the following:

- Marketing plan
- Direct mail and bill inserts
- Newspaper, radio, and Internet advertisements
- Relevant sections of the Georgia Power Website

- In-store promotional material
- Materials distributed at sales events
- Program brochures, fliers, and fact sheets
- Energy audit reports and educational materials

5.3.1.3 Social Media Analytics and Data Collection

Our Evaluation Team will work with the program manager to develop a social media analysis plan that is useful for RHEIP. This plan will include identifying what and when to track in terms of public conversation data regarding the RHEIP. Typically, we develop and track Boolean keyword strings such as: "efficiency" AND "home" OR "weatherization" OR "insulation." We also track marketing messages specific to the program. If marketing pushes are planned, we time the tracking to match those campaigns to see customer awareness and response. (A full description of our media analytics approach to collecting and analyzing online data is in Section 2.7.)

5.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

5.3.3 Survey and Interview Groups

5.3.3.1 Stakeholder Interviews

The Evaluation Team will conduct interviews with program stakeholders, including the Georgia Power staff responsible for overall management of the program, ICF staff, and the Georgia Power auditors. At the end of May 2011, we will interview the Georgia Power and ICF program staff in person, and in early June, we will interview the Georgia Power auditors by phone. These interviews will focus on assessing program process flow, effectiveness of administrative processes, program design versus program implementation, customer interaction, data management, quality control, changes in implementation, program marketing, and suggestions for improvement. Following each set of interviews, the Evaluation Team will assess the appropriateness of the current methodology to determine if changes are needed to continue effectively evaluating the program.

We will coordinate our interviews with relevant stakeholders from the Residential Water Heating Program. The interview will include questions about how these programs are coordinated, particularly in terms of marketing and implementation efforts. We will also solicit suggestions for improving coordination and clarifying distinctions, where needed, to maximize participation in both programs.

5.3.3.2 Participating Customer Surveys

Our Evaluation Team will conduct quantitative telephone interviews with a random sample of customers who participated in the program. So we can draw statistically valid conclusions for each group, we will complete up to 70 surveys for the whole-house group and another 70 for the unbundled group. These interviews will focus on program processes and satisfaction, participation motivations, behavior changes, and verification of installation. The number of interviews depend in part on the level of participation to date, but will be sufficiently large to provide 90-percent confidence with a +/- 10-percent precision at the program level.

5.3.3.3 Participant Contractors

The Evaluation Team will conduct interviews with eligible contractors participating in either the whole-house or unbundled program options. We will conduct up to 30 interviews, stratifying the number of completions proportional to participation rates in the two options. The interviews will explore benefits for participating, satisfaction with the program, satisfaction with the marketing support, application processes, and the program's impact on business.

5.3.3.4 Nonparticipant Contractors

The Evaluation Team will conduct up to 30 interviews with non-participating contractors to assess program awareness, barriers to participating in the program, marketing practices, and energy-efficiency practices and motivations.

5.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision level. The Evaluation Team will survey a total of 140 participating customers in the RHEIP: up to 70 from the whole-house option and 70 from the unbundled option. The Evaluation Team also will survey 60 contractors: 30 participating and 30 non-participating.

5.4 IMPACT EVALUATION

Due to the dual participation options within the RHEIP and the wide variety of eligible measures, the impact evaluation will either follow an IPMVP Option A or C approach depending on the projects selected within the sample and the level of uncertainty in the analysis.

Implemented projects that either are the whole-house option or with multiple unbundled measures will lend themselves well for an Option C utility bill analysis, which will be able to capture the savings of multiple simultaneous improvements. IPMVP notes that, in general, only those projects which achieve energy savings of 10% or greater are suitable for Option C analysis – this fits well with the RHEIP because both tracks target at least 10% energy savings. When performing Option C analysis, the baseline will be determined from the pre-retrofit utility bills. The energy savings calculation will be the difference between pre-retrofit and post-retrofit consumption. Additional adjustments for weather effects during the two periods will be included.

However, for those projects which do not achieve 10% savings, where there is a high degree of uncertainty, or that have undergone significant changes in occupancy or change in use, Option C may not yield accurate results. In these cases, the determination of energy savings may be completed by Option A or engineering analysis.

The impact evaluation will organize measures into end-use categories to establish uniformity in approaches and to create more homogenous population for analysis and sampling:

- Whole-House – Bundled Approach
- Unbundled Approach
    - Air/Duct Sealing
    - Insulation
    - Air-conditioning/Heat Pump replacement
    - Water Heating
    - Programmable Thermostat

5.4.1 Data Collection Methods

Two (2) different measure verification methods, desk review and on-site inspections will be used to assess measure adoption rates and savings values after a participant sample is selected.

5.4.1.1 Telephone Surveys and Desk Reviews

Data from telephone surveys will be used to collect information that can be used in savings calculations. Impact evaluation questions that will be asked over the telephone will be specific to each applicable measure. Data will be gathered from the process participant surveys; however, impact questions may not be asked for all participants, because the impact sample population is smaller than the process sample population. The Evaluation Team will request project documentation from Georgia Power, including assessment reports, work order forms, and any other project records that may exist. This documentation will be used to confirm and augment the data gathered over the telephone.

5.4.1.2 Field Inspections

The telephone surveys will be used to recruit a sub-set sample for on-site inspection verification. These on-site inspections will be a more rigorous way to verify energy savings, and will allow the Evaluation Team to note any discrepancies between what they find on-site and the information gathered through the telephone surveys and project documentation. Measurement and verifications plans will be created for each of these sites for the applicable measures to ensure that

the correct information is gathered. Table 5-4 summarizes the data points to be gathered during on-site inspections.

Table 5-4: RHEIP Site Inspection Checklist

End-Use	Baseline Information	Retrofit Information
All Residences	Year home was built Number of occupants Home square footage Number of bedrooms Number of bathrooms Total conditioned square footage Heating system type/age/efficiency/size/condition Cooling system type/age/efficiency/size/condition Heating/cooling temperature set back and time periods	
Whole-House Energy Reduction	1 year of utility bills pre-retrofit	1 year of utility bills post-retrofit
Air/Duct Sealing	Visual confirmation of sealing Duct size measurements Location of duct work (e.g., attic, crawlspace, etc.) Residence HVAC system type and heating fuel type HVAC system setpoints and occupancy schedules	
Insulation	Baseline insulation levels Baseline insulation type	Retrofit insulation levels Retrofit insulation type Estimated square footage of installed insulation Self-installed or contractor-installed?
Air-conditioning/Heat Pump Replacement	Nameplate information (brand, model, SEER, HPSF)	Nameplate information (brand, model, SEER, HPSF) Full-load hours from: Occupied set temps for winter/summer Unoccupied set temp for winter/summer Occupied hours Unoccupied hours
Water Heating	Tank make/model number/capacity Annual energy consumption Temperature setpoint Confirm insulation levels Energy Factor	Tank make/model number/ capacity Annual energy consumption Energy Factor Temperature setpoint Jacket insulation type and thickness Room air temperature Adequate space around heat pump?
Programmable Thermostat	Baseline thermostat type Location Quantity	Retrofit thermostat type Location Retrofit thermostat brand/model Retrofit thermostat Energy Star? Is the thermostat programmed? Occupied set temps for winter/summer Unoccupied set temp for winter/summer Occupied hours Unoccupied hours Quantity installed

The evaluation team will conduct interviews with program staff, implementers and auditors to understand any available documented baseline data noted above. The evaluation team will also utilize other methods as described in section 3.4.5 to determine the baseline conditions.

5.4.2 Sampling Approach

Due to the dual participation options and the variety of eligible measures within the RHEIP, sub-strata confidence / precision targets will be established to ensure all measures and end-uses are verified and analyzed at a per-unit resolution. Table 5-5 summarizes the preliminary sampling plan and verification approach for each RHEIP approach and end-use. The actual target sample sizes will be established based on actual 2011 participation rates.

Table 5-5: RHEIP Sampling Plan

Program	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size	Target Confidence / Precision	Anticipated Subset-Sample Size
Whole-House Energy Reduction	90/15	31	N/A	TBD[3]
Unbundled - Air/Duct Sealing	80/20	11	N/A	TBD[3]
Unbundled - Insulation	80/20	11	N/A	TBD[3]
Unbundled - AC/HP replacement	80/20	11	N/A	TBD[3]
Unbundled - Water Heating	80/20	11	N/A	TBD[3]
Unbundled - Programmable Thermostat	80/20	11	N/A	TBD[3]
Total	**90/10**	**86**	**90/15**	**31[2]**

(1) C/P = Statistical Confidence / Precision at assumed Cv of 0.5

(2) It is anticipated that a single on-site inspection will be able to account for verification of multiple unbundled measures

(3) Site Inspections selected will be based on uncertainty of participant responses in survey, complexity of analysis and random sampling t verify installation. Quantities of site inspections for each approach/measure will be determined during the evaluation.

5.4.1 Energy and Demand Savings Calculations

Option C analysis involves creating a mathematical model of a residence's energy use pattern. A model often includes factors derived from regression analysis, which correlate energy to one or more independent variables such as outdoor temperature, degree days, and occupancy. Models can also include a different set of regression parameters for each range of conditions, such as summer or winter in buildings with seasonal energy-use variations.

Pre-retrofit utility bills will be used to create the model of whole-house energy use and to estimate the relationship between energy and the independent variables. These regression-estimated coefficients will then be used to estimate the baseline energy use during the post-retrofit period. The difference between the baseline and actual energy use is the estimated energy savings.

For those residences where Option A or engineering analysis is selected to be more appropriate, energy savings will be calculated for each individual measure. On-site inspections will be reserved for projects where high uncertainty exists or self-reported parameters from telephone surveys are unreliable. Measurement will be limited to small set of the on-site inspections, where inspected or stipulated parameters are unreliable or not applicable.

5.5 RESIDENTIAL HOME ENERGY IMPROVEMENT EVALUATION TIMELINE

Table 5-6: Residential Home Energy Improvement Program Timeline

Residential Home Energy Improvement Program	Timeline
Program Manager Interviews	May 25-27, 2011
Auditor Interviews	June 1-8, 2011
Materials and Logic Model Review	April - June, 2011
Draft Surveys for Review	June 20
Comments from GPC on Surveys	June 27
Programming Surveys	June 29 –July 6
Field Testing Surveys	July 7-8
Implementing Surveys	July 9-20
Cleaning, Coding & Analyzing Data	July 21-29
Interim Process Evaluation Key Findings	September 20, 2011
Final Report	November 1, 2011
On-Site Inspections	September 2011- June 2012

6 RESIDENTIAL HIGH-EFFICIENCY NEW HOME PROGRAM

6.1 PROGRAM OVERVIEW

The Residential High-Efficiency New Homes Program focuses on a whole-building approach to improving the energy efficiency of new homes. Modeled after the current ENERGY STAR® New Homes Program developed by the U.S. Environmental Protection Agency (EPA), the program promotes the installation of energy-efficient measures in new home construction to improve the performance of participating homes to at least 15 percent above the existing residential energy code[9]. As such, the financial incentives for qualifying new homes are applied for and paid to the home building contractor to offset the cost of a formal inspection by a certified Home Energy Rating System (HERS) rater and to assist with the incremental cost of installing the efficiency measures.

Establishing trade ally relationships with home builders and developers is essential for this program. The trade ally communications will keep builders informed of the program and its benefits both to them and to the eventual home buyer, Georgia Power's customers. This is especially important in the present new home construction market, where fewer homes are being built, and in more single-lot locations rather than in large subdivisions.

This program also provides builders the opportunity to differentiate themselves from the competition, particularly beneficial in the current building market.

The High-Efficiency New Homes Program goals include:

- Maximizing achievable energy savings in new homes by helping homebuyers save energy while lowering projected utility bills
- Increasing the awareness of energy-efficiency practices and services among Georgia Power's customers, contractors, builders, and developers to ensure the sustainability of the program's energy-efficiency efforts
- Encouraging the use of ENERGY STAR® rated and similar energy-efficiency measures and bring them into the mainstream market
- Increasing the number of energy-efficient new homes built in Georgia

Georgia Power's long term program goal is 20-25 percent High-Efficiency New Home market penetration in Georgia Power's service territory.

[9] Currently Georgia Power's High-Efficiency New Homes program and the federal ENERGY STAR New Homes program is based on Energy Star version 2.0 and use the 2004 International Residential Code (IRC) as the baseline for calculating energy savings and Home Energy Rating System (HERS) Index.

6.1.1 Planned Targets

The Residential High-Efficiency New Homes program has established the following unit energy savings, participation goals, and estimated energy and demand savings:

Table 6-1: Residential High-Efficiency New Home Program 2011 Goals

Measure	Unit	Energy Savings (kWh/Unit)	2011 Program Participation
Single Family - HP & Elec WH	each	1,223	2,000
Multi-Family - HP & Elec WH	dwelling/ unit	800	750
Incremental Energy Savings (kWh):			3,046,000

Table includes modifications to from the 2010 IRP filing during program implementation

Georgia Power anticipates potential changes to the targets for 2012 and 2013 because of the economic recession and gradual recovery period.

6.1.2 Preliminary Program Logic Model

Georgia Power staff drafted an initial program logic model (see Figure 6-1) as part of the initial program design. It presents the program objectives, strategies, tools and market actors as well as presumed market barriers and anticipated short- and long- term effects including market and savings metrics.

High-Efficiency New Homes Program Logic Model								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Players**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**Program Activities/ 2011 Outputs**	**Impact Evaluation/ Savings Verification**
Maximize achievable energy efficiency in new homes by helping homebuyers reduce future energy consumption while lowering their future utility bills Increase awareness of energy-efficiency practices and services among Georgia Power's customers and local contractors Encourage the use of ENERGY STAR® rated and similar energy-efficiency measures and bring them into the mainstream market	High start-up cost Lack of prospective homebuyer and contractor information or awareness of practices Split incentives (i.e.,builder incurs capital costs but homeowner benefits from energy savings) Limited equipment options	Financial Incentives Provide educational material on products and practices to customers to help them understand the long term economic and environmental benefits of energy-efficiency measures Train contractors and realtors on both technical and economic aspects of the energy-efficiency measures to be conveyed to prospective homebuyers. Recruit distributors to stock and supply the eligible energy efficient products	Increase in prospective homebuyer and contractor awareness of energy-efficiency products and measures and their economic and environmental benefits Registration of contractors with Georgia Power Increase in awareness among manufacturers about energy-efficiency product demand in the market	Increase in demand for and sales of energy-efficiency products among prospective homebuyers Increase in competition among contractors to provide energy-efficiency products and to meet market demands Increase in contractor training by Georgia Power Increase in energy-efficiency businesses and equipment options available in the market Development of robust energy rater network in Georgia	Awareness as indicated by homebuyer and contractor surveys Number of contractors registered with Georgia Power	Increased sales of High-Efficiency New Homes Increase in the number of qualified contractors participating in the program Increase in availability of energy efficient products Realtors incorporating energy efficiency into home data that is provided to homebuyers	Energy and demand savings Recruitment of distributors to stock and supply high-efficiency equipment Contractors' registration and training Marketing & outreach activities	Number of homebuyers that have participated in the program Customer awareness and satisfaction surveys Contractor registration and training counts Sales records of eligible High-Efficiency New Homes M&V surveying and monitoring Energy and demand savings Number of energy raters in Georgia

Figure 6-1: High-Efficiency New Homes Program Logic Model

6.1.3 Program Measures

Table 6-2: shows program-eligible equipment and proposed incentive levels:

Table 6-3: Residential High-Efficiency New Homes Program Incentive Structure

Measure	Incentive	Unit
Program Compliant Single Family	$300	home
Program Compliant Multi-family	$150	unit

In addition to the standard incentive amounts listed above, the program may offer short-term bonus incentives, such as:

- Additional incentives per participating home
- An increased incentive for first High-Efficiency New Home built by new participating builders
- Payment of Parade of Homes fees for High-Efficiency New Homes

Similar to the current federal ENERGY STAR® program, builders may choose to demonstrate compliance with program requirements via one of two options:

1. Prescriptive path - Requires that the home is constructed following a defined list of energy-efficiency measures listed in the National Builder Option Package ("BOP")[10]; or
2. Performance path - Allows for a variety of energy-efficiency measures to be installed, and the overall performance of the home is calculated through a home energy rating. The results of the rating, known as the home's HERS Index[11], must meet the target score for the program of 85 or less to qualify.

Program compliance for both paths is determined by qualified, third-party HERS Raters.

6.2 KEY EVALUATION ISSUES

The Evaluation Team's program evaluation approach will seek to identify how the program is functioning, determine ways to improve its effectiveness, and quantify the impacts relative to a 'typical' new home. The evaluation will include addressing the following key questions:

- Is the program, as implemented, reaching its participation and energy savings goals?
- Are builders adopting the program measures and is the network of participating builders growing at a level sufficient to impact the market?

[10] http://www.energystar.gov/ia/partners/bldrs_lenders_raters/downloads/Nat_BOP_Final.pdf
[11] http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_HERS

- How do builders and homeowners respond to the ENERGY STAR® brand? What is the potential impact of messaging and promotions that do not use the ENERGY STAR® brand?
- Do homeowners recognize the value of an energy-efficient New Home and, more importantly, are they willing to pay for it?
- What is the efficiency level of "current practice" homes being built (e.g., code-compliant, beyond code?)
- Who drives the decision for a high-efficiency new home – builders or customers?
- How can the program achieve deeper energy savings? Are there additional measures that could be offered by the program? What can be done to increase program participation?

6.3 PROCESS EVALUATION

6.3.1 Data Collection Methods

The process evaluation will focus on answering the questions outlined above, using the methods shown in Table 6-4:

Table 6-4: Methods for Data Collection for the Residential High-Efficiency New Home Program

Target Population	Surveys	Interviews
Participating Builders	Up to25	
Non-participating builders	Up to 50	
GPC program staff		4
HERS raters	census up to 15	
Participating home buyers	Up to 70	

The surveys will collect information to be used in the process evaluations, including:

- Builder motivations for participating in the program; Builder satisfaction with the program and with the utility overall; and
- Whether builders are building to the program specifications, or adding more energy-efficient features.
- Spillover, e.g., the types of measures and extent to which energy efficient building practices are applied to nonparticipating homes.

The approach includes non-participating builder surveys that will capture information about spillover, e.g., the extent to which more efficient building practices may be having a transformative effect on the new homes market. The HERS rater surveys will capture information about the ranges of efficiencies within the program as well as in the larger market. Finally, the participating home

buyer survey will explore homebuyer satisfaction with their home's energy efficiency, focusing on how important energy efficiency was when considering the home, and whether the home's performance has met their expectations.

6.3.1.1 **Program Materials Review**

Our review will include the following materials, as available:

- Program manuals
- Program logic model
- Process flow diagrams
- Program information materials provided to builders
- Customer education materials
- Contracts with implementation partners
- Database dictionaries, process relevant data extracts (fields to be specified)

6.3.1.2 **Marketing Materials Review**

As above, we will review all marketing materials available at the time of the evaluation. This review will include as available:

- Direct mail and bill inserts
- Print and Web advertisements
- Relevant sections of the Georgia Power Website
- Program brochures, fliers, fact sheets
- Marketing through trade allies, realtor co-op advertising
- Trade show outreach materials

6.3.1.3 **Social Media Analytics and Data Collection**

Our Evaluation Team will work with the program manager to develop a plan that is useful for their programs. This plan will include what and when to track in terms of public conversation data regarding the High Efficiency New Homes Program. Typically, we develop and track Boolean keyword strings such as: "high-efficiency" AND "new homes" OR "HERS rating" OR "HERS index" OR "ENERGY STAR® new homes" OR "National Builder Option Package." We also track marketing messages specific to the program. If marketing pushes are planned, we will time the tracking to

match those campaigns to see customer awareness and response. (A full description of our media analytics approach to collecting and analyzing online data is in Section 2.7.)

6.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

6.3.3 Survey and Interview Groups

6.3.3.1 Stakeholder Interviews

The Evaluation Team will conduct interviews with stakeholders who, for this program, are the Georgia Power program staff responsible for overall management of the program. At the end of May 2011, we will interview the Georgia Power program staff in person. These interviews will focus on assessing program process flow, effectiveness of administrative processes, program design versus program implementation, data management, quality control, changes in implementation, program marketing, and suggestions for improvement. Following each set of interviews, the Evaluation Team will assess the appropriateness of the current methodology and determine if changes are needed to continue effectively evaluating the program.

6.3.3.2 Participating Builders

The Evaluation Team will conduct interviews with eligible builders participating in either the whole-house or unbundled program options. The interviews will explore benefits of participating, satisfaction with the program, satisfaction with marketing support, application processes, and the program's impact on business.

6.3.3.3 Non-Participating Builders

The Evaluation Team will also conduct interviews with non-participating builders to assess program awareness, barriers to participating in the program, marketing practices, and energy-efficiency practices and motivations.

6.3.3.4 HERS Raters

The Evaluation Team will conduct HERS raters surveys to assess program satisfaction, changes in builder interest and participation, barriers to participation, strengths and areas of improvement for program tracking, and possible market indicators for efficiency home penetration.

6.3.3.5 Participating Home Buyers

The Evaluation Team will conduct quantitative telephone interviews with a random sample of customers who purchased high-efficiency homes associated with the program. Our interviews will focus on motivations for having efficient homes, behavior changes, and verification of installation.

The number of interviews depend in part on the level of participation to date, but will be sufficiently large to provide 90-percent confidence with a ± 10-percent precision at the program level.

6.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision level. The Evaluation Team will make every effort to contact a representative sample of builders by volume of program-qualified homes built. We will develop a sample plan when we have access to the list of participating builders. The total number of those surveyed will depend on the total number of stakeholders available. We will survey up to 75 builders in the High-Efficiency New Homes Program: up to 25 participating builders and 50 non-participating builders. The Evaluation Team will also survey up to 15 HERS raters and up to 70 customers who purchased high-efficiency homes associated with the program.

6.4 IMPACT EVALUATION

The impact evaluation will utilize an IMPVP Option D, Calibrated Simulation approach to calculate the gross energy savings. Computer energy models will be employed to calculate savings as a function of the important independent variables. The models must include verified inputs that accurately characterize the project and must be calibrated to match actual energy usage. In order to complete this approach, the Evaluation Team will complete the evaluation through a tiered series of activities:

- Obtain and/or create a REM/Rate computer simulation model for each sampled residence (n=68);
- Gather monthly utility bill data for each sampled residence commencing with the residence's completion date (n=68);
- Meter each sampled residence for one-hour interval consumption data (n=68);
- Calibrate the computer simulation model for each sampled residence based on both sets of consumption data (n=68); and
- When high uncertainty exists, on-site inspections will be performed to gather additional data for a sub-set of the sample population (n=11).

Blower testing was not included for on-site inspections due to the third party nature and rigor of the HERS rating system

6.4.1 Data Collection Methods

6.4.1.1 Program Materials Review

Once the sample has been established, the Evaluation Team will commence analysis activities by requesting all available project file data including data from program tracking database and HERS rating. Next, the REM/Rate computer simulation model will be requested for each sampled residence from the HERS rater. The computer simulation model will be reviewed and carefully scrutinized for accuracy with specific attention to verify that the applicable residential energy code has been selected. In cases, where files are unavailable or there significant accuracy concerns in the model details, the Evaluation Team may elect to construct a new simulation model.

6.4.1.2 Metering Data

The next step will be request monthly utility bill consumption data for each sampled residence commencing with the residence's completion date. In order to increase the resolution of consumption data and better understand daily and hourly performance of the home, the Evaluation Team will work with Georgia Power to install metering equipment trending one-hour interval data. Hourly metering data will need to be collected for at least three complete (3) months; one in each season: winter, summer and shoulder (spring or fall). This data can provide very high resolution on the homes performance and in some cases can utilized to characterize certain activities within the residence. The REM/Rate computer simulation model will be amended to calibrate to the monthly utility bill and metered consumption data. When calibration is complete, the computer simulation model allows the incremental energy consumption benefits to be calculated by changing the parameters to baseline energy code conditions.

6.4.1.3 On-Site Inspections

Where high uncertainty exists, on-site inspections will be performed to gather additional data for a sub-set of the sample population to refine and/or amend the computer simulation model. Table 6-5lists information gathered at for on-site inspections to collect both general and measure specific information about the residence.

Table 6-5: Residential High-Efficiency New Home Program Site Inspection Checklist

Measure	Baseline Information	Retrofit Information
General Information	Year Home was Built Number of Occupants Home Square Footage Number of Bedrooms Number of Bathrooms	
Energy Star Certification	None	Envelope Information Energy Star Appliances Non-Energy Star Appliances HVAC System Programmable T-Stat Information/Schedule Domestic Hot Water Lighting Occupancy HERS Rating
Energy Star Lighting Package	None	Retrofit Lamp Type Wattage/Quantity/Location of Each Retrofit Fixture Type Quantity/Location of Each
Foundation/Slab Insulation	None	Insulation Sq Ft Insulation Type Insulation R value
Windows	None	U-value of Windows Window Type: Frame, Panes, Glass, etc. Window Square Footage Are windows located in finished conditioned space?
Programmable T-stats	None	Quantity and Location of Thermostats Brand and Model Numbers of T-Stat Heating System Type/Age/Efficiency/Size/Condition Cooling System Type/Age/Efficiency/Size/Condition T-Stat Programming: Occupied T-Stat Set Temp Unoccupied T-Stat Set Temp Occupied 'On' Hours for T-Stat Unoccupied 'off' hours for t-stat

Measure	Baseline Information	Retrofit Information
Electric water heater	None	Water Heating Set Temp Proper Installation?

6.4.2 Sampling Approach

Table 6-6 summarizes the anticipated confidence/precision level and sample sizes for the Residential New Homes Program. The samples will be drawn to meet the specified confidence/precision for the program to meet a 90% confidence and 10% precision level on energy savings and an 80% confidence and 20% precision level for more detailed site inspections. The lower confidence/precision level is due to the small composition of the portfolio impacts and the rigor of the analysis.

Table 6-6: Residential New Home Program

Program	Desk Analysis Without On-Site Inspection Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size	Target Confidence / Precision	Anticipated Subset-Sample Size
Residential Programs				
Residential New Homes	90/10	68	80/20	11

[1] C/P = Statistical Confidence / Precision at assumed Cv of 0.5

6.5 RESIDENTIAL HIGH-EFFICIENCY NEW HOMES EVALUATION TIMELINE

Table 6-7: Residential High-Efficiency New Homes Timeline

Residential High-Efficiency New Homes	Timeline
Program Manager Interviews	May 25-27, 2011
HERS Rater Interviews	June 1-8, 2011
Materials and Logic Model Review	April - June, 2011
Draft Surveys for Review	May 18
Comments from GPC on Surveys	May 25
Programming Surveys[12]	May 26 – June 2
Field Testing Surveys	June 6
Implementing Surveys	June 7 - 21
Cleaning, Coding & Analyzing Data	June 22-29
Interim Process Evaluation Key Findings	September 30, 2011
Request Interval Metering and Utility Bills	July 15, 2011 and Jan 15, 2012
On-Site Inspections	**September 2011- June 2012**

6.6 RESIDENTIAL HIGH-EFFICIENCY NEW HOMES DATA NEEDS

There are no additional data required for the process evaluation apart from that already presented earlier.

[12] * The survey timing will be kept flexible (either summer 2011 or winter 2012) to allow for priority programs to be surveyed in the first round of surveys. Priority will be given depending on participation to date.

7 RESIDENTIAL LIGHTING AND APPLIANCE PROGRAM

7.1 PROGRAM OVERVIEW

The Residential Lighting and Appliance Program promotes the purchase and installation of energy-efficient products and equipment by Georgia Power residential customers. This program builds on the existing tools, outreach efforts, and trade ally networks of Georgia Power, the federal ENERGY STAR® program, and the existing Georgia Energy Efficient Appliance Rebate Program[13]. Through customer education, retail partnerships, and sales training, the program focuses on increasing awareness of the benefits of energy-efficient technologies for customers' homes. Additionally, the program offers both promotional distribution of compact fluorescent lamps (CFLs) and direct financial incentives for eligible equipment. These incentives include customer rebates for ENERGY STAR® appliances and a CFL give-away campaign

During 2011, Georgia Power will continue its free-CFL Giveaway Program by providing 130,000 free CFLs to consumers across a variety of events. In June, 2011, rebates for ENERGY STAR® refrigerators and clothes washers will be made available through the appliance rebate program. Starting in January 2012, a CFL buy-down program will go into effect, where Georgia Power intends to provide buy-down incentives to retailer/manufacturers for approximately 383,000 CFLs in 2012 and 1.145 million in 2013.

The Residential Lighting and Appliance Program goals include:

- Increasing customer awareness of the benefits of energy efficient products in the residential market
- Increasing the availability of energy efficient products in local retail stores
- Training retailers to increase their understanding of the benefits of energy efficient lighting and appliances
- Increasing the local market penetration of energy efficient products, helping customers save energy and money
- Educating customers on available tax credits and other financial incentives for ENERGY STAR® products
- Pursuing industry leadership initiatives and leverage to increase knowledge and develop strategic partnerships to strengthen local program effectiveness

7.1.1 Planned Targets

Table 7-1 summarizes the program's unit energy savings, participation, and estimated energy and demand savings goals Per-unit energy and demand savings are consistent with Georgia Power program approved dockets.

[13] http://www.georgiarebate.com/

Table 7-1: Residential Lighting and Appliance Program 2011 Goals

Measure	Unit	Energy Savings (kWh/Unit)	2011 Program Participation
ES Refrigerators	each	161	7,000
ES Freezers	each	138	0
ES Clothes Washers	each	684	8,400
ES Room A/C	each	133	0
CFLs – screw in (4-pack) giveaways	each	212	32,500
CFLs – screw in (4-pack) buy-downs	each	212	0
Incremental Energy Savings (KWh):			13,762,600

7.1.2 Preliminary Program Logic Model

Georgia Power's preliminary program logic model is shown in Figure 7-1 below. It shows that to meet the overall objectives of increasing awareness and market share of energy efficient lighting and appliances, Georgia Power will utilize a number of different strategies and tools from mass marketing communications, collaboration with retailers and manufacturers to increase product availability in retail stores, and in-store point of purchase initiatives to meet these objectives.

Residential Lighting and Appliance Program Logic Model								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Players**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**Program Activities/ 2011 Outputs**	**Program Activities/ 2011 Outputs**
Lighting, appliances and room air conditioning market transformation - increase awareness and market share of high-efficiency lighting and appliances such as: CFLs, ENERGY STAR qualified lighting fixtures, lighting controls, ENERGY STAR qualified appliances and room air-conditioners.	Lack of information and awareness of energy efficient products Product differentiation confusion Higher initial cost Limited product availability Prior negative experience with technology (CFLs) Concern for reduced product performance or lost features.	Financial incentives Increase awareness of consumer benefits and product availability through coordination with retailers, manufacturers, consumer channels, trade allies and professional organizations. Retail sales associate training, point of purchase initiatives, collaboration with retailers and manufacturers, mass market communication and promotional outreach, such as State Sales Tax holiday.	Increase in customer awareness of technology benefits Increase in utility driven consumer education impressions through retailers or manufacturers.	Increased CFL penetration prior to progressive phase-out of most incandescent bulbs Increase in appliances' and window A/C units' average energy efficiency Increase in high-efficiency lighting, appliance and window A/C unit availability and sales	CFLs, efficient lighting fixtures, appliances and window A/C unit sales levels Customer product awareness survey Manufacturers introduce more products in the market and promote them	CFLs, efficient lighting fixtures, appliances and window A/C unit sales levels Customer product awareness survey Participant reported commitment to continual improvement process w/o program (especially for window A/C units) Spillover to non-participants Increase in average SEER of window A/C unit being sold Increase in availability of energy efficient products, and decrease in incremental price	Marketing and outreach to end-users: leverage suppliers existing promotional resources, coordinate with the ENERGY STAR program Recruitment of distributors to stock and supply high-efficiency equipment Energy and demand savings Marketing & Outreach activities	Customer awareness and satisfaction surveys Retailer registration and training counts M&V surveying and monitoring Energy and demand savings

Figure 7-1: Residential Lighting and Appliance Program Logic Model

7.1.3 Program Measures

The program promotes ENERGY STAR® qualified lighting and appliances with incentives offered for the following ENERGY STAR® qualifying products and equipment:

Table 7-2: Residential Lighting and Appliance Program Incentive Structure

Equipment Type	Minimum Requirements/ Equipment Description	Estimated Incentive*
CFL (Promotional Giveaways)	Single-lamp packs	N/A
CFL Multi-Pack (Vendor Buy-down)	Pre-approved 4-lamp multi-pack	$3/pack vendor reimbursement
ENERGY STAR® Refrigerator	≥7.75 cubic feet, ENERGY STAR® qualified	$30 customer rebate
ENERGY STAR® Freezer	≥7.75 cubic feet, ENERGY STAR® qualified	$20 customer rebate
ENERGY STAR® Clothes Washer	ENERGY STAR® qualified	$75 customer rebate
ENERGY STAR® Room Air-Conditioner (≤8,000 BTU)	ENERGY STAR® qualified	$30 customer rebate
ENERGY STAR® Room Air-Conditioner (>8,000 BTU)	ENERGY STAR® qualified	$40 customer rebate

Table includes modifications to from the 2010 IRP filing during program implementation

7.2 KEY EVALUATION ISSUES

The Evaluation Team's program evaluation approach will identify how the program is functioning, determine ways to improve its effectiveness, particularly as the program is expanded in 2012, and quantify the impacts achieved from both the CFL giveaways and buy-downs and rebates (if sufficient participation levels are available prior to the end of the evaluation period). The evaluation will address the following key questions:

- Is the program, as implemented, reaching its participation and energy savings goals?
- Are consumers becoming more aware of the benefits of energy-efficient equipment as a result of program outreach efforts?
- Will program intervention contribute to the penetration of energy-efficient products in homes within Georgia Power's service territory?
- How well are the barriers identified in the logic model being addressed by the program?
- Are retailers stocking more energy efficient products?
- Are CFL and ENERGY STAR® appliance users satisfied with their products?

- Are retailer training sessions effective in increasing the energy-efficient product promotion by retailers?
- Are manufacturers offering a greater variety of energy-efficient products?
- Are CFL giveaway events successful in encouraging additional CFL purchases?
- What are the gross and net savings due to the program?
- How can the program achieve deeper energy savings? Are there additional measures that could be offered by the program? What can be done to increase program participation?

7.3 PROCESS EVALUATION

7.3.1 Data Collection Methods

The Evaluation Team proposes the following research activities as shown in Table 7-3.

Table 7-3: Methods for Data Collection for the Residential Lighting and Appliance Program

Target Population	Surveys	Interviews
General population survey for CFL giveaway recipients and non-participants	420 to achieve up to 70 CFL recipients and 150 non-participants	
Appliance participants survey	70	
Retailer interviews (Optional)		*10*
GPC Program and Implementation Staff		4

The CFL giveaway participants will be asked questions to be used in both the impact and process evaluation including:

- Whether customers are familiar with or have purchased any CFLs on their own before or after receiving a free CFL
- Where customers purchased any CFLs
- Customer satisfaction with the CFLs they received through the giveaways
- Whether customers have taken additional energy-efficiency actions after participating in the program
- Where the customer received the free CFL
- Whether the free CFLs were installed

- Where were they installed;

The non-participant customers identified through the General Population Survey will be asked questions gathering some baseline information for Georgia Power's upstream lighting program, which will be introduced in 2012 as well as the other offerings. It can be designed to include short batteries of questions that ask about customer awareness of, and interest in, other residential programs such as HEIP and the appliance rebate program. If customers demonstrate awareness of these programs, then the interviewer can probe their level of interest for future participation. The survey also can determine whether customers purchased appliances in the preceding year without participating in the appliance rebate program.

The Appliance Participant Survey will be conducted with those receiving rebates through the appliance rebate program. Questions asked will include:

- Verification of measure installation
- Customer motivations for purchasing energy efficient appliances
- Customer satisfaction with the appliance rebate program
- Whether customers have taken additional energy-efficiency actions after participating in the program
- Customers' familiarity with ENERGY STAR® label prior to the purchase

As an option to Georgia Power, the Evaluation Team will also speak with CFL and appliance retailers about their motivations for participating in the program and their stocking practices. The retailer interviews would take place in June, to allow adequate time for the program to stabilize, and would ask for early feedback on the CFL buy-down program and qualitatively assess the impacts of both the appliance and CFL programs on the market. The retailer interviews will address the following issues:

- Retailer motivation for participating in the appliance rebate program
- Retailer motivation for participating in the CFL buy-down program
- Influence of the program on stocking practices
- Retailer satisfaction with the program

7.3.1.1 **Program Materials Review**

The Lighting and Appliances Program has three focus areas for materials review: (1) CFL giveaways (underway), (2) Appliance rebates (beginning June 1, 2011), and (3) CFL buy-downs (beginning 2012).

Our Evaluation Team will review the following materials, as available, for each program area:

- Program manuals
- Program logic model
- Program flow diagrams
- Program information materials provided to trade allies
- Customer education materials
- Contracts with implementation partners and any giveaway collaborators
- Database dictionaries, process relevant data extracts (fields to be specified)

7.3.1.2 **Marketing Materials Review**

As above, we will review all marketing materials available at the time of the evaluation and as available for the three program focus areas:

- Direct mail and bill inserts
- Newspaper and Internet advertisements
- Relevant sections of the Georgia Power Website
- In-store promotional material
- Materials distributed at sales or giveaway events
- Promotional materials for retailers and manufacturers

7.3.1.3 **Social Media Analytics and Data Collection**

Our Evaluation Team will work with the program manager to develop a plan that is useful for their programs. This plan will include what and when to track in terms of public conversation data regarding the Residential Lighting and Appliances Program. Typically, we develop and track Boolean keyword strings such as: "CFLs" OR "refrigerators" OR "lighting" OR "clothes washers" AND "efficiency" OR "energy savings" OR "ENERGY STAR®." We also track marketing messages specific to the program. If marketing pushes are planned, we will time the tracking to match those campaigns to see customer awareness and response. (A full description of our media analytics approach to collecting and analyzing online data is in Section 2.7.)

7.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

7.3.3 Survey and Interview Groups

7.3.3.1 Interviews

The Evaluation Team will conduct interviews with stakeholders who, for this program, are the Georgia Power staff responsible for overall management of the program and the subcontractor staff involved in implementation. In May or in early June 2011, we will conduct phone interviews with the Georgia Power program staff regarding the CFL Giveaway Program. In early 2012, we will follow up with additional questions regarding the Upstream Buy-Down and Appliance programs. At that time, we will interview implementation subcontractor staff as well.

These interviews will focus on assessing program process flow, program design versus program implementation, customer interaction, data management, and quality control, changes in implementation, program marketing, and suggestions for improvement. Following each set of interviews, the Evaluation Team will assess the appropriateness of the current methodology to determine if changes are needed to continue effectively evaluating the program.

As an optional task, evaluators will also interview a sample of participating retailers offering eligible products for this program. These phone interviews, which will occur in mid-2012, will focus on program impacts on product stocking, changes in sales, marketing efforts, program satisfaction, and make suggestions for improvement.

7.3.3.2 General Population Survey

We will conduct a general population survey to identify CFL giveaway participants and provide baseline information for other programs as well as baseline data for the Upstream Buy-Down program. CFL give away participants will be asked process evaluation questions aimed at assessing participant satisfaction levels and experience with the program and impact questions relating to whether or not the CFL was installed and where. Nonparticipants will be asked about their awareness of all Georgia Power 2010 certified DSM programs, awareness of energy efficiency, and familiarity with ENERGY STAR and energy efficient products. We expect to survey approximately 420 random Georgia Power customers to identify up to 70 CFL giveaway recipients. Of the remaining 350 surveys, 150 will receive a non-participant survey and the balance of customers will be asked screening questions only.

7.3.3.3 Appliance Participant Survey

The Appliance Participant Survey will inform both the process and impact evaluations. We will conduct a survey of a total of 70 program participants who received appliance rebates. The survey

will ask about installation and operating parameters as well as assessing participant satisfaction and experience with the program.

7.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision.

We will conduct the General Population Survey using a random sample of Georgia Power customers to identify up to 70 customers who received a free CFL from a Georgia Power giveaway and 150 customers who have not participated in any Georgia Power energy-efficiency program. As Georgia Power has given away approximately 580,000 CFLs across Georgia's over three million households, we anticipate as many as one out of six homes we contact will have received a free CFL. We will target 420 calls to reach up to 70 CFL recipients. Of those who are not CFL recipients, we will ask approximately every other respondent our non-participant questionnaire. The remaining 200 calls will be terminated after the screening questions.

Table 7-3 shows the planned number of samples for each research effort.

7.4 IMPACT EVALUATION

The impact evaluation of the Residential Lighting and Appliance program will follow a calculated analysis approach or IPMVP Option A (Retrofit Isolation: Key Parameter Measurement) methods based on parameter performance. Engineering activities will include installation verification, determination of operational parameters, and savings calculations.

7.4.1 Data Collection Methods

Two (2) different measure verification methods, desk review and on-site inspections will be used to assess measure adoption rates and savings values after a participant sample is selected.

7.4.1.1 Telephone Surveys and Desk Reviews

Data from telephone surveys will be used to collect information that can be used in savings calculations. Impact evaluation questions that will be asked over the telephone will be specific to each applicable measure. Data will be gathered from the process participant surveys; however, impact questions may not be asked for all participants, because the impact sample population is smaller than the process sample population. The Evaluation Team will request any project documentation from Georgia Power's tracking database. This documentation will be used to confirm and augment the data gathered over the telephone.

7.4.1.2 Field Inspections

The telephone surveys will be used to recruit a sub-set sample for on-site inspection verification. These on-site inspections will be a more rigorous way to verify energy savings, and will allow the Evaluation Team to note any discrepancies between what they find on-site and the information

gathered through the telephone surveys and project documentation. Measurement and verifications plans will be created for each of these sites for the applicable measures to ensure that the correct information is gathered.

The determination of whether site inspections are required or whether sufficient information can be collected through phone interviews is based on the level of technical detail required. Site inspections will utilize to verify a sub-set of the sample and when additional metering is required. The data method utilized will be a function of the measure's contribution to the overall program savings, uncertainty of the data points used in the savings calculations, and logistical issues involved in metering.

7.4.1.3 **CFL Giveaways and Buy-downs**

Data analysis for CFLS will follow an Option A analysis approach, with operating hours measured. It can be difficult to gather detailed project information for these measures, because customers do not have to submit a rebate application. Hence, the sample will be drawn from the identified participant population as part of the process evaluation; random sample of 68 customers will be chosen for the metering study. It is anticipated that this sample size will produce annual operating hour results with 10% precision at the 90% confidence level. The chosen customers will be recruited through additional telephone calls, and may be offered financial compensation to participate.

A variable number of HOBO® U9-002 light on/off data loggers will be placed in customer homes in addition to asking the occupant about operating schedules. The number of loggers placed in each home will be determined by the visiting engineer according to the number of lighting circuits with different operating schedules. The loggers will be left in place for at least one month to determine how measured operating schedules differ from reported schedules. The metered data will be extrapolated to the full year using occupant self reports of how the schedule may or may not change over time.

In addition to an estimate of average annual operating hours, the metering study will provide Georgia Power with additional important information, as outlined below.

- Baseline conditions – lamp type and wattage
- Retrofit conditions – lamp type and wattage
- Verbal confirmation of operating hours by space type
- Lighting fixture type
- The presence of air conditioning
- Installation Rate – the percent of CFLs bought that were actually installed

- Installation Location – the residential areas where CFLs were installed and corresponding operating hours
- System peak coincidence factors for each end use where metering is conducted

7.4.1.4 **ENERGY STAR® Refrigerators**

Data analysis for ENERGY STAR® refrigerators will follow a deemed savings approach with limited verification. This approach utilizes the program tracking database including the make and model number of each rebated unit. If this data is missing, the Evaluation will utilize energy savings amounts identified by Energy Star for each qualified refrigerator. The Evaluation Team will verify measure installation through the following information gathered in telephone surveys:

- Make and Model Number
- Type (Side-by-Side, Top Mount Freezer w/ice, etc.)

Secondary data from energy-efficiency databases and Technical Reference Manuals will be utilized to supplement and triangulate per-unit savings.

7.4.1.5 **ENERGY STAR® Freezers**

Because there will no participants for the 2011 program year, the Evaluation Team will review the program tracking database for the first six (6) months of 2012 to verify the per-unit assumptions. Data analysis for Energy Star freezers will follow a deemed savings approach. This approach utilizes the program tracking database including the make and model number of each rebated unit. If this data is missing, the Evaluation will utilize energy savings amounts identified by Energy Star for each qualified freezer. Secondary data from energy-efficiency databases and Technical Reference Manuals may be utilized to supplement and triangulate per-unit savings.

7.4.1.6 **ENERGY STAR® Clothes Washers**

Telephone surveys and on-site inspections for ENERGY STAR® clothes washers will attempt to gather the following data:

- Verification of installation and operation of the clothes washer
- Approximate age and condition of the old clothes washer
- Use of the clothes washer (duration, water type) and clothes dryer
- Type, age, and size of clothes dryer
- Type, age, efficiency, and temperature setpoint of hot water heater

On-site inspections for clothes washer replacements will follow IPMVP Option A (Retrofit Isolation – Key Parameter Measurement). ENERGY STAR® clothes washers also reduce the required use of clothes dryers and water heaters, thus, data gathering activities will focus on all three pieces of equipment.

Data loggers will be installed to measure the clothes washer energy consumption and verify the self-reported frequency of use. This data will be compared to other clothes washer energy consumption studies. Energy savings from reduced hot water usage and clothes dryer usage will be calculated by extrapolating information from other sources to the Georgia Power population based on the measured clothes washer behavior.

The baseline condition for this retrofit is a standard efficiency clothes washer. The energy savings for this measure include the reduced electricity usage of the washer, reduced energy use by the hot water heater, and reduced energy use by the clothes dryer. Water savings from the Energy Star clothes washer will also be calculated.

7.4.1.7 ENERGY STAR® Room Air Conditioners

Because there will no participants for the 2011 program year, the Evaluation Team will review the program tracking database for the first six (6) months of 2012 to verify the per-unit assumptions. Data analysis for ENERGY STAR® room air conditioners will follow a deemed savings approach. This approach utilizes the program tracking database including the make and model number of each rebated unit. If this data is missing, the evaluation will utilize energy savings amounts identified by Energy Star for each air-conditioning unit. Secondary data from energy-efficiency databases and technical reference manuals may be utilized and adjusted for Georgia Power weather conditions to supplement and triangulate per-unit savings.

7.4.2 Sampling Approach

Due to the wide variety of eligible measures within the Lighting and Appliance Program, sub-strata confidence / precision targets will be established to ensure all measures are verified and analyzed at a per-unit resolution. Table 5-5 summarizes the preliminary sampling plan and verification approach for each the Lighting and Appliance Program measure. Due to the reduced uncertainty of measure performance, the efforts for on-site activities are reduced when compared to other Georgia Power programs. The actual target sample sizes will be established based on actual 2011 participation rates.

Table 7-4: Lighting and Appliance Sampling Plan

Program	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size	Target Confidence / Precision	Anticipated Subset-Sample Size
CFLS	90/10	68	90/10	68
ENERGY STAR® Refrigerator	80/20	11	N/A	0
ENERGY STAR® Freezer	N/A	0	N/A	0
ENERGY STAR® Clothes Washer	80/20	11	N/A	6
ENERGY STAR® Room Air-Conditioner	N/A	0	N/A	0
Total	**90/10**	**90**	**90/10**	**74**

(1) C/P = Statistical Confidence / Precision at assumed CV of 0.5

7.5 RESIDENTIAL LIGHTING & APPLIANCES EVALUATION TIMELINE

Table 7-5: Residential Lighting & Appliance Program Timeline

Residential Lighting & Appliances Program	Timeline
Program Manager Interviews	May 25-June3, 2011
Material & Logic Model Review	April - June, 2011
Draft General Population Survey for Review	June 20
Comments from GPC on Surveys	June 23
Programming Surveys	July 5 – July 8
Field Testing Surveys	July 5-6
Implementing Surveys	July 7 - 17
Cleaning, Coding & Analyzing Data	July 18- 29
Draft Report on Giveaways and Baseline	TBD
Interim Process Evaluation Key Findings	September 30th, 2011
Appliance Survey	June 2012
Retailer Interviews	June 2012
Draft Report on Appliances and Upstream Buy-Down	April 1, 2012
On-Site Inspections	September 2011- June 2012

7.6 RESIDENTIAL LIGHTING AND APPLIANCES DATA NEEDS

In addition to the materials requested previously, please provide a list of all events where CFL giveaways occurred and the number of CFLs distributed.

8 RESIDENTIAL REFRIGERATOR RECYCLING PROGRAM

8.1 PROGRAM OVERVIEW

The Residential Refrigerator Recycling Program (RRR) aims to eliminate inefficient or extraneous refrigerators and freezers in an environmentally safe manner and produce cost-effective long-term energy and peak demand savings in the residential sector. The program focuses on increasing customer awareness of the economic and environmental costs associated with running inefficient, older appliances in a household, and provides eligible customers with convenient, free refrigerator and freezer pickup services in addition to a cash incentive. All Georgia Power customers who own a working refrigerator or freezer of 10-30 cubic feet are eligible to participate. The program is being implemented and tracked by JACO Environmental, Inc. (JACO) although customers can make appointments through the Georgia Power Website or call center. The program is marketed through the GPC Website, direct mail, postcards, bill inserts, door hangers and customer newsletters, in-store materials and outreach through the other Georgia Power residential DSM programs.

This program is an expansion of Georgia Power's previous pilot program, which was initiated in 2008 and available to customers only in the metro-Atlanta area. During the Pilot Program, Georgia Power averaged collecting approximately 6,000 appliances per year in 2009 and 2010 program years.

8.1.1 Planned Targets

The Refrigerator Recycling program has established the following unit energy savings, participation goals, and estimated energy and demand savings consistent with Georgia Power program approved dockets:

Table 8-1: Residential Refrigerator Recycling Program 2011 Goals

Measure	Unit	Energy Savings (kWh/Unit)	2011 Program Participation
Refrigerator Recycling	each	1,101	7,418
Incremental Energy Savings (kWh):			8,167,221

8.1.2 Preliminary Program Logic Model

Georgia Power staff drafted a program logic model (see Figure 8-1 below) as part of the initial program design. It specifies the program objectives, strategies, tools, market actors, presumed market barriers, and anticipated short- and long-terms effects (including market and savings metrics). This logic model shows how the program is expected to increase the number of refrigerators and freezers recycled and reduce the number of secondary, inefficient refrigerators

and freezers in the marketplace through the availability of financial incentives, free pick-up service, and increased customer awareness.

Residential Refrigerator Recycling Program Logic Model								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Actors**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**Program Activities/ 2009 Outputs**	**Impact Evaluation/ Savings Verification**
Educate and encourage residential customers to dispose of spare or inefficient refrigerators Energy and demand savings from removal of second refrigerators and freezers .	Lack of information on cost of operating equipment and benefits of removing and recycling Inconvenience and expenses involved in the disposing of old refrigerators and freezers Concern over losing additional refrigeration capacity	Financial incentives Free refrigerator/freezer pick-up service Educational materials on expense of maintaining a second refrigerator/freezer	Increase in customer awareness of energy and bill savings benefits	Increase in the number of refrigerators and freezers recycled Reduction in the number of secondary, inefficient refrigerators and inefficient freezers Increased awareness in the benefits of energy efficient appliances Spillover to non-participants	Customer awareness of program and energy expense of secondary refrigerators and inefficient freezers	Customer satisfaction and commitment to refrigerator and freezer recycling Number of non-participants adopting the practice and eliminating the use of a secondary refrigerator and inefficient freezer	Energy and demand savings Number of refrigerators and freezers recycled Outreach to customers. Leverage field representatives.	Number of refrigerators and freezers recycled Reduction in the number of secondary refrigerators M&V surveying and monitoring Energy and demand savings

Figure 8-1: Residential Refrigerator Recycling Program Logic Model

8.1.3 Program Measures

The program criteria for an eligible refrigerator or freezer are: unit must be in working condition, between 10 and 30 cubic feet in size, and owned by the customer. Each residential address is eligible to recycle no more than two units per year.

The program provides incentives in the form of a free pick-up service for eligible refrigerators and freezers pick-up and a check for $35 paid directly to participating customers.

8.2 KEY EVALUATION ISSUES

The Evaluation Team's program evaluation approach will seek to identify how the program is functioning, determine ways to improve its effectiveness, particularly the acquisition cost per customer, which is currently higher than Georgia Power's expectations, and quantify the impacts of the refrigerators and freezers (a.k.a. appliances) recycled. The evaluation will include addressing the following key questions:

- Is the program, as implemented, reaching its participation and energy savings goals?
- Are customers happy with the program and the implementer?
- Is the program based on an accurate understanding of customer preferences and education?
- Are marketing resources and the selected marketing channels reaching the appropriate targets?
- Is recruitment effective and attracting the number of participants?
- What additional marketing channels might Georgia Power and JACO use to reach customers cost-effectively?
- Are program processes being revised to address recommendations from the pilot evaluation to minimize drop outs, bottlenecks and maximize participation?
- How can the program achieve deeper energy savings? Are there additional measures that could be offered by the program? What can be done to increase program participation?

8.3 PROCESS EVALUATION

8.3.1 Data Collection Methods

We will conduct the research activities shown in Table 8-2 as part of this evaluation.

Table 8-2: Methods for Data Collection for the Residential Refrigerator Recycling Program

Target Population	Surveys	Interviews
Participating Customers	70	
Non-participating Customers	70	
Appliance Market Actors		10
Program Staff (GPC and JACO)		4

Interviews with local appliance market actors will provide insights into the natural movement of older, operable appliances within Georgia Power's service territory. Specifically, these interviews will determine percentages of units of various ages and other characteristics discarded through traditional channels, differentiating those destroyed and those resold to new users (and therefore remaining active within Georgia Power's service territory).

Specifically, the Evaluation Team will interview approximately 10 market actors, including both local appliance retailers and appliance haulers, determined through Internet research and input from Georgia Power.

The participant surveys will focus on the usual questions of customer satisfaction with the program, the implementing partner and the incentive. Surveys of non-participants—defined as Georgia Power customers discarding a refrigerator and/or freezer independently of the program—will provide valuable insights into what would happen to older, operable appliances in the program's absence. We will add new questions to the survey based on results from the pilot and based on what topics need further investigation. As surveyed participants in utility programs often exhibit socially responsible response bias (i.e., exaggerating the frequency with which they would have done "the right thing" – in this case, recycling their old appliances independently of the recycling program), the Evaluation Team will collect supplementary information for the NTG analysis. Information collected from non-participants will be combined with the self-reported participant NTG to mitigate potential bias and result in a more accurate assessment of the program's NTG. Indeed, using both participant and non-participant responses to determine the program's NTG ratio increases the reliability of final net savings estimates and aligns this evaluation with industry standard approaches.

8.3.1.1 Program Materials Review

Our Evaluation Team will review all relevant materials created since the program's inception in 2008. This review will identify where updates have been made and compare these with results of the surveys, which provide suggestions as to how materials can be improved or should be adjusted. In addition, the program implementer, JACO, is identifying reasons for cancellation and opportunities to reduce the percentage of cancellations. We will review what mechanisms JACO has in place for gathering this data and how we can cost-effectively work together to obtain this information.

Our program materials review will include the following materials, as available:

- Program manuals
- Program logic model
- Program flow diagrams
- Program information materials provided to trade allies
- Customer education materials
- Support materials provided to the call center
- Contracts with implementation partners
- Materials developed by JACO as relevant
- Call center data (call rate, scheduling)
- Database dictionaries, process relevant data extracts (fields to be specified)
- All potential data fields, which can be generated by the implementation contractor

8.3.1.2 **Marketing Materials Review**

Our review of the marketing materials will encompass the recommendations from the pilot evaluation. For example, customers indicated that a main reason for participating in the program was the convenience of the free pick-up of old appliances. This led to the recommendation that marketing materials should be revised to emphasize this aspect of the program, so we will look for this in the materials. We will review the following materials, as available:

- Marketing plan
- Direct mail, postcards, bill inserts, door hangers
- Customer newsletters
- Relevant sections of the Georgia Power Website
- In-store promotional material
- Materials that involve co-marketing with other programs

8.3.1.3 Social Media Analytics and Data Collection

Our Evaluation Team will work with the program manager to develop a plan that is useful for their programs. This plan will include determining what and when to track in terms of public conversation data regarding the Residential Refrigerator Recycling Program. Typically, we develop and track Boolean keyword strings such as: "efficiency" AND "refrigerator" OR "freezer" OR "recycling." We also track marketing messages specific to the program. If marketing pushes are planned, we will time the tracking to match those campaigns to see customer awareness and response. (A full description of our media analytics approach to collecting and analyzing online data is in Section 2.7.)

8.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

8.3.3 Survey and Interview Groups

8.3.3.1 Program Staff Interviews

The Evaluation Team will meet in person with Georgia Power program managers to confirm key program evaluation priorities, identify any concerns about the program, and discuss any upcoming changes. We will also discuss their quality control process, call center management, the degree to which pilot evaluation recommendations have been implemented, and their experience so far with JACO, specifically, the type of reports provided by JACO, the quality and ease of use of the database, the format of the data and what timeframe it is received in. The purpose of these questions is to determine whether program managers are receiving the resources and support they need to track program progress. Depending on the organization and management of the call center, we may also want to talk to or obtain data related to customer calls associated with making or cancelling appointments.

The Evaluation Team will meet with JACO managers to review and discuss the following:

- The complete implementation flow
- The logic model
- Challenges experienced to date (or they may expect when expanding the program statewide)
- Satisfaction with subcontractors (if any are being used)
- Quality control procedures
- How they report to and coordinate with the utility

- Their experience working with the utility
- Opportunities to implement the recommendations from the pilot evaluation

8.3.3.2 **Market Actor Interviews**

Market actors include local appliance retailers and market haulers. Following its interviews with the program managers, the Evaluation Team will determine key areas of investigation and the appropriate market actors for follow-on telephone interviews.

Similar to the nonparticipant surveys, these interviews with local appliance market actors can provide insights into the natural movement of older, operable appliances within Georgia Power's service territory. On the impact side, these interviews can help determine the fraction of units of various ages and other characteristics discarded through traditional channels, indicating those destroyed and those resold to new users. The process team will work closely with the impact team to determine to what degree this level of information would be beneficial or necessary for the NTG calculations.

It is important to interview those appliance retailers, if any, with which Georgia Power is partnering. From a market characterization perspective, it can be worthwhile to ask retailers whether they offer to pick up used appliances and, if so, what they do with those appliances. (Some retailers resell used appliances while others scrap them or recycle them.)

We will conduct interviews with approximately 10 market actors over the evaluation period. These market actors will be determined through Internet research and input from Georgia Power stakeholders.

8.3.3.3 **Participating and Non-participating Customers Surveys**

Based on the document and logic model review and our interviews with stakeholders, we will design and conduct surveys with participating and non-participating customers. These surveys will address process issues and also inform the impact evaluation (as discussed in more detail in the impact section below).

The Evaluation Team will work closely with JACO to collect customer data at the pickup point and call center. In addition, we will implement a full survey of RRR participants, defined as those Georgia Power customers who called and followed through with a pickup of their qualifying refrigerator or freezer. To maintain consistency and allow comparisons across the program years, we will develop surveys based on those used to assess the pilot program. As appropriate, we will adjust these surveys, based on the results of the pilot evaluation and the Evaluation Team's experience with surveying other similar groups.

We will ask key process evaluation questions addressing how the customers heard about the program; their satisfaction with the process, the utility, and the implementation contractor; any behavioral changes as a result of their participation in the program; and how this program has

impacted or was impacted by their participation in other Georgia Power programs. Additionally, the participant telephone survey will include some additional questions regarding characteristics of the removed refrigerator, including:

- Was the refrigerator or freezer utilized as the primary or secondary appliance?
- Was the removed refrigerator or freezer replaced with a new appliance?
- Was the removed refrigerator or freezer replaced with an Energy Star appliance?

As mentioned above—and depending on the need for this type of data—the Evaluation Team may develop a few short survey questions to be asked by JACO at the time of pickup and at the time of cancellation. Typically, at the time of pickup, JACO already collects data about customers' decisions to participate and how they heard about the program; we will utilize this information to complement our survey effort.

If the team determines that dropouts are important to investigate more thoroughly, we will consider developing a short survey on the RRR Website for customers who choose to cancel via the Internet.

Surveys with nonparticipants—defined as Georgia Power customers discarding a functioning secondary refrigerator and/or freezer independently of the program—will provide valuable insight into what happens to older, operable appliances in the program's absence. Key process evaluation questions for nonparticipants will address awareness and why they chose not to participate.

8.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision level. As shown in Table 8-2, up to 140 customers will be surveyed: including 70 randomly selected RRR participants, stratified by measure and 70 non-participants.

8.4 IMPACT EVALUATION

The impact evaluation of the Residential Refrigerator Recycling program will follow a calculated analysis approach or IPMVP Option A (Retrofit Isolation: Key Parameter Measurement) methods based on parameter performance. Engineering activities will include installation verification, determination of operational parameters, measurement of energy consumption, and savings calculations.

8.4.1 Data Collection Methods

Two (2) different measure verification methods, desk review and on-site inspections will be used to assess measure adoption rates and savings values after a participant sample is selected.

8.4.1.1 **Telephone Surveys and Desk Reviews**

Data from telephone participant surveys in the process evaluation will be used to verify participation in the program and collect information that can be used in savings calculations. For a refrigerator recycling program, the appliance's energy savings is calculated based on forecasted benefits, so impact questions will focus on what would have happened in the absence of the program and expected use. The savings will follow the following equation for Unit Energy Consumption (UEC):

$$Savings_{Gross} = At\text{-}Manufacture\ UEC \times In\ Situ\ Adjustment \times Part\text{-}Use\ Factor$$

Where

$Savings_{Gross}$	= Appliance UEC Savings at time of removal (kWh)
At-Manufacture UEC	= Appliance UEC at time of manufacture (kWh)
Part-Use Factor	= Fraction of the year that appliances would have been in use
In Situ Adjustment	= Adjustment factor for on-site conditions, including degradation

To determine the at-manufacture UEC, the Evaluation Team will obtain the program tracking database of all refrigerators and freezers collected during the program year. This database includes program collection totals, deemed appliance UECs, and descriptions of recycled appliances. At-manufacture energy consumption values from the JACO database will be compared to national consumption databases, such as WAPTAC, and analyzed for validity and representativeness.

The part-use factor is a measure of the fraction of the hours in a year that a refrigerator or freezer operates. The gross full year UEC is adjusted by the part-use factor to reflect the decrease in yearly energy usage. The value is calculated using Equation 2 below:

$$U = (Months) / (12)$$

Where

U	= Part-Use Factor
Months	= Number of months appliance is in use
12	= Number of months in a year

The participant survey asks customers to estimate how many months out of the following year they would have operated (plugged in and running) the appliance if it had not been removed by the program, as well as how many months out of the past year the appliance was running. These two responses are compared for consistency; however, the usage from the previous year is used as the part-use factor.

The in-situ adjustment factor will be established both through secondary studies and actual measurements taken for a sample of participants.

Information collected from non-participants will be combined with the self-reported participant NTG to mitigate potential bias and result in a more accurate assessment of the program's NTG. Indeed, using both participant and non-participant responses to determine the program's NTG ratio increases the reliability of final net savings estimates and aligns this evaluation with industry standard approaches.

This impact evaluation will determine partial use factors for refrigerators and freezers (to adjust savings for units that are only plugged in for part of a year) and will examine how annual kWh savings for a removed unit is impacted when a removed unit gets replaced with a new unit.

8.4.1.2 **Field Inspections**

The Evaluation Team will work with JACO to recruit a sample of program participants to participate in an *in situ* measurement study, prior to having their appliance picked up. Customers may need to be incented with a gift card to participate in the study.

Past evaluations of similar appliance recycling programs have found that the manufacturer energy use data, which is based on Department of Energy (DOE) testing methods, underestimate the actual energy usage of appliances that are installed in the home. This evaluation will incorporate *in situ* field monitoring in order to make accurate adjustments to the "at-manufacture" UEC data collected by JACO Environmental.

In situ monitoring is performed to gain actual energy consumption values of appliances that are in operation in customer's homes. *In situ* monitoring involves taking spot measurements and long term measurements of appliance usage for fourteen (14) days. The data collected will be used to adjust the UEC to accurately reflect appliance energy usage in Georgia Power's service territory.

8.4.2 Sampling Approach

Table 8-3 summarizes the anticipated confidence/precision level and sample sizes for the Residential Refrigerator Recycling Program. The samples will be drawn to meet a 90% confidence and 10% precision level for aggregate program and a 90% confidence and 15% precision level for more detailed site inspections and in-situ metering.

Table 8-3: Residential Refrigerator Recycling Program Sampling Approach

Program	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size	Target Confidence / Precision	Anticipated Subset-Sample Size
Residential Programs				
Residential Refrigerator Recycling	90/10	68	90/15	31

[1] C/P = Statistical Confidence / Precision at assumed Cv of 0.5

8.5 REFRIGERATOR RECYCLING EVALUATION TIMELINE

Table 8-4: Refrigerator Recycling Program Timeline

Refrigerator Recycling Program Steps	Timeline
Develop Process Evaluation Analysis Plan	May 2011
Program Manager and JACO Interviews	May 25-27, 2011
Market Actor Interviews	June 1-30, 2011
Materials and Logic Model Review	April - June, 2011
Draft Surveys for Review*	June 13
Comments from GPC on Surveys*	June 17
Programming Surveys*	June 27 – July 1
Field Testing Surveys*	July 5-6
Implementing Surveys*	July 7 - 17
Cleaning, Coding & Analyzing Survey Data*	July 18- 29
Analysis of All Results and Report Writing	August 2011
Interim Process Evaluation Key Findings	September 30th, 2011
On-site Inspections and Metering	January 2012 – June 2012

* The survey timing will be kept flexible (either summer 2011 or winter 2012) to allow for priority programs to be surveyed in the first round of surveys. Priority will be given depending on participation to date.

9 COMMERCIAL PRESCRIPTIVE INCENTIVE PROGRAM

9.1 PROGRAM OVERVIEW

The Commercial Prescriptive Incentive program promotes the purchase of eligible high-efficiency equipment installed at qualifying (new or existing) customer facilities. Rebates offered through this program serve to reduce the incremental cost to upgrade to high-efficiency equipment over standard efficiency options for Georgia Power's customers. Eligible equipment (by type and efficiency requirements) is clearly identified along with corresponding incentive amounts. The program specifies equipment and easily calculated savings, provides straightforward participation for customers, and reduces measurement and verification (M&V) costs.

The program is implemented by ICF with marketing assistance from trade allies (vendors, distributors, contractors, etc.). Georgia Power also provides a commercial audit service, part of the general customer service offering referring eligible customers to the commercial prescriptive and custom programs.

The goals of the Prescriptive Incentive program include:

- Increasing awareness and customer demand for high-efficiency, energy saving equipment
- Increasing the availability and market penetration of energy-efficient equipment that will result in long-term energy savings and peak reductions

9.1.1 Planned Targets

There were several prescriptive measures that were not included in the initial plan for the 2011 program year. Therefore the 2011-2013 program composition was determined without projected participation rates or energy savings from those measures excluded in 2011 projected savings. Prescriptive Incentive program has established the following unit energy savings, participation expectations, and estimated energy and demand savings:

Table 9-1: Commercial Prescriptive Incentive Program Measures and Goals

End-Use Category	Measure	Unit	Energy Savings (kWh/Unit)	Program Participation 2011	Percentage of 2011-2013 Savings
Lighting	Occupancy Sensor	sensor	4,335	664	49.4%
	Compact Fluorescent, screw-in (1)	lamp	-	0	0.0%
	Compact Fluorescent, hardwired (1)	fixture	-	0	0.0%
	LED Exit Sign	sign	322	0(2)	2.4%
HVAC	Packaged A/C	ton	305	0(2)	6.1%
	Packaged ASHP	ton	737	0(2)	7.2%
	Reflective Roof	sq ft	0	89	1.2%
	Duct Sealing	sq ft	2	109	10.1%
	Restaurant DC Vent Hoods	each	9,800	0(2)	0.5%
Water Heating	High Eff Elec Storage WH	each	168	167	0.3%
	Heat Pump WH	tons cooling	9,122	124	10.5%
	Pipe Insulation	ln ft	9	112	0.3%
	Heat Exchanger	each	4,233	0(2)	0.1%
Refrigeration	Grocery Display Case LED Lighting(1)	-	-	0	0.0%
	Grocery Anti-Sweat Control	control	14,097	17	5.8%
	Grocery Door Gaskets	ln ft	281	0(2)	1.3%
	Grocery Pipe Insulation	ln ft	18	0(2)	0.0%
Appliances	Rest. ES Holding Cabinet	each	7,429	0(2)	0.9%
	Rest. ES Electric Fryer	each	1,231	0(2)	0.4%
	Rest. ES Steam Cookers	each	2,676	41	0.5%
	Rest. High Eff Griddles	each	2,606	41	0.5%
	Rest. ES Refrigerator/Freezer	each	5,120	0(2)	1.8%
	Rest. ES Dishwasher	each	16,131	0(2)	0.8%
	ES Ice Machines	each	591	0(2)	0.0%
			Incremental Energy Savings (kWh):	17,274,415	

(1) Measure was not included in initial program, thus there are no per-unit savings or participation values projected for 2011-2013

(2) Measure was not included in 2011 program year program, thus there are no or participation values projected for 2011

9.1.2 Preliminary Program Logic Model

Georgia Power staff drafted a program logic model (see figure below) as part of the initial program design. It presents the program objectives, barriers, strategies, tools and market actors. These elements come together in the program and produce anticipated short and long term outcomes. This logic model shows how the program expects to increase the customer's awareness of energy efficiency and its benefits, availability of high-efficiency equipment, spillover, energy and demand savings, and number of active market actors.

Prescriptive Incentive Program Logic Model								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Actors**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**Program Activities/ 2009 Outputs**	**Impact Evaluation/ Savings Verification**
Increase awareness and customer demand for high-efficiency, energy saving equipment Increase the availability and market penetration of energy efficient equipment that will result in long-term energy savings and peak reductions	High initial costs of technologies Lack of in-house staff resource to manage energy-efficiency projects, especially in small companies Lack of awareness of costs and benefits	Financial Incentives Straightforward and streamlined application process, Comprehensive marketing and education campaign (advertisement, workshops) targeting the upstream, midstream and downstream market segments Leverage Energy Star	Increase in customer awareness of technology benefits Increase in retailers and vendors awareness of market potential	Increase in high-efficiency equipment market availability Increase in equipment average energy efficiency Increase in high-efficiency equipment sales	Program's eligible equipment sales levels Customers, vendors and retailers product awareness survey	Program's eligible equipment sales levels Participant reported commitment to continual improvement process w/o program Spillover to non-participants Prices decrease Increase in average efficiency of equipment being sold	Energy and demand savings Contractors and retailers enrollment and training Outreach to customers through marketing campaigns and field representatives	Number of projects implemented Number of trade allies and contractors recruited Customer awareness and satisfaction survey M&V surveying and monitoring Energy and demand savings

Figure 9-1: Prescriptive Incentive Program Logic Model

9.1.3 Program Measures

The eligible measures for the Prescriptive Incentive program are grouped into four general categories:

- High-efficiency lighting
- High-efficiency HVAC equipment
- Building envelope
- High-efficiency equipment and controls

The following tables list the eligible measures and proposed efficiency and incentive levels within each category, which may be refined during final program development:

Table 9-2: Eligible Lighting Equipment**

Category	Pre – Retrofit	Post - Retrofit	Estimated Customer Incentive	Unit
Other Interior Lighting				
Compact Fluorescents (CFLs) (retrofit or new construction)	Incandescent	CFL - screw-in	$1.25	lamp
	Incandescent	CFL - hardwired	$6.50	Fixture
LED Exit Sign (Retrofit Only)	Incandescent or fluorescent exit sign	Light Emitting Diode (LED) or Electro luminescent (EL) Exit Sign – 1 or 2 faced	$7	Fixture
Lighting Controls				
Occupancy Sensor (Retrofit or New Construction)	Wall switch or no control	Wall or Ceiling Mounted Occupancy Sensor (<500 watts)	$10	Sensor
	No control	Fixture-Integrated occupancy sensor	$10	Sensor

** Combined Custom and Prescriptive Track Lighting incentives are capped at $5,000 for tax-paying customers and $10,000 for non-tax paying customers.

Table 9-3: HVAC Equipment

Size	System Type	Minimum Requirements	Estimated Customer Incentive
Air-Cooled Unitary Air Conditioners			
<65,000 Btu/h	Split System	14.0 SEER 12.0 EER	$20/ton
	Single Package	14.0 SEER 11.6 EER	$20/ton
≥65,000 Btu/h and <135,000 Btu/h	Split System and Single Package	11.5 EER	$20/ton
≥135,000 Btu/h and <240,000 Btu/h	Split System and Single Package	11.5 EER	$20/ton
≥240,000 Btu/h and <760,000 Btu/h	Split System and Single Package	10.5 EER	$20/ton
≥760,000 Btu/h	Split System and Single Package	9.7 EER	$20/ton
Air-to-Air Unitary Heat Pumps			
<65,000 Btu/h	Split System	14.0 SEER 12.0 EER 8.5 HSPF	$40/ton
	Single Package	14.0 SEER 11.6 EER 8.0 HSPF	$40/ton
≥65,000 Btu/h and <135,000 Btu/h	Split System and Single Package	11.5 EER 3.4 COP[1] 2.4 COP[2]	$40/ton
≥135,000 Btu/h and <240,000 Btu/h	Split System and Single Package	11.5 EER 3.2 COP[1] 2.1 COP[2]	$40/ton
≥240,000 Btu/h	Split System and Single Package	10.5 EER 3.2 COP[1] 2.1 COP[2]	$40/ton

[1] At 47°F db/43°F wb outside air
[2] At 17°F db/15°F wb outside air

Table 9-4: Building Envelope

Equipment Type	Minimum Requirements	Estimated Customer Incentive
Duct Sealing	≤ 15% duct leakage	25% of project cost with $1,000 cap
Reflective Roof**	Energy Star Qualified	$0.05/sq ft of applicable roof area

** Reflective roofing is capped at $5,000 for taxable customers and $10,000 for non-tax customers.

Table 9-5: High-Efficiency Equipment and Controls

Equipment Type		Minimum Requirements	Estimated Customer Incentive
Water Heating			
Electric Storage Water Heater		EF > 0.94	$40/unit
Heat Pump Water Heater		EF > 2.20	$250/cooling ton
Water Heater Pipe Insulation		> 1" thickness, electric water heating system	$1.00/ln ft
Water Heater Heat Exchanger		Minimum water temperature difference of 80° F, electric water heating system	$150/water heating system
Grocery Measures			
Grocery Anti-Sweat Control		--	$15/door
Grocery Display Case LED Lighting		≥ 5 ft. fixture	$40/door
Grocery Case Door Gaskets		Replacement gaskets in existing facilities only	$2/ln ft
Commercial Refrigeration Pipe Insulation for Bare Suction Lines		R-4 insulation	$0.50/ln ft
Kitchen Appliances			
Electric Steam Cooker		ENERGY STAR Qualified	$150/cooker
Electric Fryer		ENERGY STAR Qualified	$75/vat
Insulated Holding Cabinet	Full Size	ENERGY STAR Qualified	$300/unit
	¾ Size		$250/unit
	½ Size		$200/unit
Electric Griddle		>70% cooking efficiency (tested in accordance with ASTM F1275)	$25/unit
Commercial Kitchen Ventilation Control		--	$200/exhaust fan hp
Commercial Glass-, Mixed-, or Solid-Door Commercial Refrigerator or Freezer		ENERGY STAR Qualified	$75/unit
Commercial Dishwasher		ENERGY STAR Qualified	$250/unit
Commercial Ice Machines	101 - 500 lbs ice/day	ENERGY STAR Qualified	$50/unit
	501-1000 lbs ice/day		$100/unit
	>1000 lbs ice/day		$150/unit

9.2 KEY EVALUATION ISSUES

The Evaluation Team's program approach will identify how well the program is functioning, ways to improve its effectiveness, and will quantify the energy improvement impacts. The commercial program evaluations will be of particular interest because the two programs (prescriptive and custom) are new offerings to Georgia Power's customers, having just begun in January 2011. Process evaluation is especially important during the early stages of implementation to provide early feedback that will help improve the organization and delivery of DSM programs.

More specifically our experience suggests that issues in program start-up and early program implementation may include:

- Communication difficulties between stakeholders on roles and responsibilities, information sharing, and the process of providing feedback
- Third-party implementation and record keeping practices
- High-freeridership stemming from targeting of early adopters and familiarity with existing customers
- QA/QC of installations
- Unrealistic expectations regarding uptake because of the decision-making process (discussed next)

Commercial programs offer several evaluation challenges because the decision-making process in companies is so different from that of a residential consumer. Successful commercial programs target all the key decision makers within an organization, which may include financial officers as well as senior management and facilities staff. Smaller commercial customers tend to look more like residential customers in terms of decision-making, so any programs that are targeted to both large and small commercial customers will need to be flexible enough to appeal to all the appropriate decision makers.

A second key difference between commercial and residential consumers is the period over which they make facility-related decisions. Homeowners tend to purchase new equipment when the old equipment fails, or when they are undertaking renovations. Commercial customers, however, schedule changes far in advance, and may have a decision cycle of up to 18 months for efficiency improvements. Thus commercial programs tend to begin slowly and show higher savings in later years than in the first year of operation.

The Prescriptive Incentive program targets energy-efficient equipment upgrades with easily calculated savings and provides a straightforward participation path for customers. The program includes specific equipment types, efficiency levels, and rebate amounts per unit so that eligibility and rebates are quickly and easily understood and calculated. Eligible equipment categories include lighting, HVAC equipment, building envelope, and high-efficiency equipment and controls such as

refrigeration, water heating, and cooking equipment. The evaluation will include the following key questions:

- Is the program, as implemented, reaching its participation and savings goals?
- Are commercial customers aware that program incentives are available for efficiency improvements?
- How well does/do the marketing strategy/strategies promote awareness of the program and types of eligible equipment among the target population?
- For those customers who have participated, how did the program affect their satisfaction with GPC? What aspect(s) of the program were they most interested in? Are there any suggested improvements?
- Do customers find the program offering easy to understand and the participation process straightforward?
- What is the customers' decision-making timeframe, e.g., how long from the time they learn about the program will it be before they would actually install equipment?
- How large are their businesses (to understand participation differentials between large and small commercial customers?) What is the decision-making process in their organization?
- Are contractors and equipment vendors incorporating the rebate offering into their sales and marketing activities?
- How can the program achieve deeper energy savings? Are there additional measures that should be offered by the program? What can be done to increase program participation?

9.3 PROCESS EVALUATION

As discussed above in our overall approach to process evaluation, we will develop a detailed process evaluation analysis framework. This analysis framework will identify specific questions relevant to each program's goals, objectives, schedule, and history. Our Evaluation Team will review these researchable questions with Georgia Power and the program manager before developing the specific set of tools to address the evaluation's researchable questions.

We begin all evaluations by reviewing program materials, marketing materials, and the database. This review ensures we have the information necessary to develop and implement an evaluation plan that delivers useful findings and recommendations.

The most crucial step of the evaluation is to confirm the current state of the prescriptive program with Georgia Power staff and ICF, the program implementer. This entails clarifying how the program is being implemented and how it is being marketed. We will also review the programs' marketing

and outreach strategies with Georgia Power and ICF staff. If key account representatives help market the program, we anticipate speaking with them, as well as with the program management staff.

9.3.1 Data Collection Methods

The Evaluation Team will focus on process issues during the Commercial Programs' first year. We will follow the same process for both commercial programs, conducting the research shown in Table 9-6.

Table 9-6: Methods for Data Collection for the Commercial Incentive Programs

Target Population	Surveys	Interviews
Participating and non-participating customers	90/10 confidence/precision*	
Participating and non-participating trade allies	90/10 confidence/precision*	
Program staff (Georgia Power program managers, account managers, commercial audit staff, and ICF)		15-20

*The number of surveys will depend on the population size (participation).

9.3.1.1 Program Database and Administrative Materials Review

We will review the following sources of information to assess the program's effectiveness, using these to (1) either answer or inform questions for the surveys/interviews, and (2) gain a better understanding of what data are being tracked.

- A program database extract for applicants (customer company, contact names, and email information should be included so that we may draw up a participant survey sample) with project status (date completed, date applied, in-progress)
- Database header definitions, if abbreviated
- A trade ally tracking database (used to draw up a survey sample population) will be even better if trade ally activities are also tracked in this same database
- Program manuals, diagrams, and budgets
- Verification protocols (post-installation inspections)
- Georgia Power staff job descriptions and internal incentive structures (as well as implementation partner contracts)

- Existing or former customer surveys
- A comparison with industry best practices

9.3.1.2 Program Marketing Materials Review

To assess the program's marketing effectiveness accurately, the Evaluation Team will request the following information for review:

- Marketing and outreach strategy descriptions for targeting specific industries (such as food service) and industry segments (e.g., upstream vs. downstream)
- A log or database of customers who were directly contacted regarding the program offerings
- Protocols for trade ally screening
- Trade ally training materials not available on the Georgia Power Website
- Brochures, advertisements, bill-inserts and other promotional materials distributed to customers
- Trade show and other event participation logs

9.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

9.3.3 Survey and Interview Groups

9.3.3.1 Georgia Power Staff (Prescriptive Program and Commercial Audit) Interviews

The Evaluation Team will conduct interviews with Georgia Power program staff members to clarify the roles and responsibilities of all involved stakeholders. In addition to asking questions to determine which best practices the administrators are following, we will ask:

- How does communication occur between the key stakeholders?
- How were the program's goals set?
- What are the internal protocols for verification and due diligence?
- Are resources allocated appropriately across the program (are there any bottlenecks?)
- What are the perceived challenges in running this program?

- How was the program designed, and what were the assumptions of the staff?

9.3.3.2 ICF Staff Interviews

The Evaluation Team will conduct interviews with up to three ICF staff on changes that have occurred with the prescriptive and custom programs. This conversation will clarify what program activities are actually occurring (such as marketing activities), who are the trade allies, and what are the eligible equipment and their incentives. We will also ask ICF to provide us with program materials, tracking databases, and developed protocols.

9.3.3.3 Participating and Nonparticipating Customer Surveys

We will conduct participant surveys in the field during site visits. Our field staff will use an electronic template and record answers on a tablet PC, which will allow for greater efficiency and reduced error. We will ask process evaluation questions regarding the participants' satisfaction with the program and their reasons for participating. Our survey will contain NTG questions, determining how influential the program was to their decision-making process (what would have happened if there were no program).

The participant sample will be provided from the program database extract or through a data request from Georgia Power. Our questions will be similar to those asked for the custom program.

We expect commercial nonparticipant sample populations to be identical for both the commercial prescriptive and custom programs. Therefore SRBI will conduct one nonparticipant commercial customer survey (nonparticipants are defined as customers who are billed at rates included in the list of eligible rates on the Georgia Power Website and have not completed projects through either the commercial prescriptive program or the commercial custom program.) Nonparticipants will be identified as (1) those who started an application but did not follow through to completion, or (2) through applying the preceding criteria to a list of customers who were contacted regarding the program. We will ask nonparticipating customers about their awareness of the program, reasons for nonparticipation, and questions to identify their retrofit decision-making process.

9.3.3.4 Participating Trade Allies and Nonparticipating Trade Ally Surveys

Having no recent information to the contrary, the Evaluation Team assumes trade allies (such as contractors and vendors) help market the program to commercial customers. After obtaining names and contact information (phone numbers) from Georgia Power or ICF, we will survey the participating trade allies about their experience with the program, customer reactions to the program, and how the program impacts their business. However, to ensure high quality data for the commercial program process evaluation, timing of these surveys will be determined based on trade ally participation rates.

As an optional task (to be determined based on further discussions with Georgia Power staff), the Evaluation Team may conduct surveys with non-participating trade allies. In order to better focus our efforts, we will request a list of nonparticipating trade ally contacts (from Georgia Power or ICF)

who may be more likely to provide feedback. These nonparticipants are likely to be the same as those for the custom program. Our survey of the non-participating trade allies may help to determine potential barriers to participation, attitudes towards the program, perceived value of energy efficiency, and concerns about participation.

9.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision level. In instances where there are overlapping sample populations, we will combine the surveys and interviews for the commercial prescriptive and custom programs.

Table 9-7: Commercial Prescriptive Sampling Approach Summary

Target population	Target	Type
GPC Commercial Auditors	2-3	Interview
GPC Program Managers	3	Interview
ICF Program Implementers	6	Interview
GPC Account Managers	8	Interview
Participating Customers	90/10 confidence/precision	Field survey (on tablet PC) administered by evaluation team staff members
Non-participant Customers* (optional)	90/10	SRBI survey
Participating Trade Allies	90/10 confidence/precision	SRBI survey
Non-participating Trade Allies* (optional)	TBD	TBD

*Non-participants are a difficult population to reach and, given the limited time the commercial programs have been running, could also be a very small population depending on how it's defined. Approach and timing for reaching this population will be determined based on further discussions with Georgia Power.

9.4 IMPACT EVALUATION

The impact evaluation for the measures will follow IPMVP Option A (Retrofit Isolation: Key Parameter Measurement) methods or engineering analysis based on observed parameter performance. Engineering activities will include installation verification, determination of operational hours, spot-metering of fixture energy consumption, and savings calculations. In order to evaluate the large number of unique prescriptive measure, measures will be grouped into five end-use categories:

- Lighting
- HVAC
- Water Heating

- Refrigeration
- Appliances

Participation levels will be combined with original deemed savings values to assign weights to each end-use category and then to each measure within each category. Evaluation efforts will target those categories and measures with the most significant impact on overall Prescriptive program savings.

9.4.1 Data Collection Methods

As summarized in Section 3, the Prescriptive Program will be assigned a specific number of telephone surveys, desk reviews, and site inspections based on overall portfolio savings. Once the samples are identified, desk reviews of project files will verify basic information and will inform telephone surveys, on-site inspections, and M&V activities.

Table 9-8 shows the general information that will be collected for each prescriptive project based on end use category. Engineering judgment may suggest collection of additional information under certain conditions.

Table 9-8: Commercial Prescriptive Incentive Program Inspection Checklist

END USE CATEGORY	BASELINE	RETROFIT
All Facilities	Year facility was built Number of occupants Number of stories Business Type Operating Hours, posted or otherwise Total conditioned square footage Heating system type/age/efficiency/size/condition Cooling system type/age/efficiency/size/condition	
Lighting	Lamp Type (e.g., T8, T12) Ballast Type (mag. or elec.) Lamp Size (4 ft. or 8 ft.) Quantity of Lamps per Fixture Wattage per Lamp Fixture Quantity **Operating Hours**	Lamp Type Confirm Electronic Ballast and Factor Lamp Size Quantity of Lamps per Fixture Wattage per Lamp Fixture Quantity **Operating Hours** Confirm ENERGY STAR rating

END USE CATEGORY	BASELINE	RETROFIT
HVAC	Type (e.g., DX, heat pump) Capacity Efficiency **Operating Hours** **Operating Temperatures (space, supply, return, including info on setbacks)** **Features (e.g., economizer)**	Type Capacity Efficiency **Operating Hours** **Operating Temperatures** **Features**
Water Heating	Tank Size Heating Capacity **Water Temperatures** Energy Factor Fuel Type Location and Thickness of Insulation Pipe Diameter **Operating Hours**	Tank Size Heating Capacity **Water Temperatures** Energy Factor Confirm Electric Location and Thickness of Insulation Pipe Diameter **Operating Hours**
Refrigeration	Type of Equipment (e.g., open reach-in refrigerated case, closed freezer) **Operating Temperatures** Capacity Efficiency **Operating Hours** Other Parameters (e.g., linear feet of gaskets, thickness of suction line insulation)	Type of Equipment **Operating Temperatures** Capacity Efficiency **Operating Hours** Other Parameters
Appliances	Type of Equipment (e.g., dishwasher, fryer) Operating Parameters Capacity Efficiency **Operating Hours**	Type of Equipment Operating Parameters Capacity Efficiency Confirm ENERGY STAR Rating **Operating Hours**

Metering activities will focus on parameters with the highest uncertainty, shown in bold in Table 9-8. Based on the Evaluation Team's experience evaluating customer projects in the commercial sector and the measures offered in Georgia Power's Prescriptive Program, only HVAC projects and 50% of the lighting projects will require on-site trend measurements, because of certainty of the variables of the other measure end-uses. Operating hours represent a highly uncertain but critical parameter and will be metered whenever possible with the use of motor on/off and amperage data loggers. Parameter(s) to be measured will be on each specific project.

In addition to those parameters highlighted in the table above, certain baseline parameters may have a significant impact on savings calculations but may not have been required fields in project applications. Project file reviews will identify these potential gaps in baseline data for each measure, and surveys and site inspections will attempt to gather this information.

The evaluation team will conduct interviews with program staff, implementers and auditors to understand any available documented baseline data noted above. The evaluation team will also utilize other methods as described in section 3.4.5 to determine the baseline conditions.

9.4.2 Sampling Approach

Due to the eligible measures within the Commercial Prescriptive Program, sub-strata confidence / precision targets will be established to ensure all measures and end-uses are verified and analyzed at a per-unit resolution. Table 9-9 summarizes the preliminary sampling plan and verification approach for each Commercial Prescriptive Program end-use. All sample size listed are estimated based on an infinite population size and thus represent a maximum sample size. If 2011 participation results in very low populations for end-uses, then the Evaluation Team will investigate the opportunity to utilize 2012 participants to assess per-unit savings values. Otherwise, deemed will be identified from applicable secondary sources.

Table 9-9: Commercial Prescriptive Program Sampling Plan

Program	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size(2)	Target Confidence / Precision	Anticipated Subset-Sample Size(2)
Lighting	90/15	31	80/15	17
HVAC	80/15	17	80/15	17
Water Heating	80/20	11	80/20	11
Refrigeration	80/20	11	80/20	11
Appliances	80/20	11	80/20	11
Total	**90/10**	**81**		**67**

(1) **C/P = Statistical Confidence / Precision at assumed Cv of 0.5**

(2) **All sample size listed are estimated based on an infinite population size and thus represent a maximum sample size. Actual sample sizes to be based on 2011 participation.**

9.5 COMMERCIAL PRESCRIPTIVE EVALUATION TIMELINE

Table 9-10: Commercial Prescriptive Program Timeline

Commercial Prescriptive Program	Timeline
Interview Guide Development	May 2-6, 2011
GPC Program Manager Interviews	May 25-27, 2011
GPC Commercial Auditor Interviews	May 25-27, 2011
GPC Account Manager Interviews	May 25-27, 2011
Material & Logic Model Review	April - June, 2011
ICF Staff Interviews	June 1-8, 2011
Interim Process Evaluation Key Findings	September 30, 2011
Draft Surveys for Review	January 2012
Comments from GPC on Surveys	February 2012
Programming Surveys	February 2012
Field Testing Surveys	February 2012
Implementing Surveys	February 2012
Cleaning, Coding & Analyzing Data	March 2012
On-Site Inspections	Commencing June 2012

9.6 COMMERCIAL PRESCRIPTIVE DATA NEEDS

We require access to updated prescriptive program manuals/implementation plans from ICF for review. In addition, we require names and contact information for the interviewees described in Table 9-7. We also need extracts of all applicant, trade ally, and marketing databases.

10 COMMERCIAL CUSTOM INCENTIVE PROGRAM

10.1 PROGRAM OVERVIEW

The Commercial Custom Incentive program offers rebates for certain fluorescent, high bay, and other ENERGY STAR® qualified lighting. Fixture wattage must be reduced by a minimum of 10% with run-time of at least 1,000 hours per year.

The goals of the Commercial Custom Incentive program include:

- Increasing customer acceptance and use of energy efficient technologies and practices
- Obtaining verifiable, cost-effective and long-term electrical energy and demand savings

The program is implemented by ICF with marketing assistance from trade allies (vendors, distributors, contractors, etc). A commercial audit service, part of the general customer service offering, also refers eligible customers to the commercial prescriptive and custom programs. Customers on a commercial rate are eligible to participate.

10.1.1 Planned Targets

The Commercial Custom Incentive program has established the following unit energy savings, participation expectations, and estimated energy and demand savings consistent with Georgia Power program approved dockets:

Table 10-1: Commercial Custom Incentive Program 2011 Goals

Measure	Unit	Energy Savings (kWh/Unit)	2011 Program Participation
Lighting	facility	256,399	200
Incremental Energy Savings (kWh):			61,202,855

10.1.2 Preliminary Program Logic Model

Georgia Power staff drafted a logic model as part of the initial program design. This logic model presents the program objectives, barriers, strategies, tools and market actors. These elements come together in the program and produce anticipated short and long term outcomes. This logic model shows how the program expects to increase the customer's awareness of the energy efficiency and its benefits, availability of high-efficiency equipment, spillover, energy and demand savings, and number of active market actors.

Commercial Custom Incentive Program Logic Model								
			Market Effects		Market Effects Metrics		Savings Metrics	
Objective	**Market Barriers Addressed**	**Strategy, Tools and Market Actors**	**SHORT TERM Behavior Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**SHORT TERM Behavioral Change Effects (1 year)**	**LONGER TERM Market Effects (2- 5 years)**	**Program Activities/ 2009 Outputs**	**Impact Evaluation/ Savings Verification**
Increase customer acceptance and use of energy efficient technologies and practices Encourage and support comprehensive energy-efficiency projects that go beyond single measures and common efficiency practices Obtain verifiable, cost-effective and long-term electrical energy and demand savings	Access to capital Competing priorities Lack of information Lack of customer resources in small companies Short term payback criterion (< 2 years) Lack of an Energy Services Company (ESCO) network Economic downturn Getting to decision maker	Financial incentives Technical assistance Comprehensive marketing and education campaign (advertisement, workshops) targeting the upstream, midstream and downstream market segments.	Increase in customer awareness of technology benefits Increase in retailers and vendors awareness of market potential	Increase in high-efficiency equipment market availability Increase in equipment average energy efficiency Increase in high-efficiency equipment sales	Program's eligible equipment sales levels Customers, vendors and retailers product awareness survey	Program's eligible equipment sales levels Participant reported commitment to continual improvement process w/o program Spillover to non-participants Incremental prices decrease Increase in average efficiency of equipment being sold Effects on new construction design	Energy and demand savings Contractor and retailer enrollment and training Outreach to customers through marketing campaigns and field representatives.	Number of projects implemented. Energy and demand savings Number of trade allies and contractors recruited Customer awareness and satisfaction survey

Figure 10-1: Commercial Custom Incentive Program Logic Model

10.1.3 Program Measures

The Custom program offers rebates for both retrofit and new construction projects. Retrofit projects on existing buildings are grouped into the following three categories:

- Measure 1: Fluorescent Lighting fixtures. Fixture must be listed on Consortium for Energy-efficiency Website. This site covers only 4' T8 lamps and ballasts. 17w, 2' T8 lamps must have a minimum efficacy of 75 mean lumens/watt. 32w, U-bend T8 lamps must have a minimum efficacy of 79 mean lumens/watt. T5 lamps are also eligible under this measure.

- Measure 2: High Bay Lighting. All high bay lighting must be pulse start HID technology or high efficient fluorescent.

- Measure 3: Other lighting. This consists of lighting fixtures not included in Measure 1 or Measure 2. Common to this category is LED lighting, which must meet ENERGY STAR® standards, a list of which is provided on the ENERGY STAR® Website. Other lighting sources and fixtures may qualify but require pre-approval.

New Construction: lighting power density must exceed requirements of ASHRAE 90.1-2007 by at least 30%.

Additional eligibility criteria include the following:

- Fixture wattage must be reduced by a minimum of 10% to qualify.

- All Custom Lighting retrofits must operate a minimum of 1,000 hours per year.

- All lighting measures (Custom & Prescriptive combined) are capped at $5,000 for taxable and $10,000 for non-tax customers.

- Any custom lighting retrofit application with an incentive over $1,000 and/or any application that utilizes Measure 3 requires pre-approval.

- Custom lighting retrofit incentives are available to help offset the cost of new fixtures. Incentives are not available for "De-lamping ."

Commercial facilities meeting these program eligibility rules may be eligible for federal or state tax incentives. In addition to tax incentives or credits available, the Custom Incentive program will provide the following incentives to participating facilities:

Table 10-2: Commercial Custom Incentive Program Incentive Schedule

Facility Vintage	Facility Type	Incentive	Maximum per facility
Existing	Commercial Facility (taxable)	$0.20/kWh	$5,000
Existing	Tax Exempt Commercial Facility	$0.20/kWh	$10,000
New	Commercial Facility (taxable)	$0.05/kWh	$5,000
New	Tax Exempt Commercial Facility[16]	$0.05/kWh	$10,000

10.2 KEY EVALUATION ISSUES

The Evaluation Team's program approach will identify how well the program is functioning, ways to improve its effectiveness, and will quantify the energy improvement impacts. The commercial program evaluations will be of particular interest because the two programs (prescriptive and custom) are new offerings to Georgia Power's customers, having just begun in January 2011. Process evaluation is especially important during the early stages of implementation to provide early feedback that will help improve the organization and delivery of DSM programs.

More specifically our experience suggests that issues in program start-up and early program implementation may include:

- Communication difficulties between stakeholders on roles and responsibilities, information sharing, and the process of providing feedback
- Third-party implementation and record keeping practices
- High-freeridership, stemming from targeting of early adopters and familiarity with existing customers
- QA/QC of installations
- Unrealistic expectations about the uptake rate because of commercial customer decision making processes

Commercial programs offer several evaluation challenges because the decision-making process in companies is so different from that of a residential consumer. Successful commercial programs target all the key decision makers within an organization, which may include financial officers as well as senior management and facilities staff. Smaller commercial customers tend to look more like residential customers in terms of their decision-making, so any programs that are targeted to both

[16] Tax-exempt facilities have a higher maximum incentive amount because they are not eligible for existing federal and state tax incentives to help offset the cost of implementing eligible measures.

large and small commercial customers will need to be flexible enough to appeal to all the appropriate decision makers.

A second key difference between commercial and residential consumers is the period over which they make facility-related decisions. Homeowners tend to purchase new equipment when the old equipment fails, or when they are undertaking renovations. Commercial customers, however, schedule changes far in advance, and may have a decision cycle of up to 18 months for efficiency improvements. Thus commercial programs tend to begin slowly and show higher savings in later years than in the first year of operation.

Both prescriptive and custom commercial program evaluations will cover key issues such as:

- Is the program, as implemented, reaching its participation and energy savings goals?
- Are commercial customers aware that program incentives and federal tax incentives are available for efficiency improvements?
- How well does/do the marketing strategy/strategies promote awareness of the program and types of eligible equipment among the target population?
- For those customers who have participated, how did the program affect their satisfaction with GPC? What aspect(s) of the program were they most interested in? Are there any suggested improvements?
- Do customers find the program offering easy to understand and the participation process straightforward?
- What is the customers' decision-making timeframe, e.g., how long from the time they learn about the program will it be before they would actually install equipment?
- How large are their businesses? (to get at participation differentials between large and small commercial customers) What is the decision-making process in their organization?
- Are contractors and equipment vendors incorporating the rebate offering into their sales and marketing activities?
- How can the program achieve deeper energy savings? Are there additional measures that could be offered by the program? What can be done to increase program participation?

10.3 PROCESS EVALUATION

As discussed above in our overall approach to process evaluation, we will develop a process evaluation analysis framework. This analysis framework will identify specific questions relevant to each program's goals, objectives, schedule, and history. Our Evaluation Team will review these

researchable questions with Georgia Power and the program manager before developing the specific set of tools to address the evaluation's researchable questions.

We begin all evaluations by reviewing program materials, marketing materials, and the database. This review ensures we have the information necessary to develop and implement an analysis plan that delivers useful findings and recommendations.

The most crucial step of the evaluation is to confirm the current state of the custom program with Georgia Power staff and ICF, the program implementer. This entails clarifying how the program is being implemented and how it is being marketed. We will also review the programs' marketing and outreach strategies with Georgia Power and ICF staff. If key account representatives help market the program, we anticipate speaking with them, as well as with the program management staff.

10.3.1 Data Collection Methods

The Evaluation Team will focus on process issues during the Commercial Programs' first year. We will follow the same process for both commercial programs, conducting the research shown in Table 10-3.

Table 10-3: Methods for Data Collection for the Commercial Incentive Programs

Target Population	Surveys	Interviews
Participating and non-participating customers	90/10 confidence/precision*	
Participating and non-participating trade allies	90/10 confidence/precision*	
Program staff (Georgia Power program managers, account managers, commercial audit staff, and ICF)		15-20

*The number of surveys will depend on the population size (participation).

10.3.1.1 Program Database and Administrative Materials Review

We will review the following sources of information to assess the program's effectiveness, using these to (1) either answer or inform questions for the surveys/interviews, and (2) gain a better understanding of what data are being tracked.

- A program database extract for applicants (customer company and contact names and email information should be included so that we may draw up a participant survey sample) with project status (date completed, date applied, in-progress)
- Database header definitions, if abbreviated

- A trade ally tracking database (used to draw up a survey sample population) will be even better if trade ally activities are also tracked in this same database.
- Program manuals, diagrams, and budgets
- Verification protocols (post-installation inspections)
- Georgia Power staff job descriptions and internal incentive structures (as well as implementation partner contracts)
- Existing or former customer surveys
- A comparison with industry best practices
- Guidance provided to applicants on EMV requirements

10.3.1.2 Program Marketing Materials Review

To assess the program's marketing effectiveness accurately, the Evaluation Team will request the following information for review:

- Marketing strategy descriptions for targeting specific industries (such as food service) and industry segments (e.g., upstream vs. downstream)
- A log of database of customers who were directly contacted regarding the program offerings
- Protocols for trade ally screening
- Trade ally training materials not on the Georgia Power Website
- Brochures, advertisements, bill-inserts and other promotional materials distributed to customers
- Trade show and other event participation logs

10.3.2 Logic Model Review

The Evaluation Team will consider the logic theory reflected in the model based on how the program is operating. We will revise the model, as needed, so it is up to date and reflects any changes in program design or the reality of program implementation.

10.3.3 Survey and Interview Groups

10.3.3.1 Georgia Power Staff (Custom Program and Commercial Audit) Interviews

The Evaluation Team will conduct interviews with Georgia Power program staff members to clarify the roles and responsibilities of all involved stakeholders. In addition to asking questions to determine which best practices the administrators are following, we will ask:

- How does communication occur between the key stakeholders?
- How were the program's goals set?
- What are the internal protocols for verification and due diligence?
- Are resources allocated appropriately across the program (any bottlenecks?)
- What are the perceived challenges in running this program?
- How was the program designed, and what were the assumptions of the staff?

10.3.3.2 ICF Staff Interviews

We will interview up to three ICF staff on changes that have occurred with the prescriptive and custom programs. This conversation will clarify what program activities are actually occurring (such as marketing activities), who are the trade allies, and what are the eligible equipment and their incentives. We will also ask ICF to provide us with program materials, tracking databases, and developed protocols.

10.3.3.3 Participating and Non-participating Customers

We will conduct participant surveys in the field during site visits. Our field staff will use an electronic template and record answers on a tablet PC, which will allow for greater efficiency and reduced error. We will ask process evaluation questions regarding the participants' satisfaction with the program and their reasons for participating. Our survey will contain net-to-gross questions, determining how influential the program was to their decision-making process (what would have happened if there were no program).

The participant sample will be provided from the program database extract or through a data request from Georgia Power.

We expect commercial nonparticipant sample populations to be identical for both the commercial prescriptive and custom programs. Therefore SRBI will conduct one nonparticipant commercial customer survey. (Nonparticipants are defined as customers who are billed at rates included in the list of eligible rates on the Georgia Power Website and have not completed projects through either the commercial prescriptive program or the commercial custom program.) Nonparticipants will be identified as (1) those who started an application but did not follow through to completion, or (2)

through applying the preceding criteria to a list of customers who were contacted regarding the program. We will ask non-participating customers about their awareness of the program, reasons for nonparticipation, and questions to identify their retrofit decision-making process.

10.3.3.4 Participating Trade Allies and Non-participating Trade Allies

Having no recent information to the contrary, the Evaluation Team assumes trade allies (such as contractors and vendors) help market the program to commercial customers, and these may include contractors and vendors. After obtaining names and contact information (phone numbers) from Georgia Power or ICF, we will survey the participating trade allies about their experience with the program, customer reactions to the program, and how the program impacts their business.

As an optional task (to be determined based on further discussions with Georgia Power staff), the Evaluation Team may conduct surveys with non-participating trade allies. In order to better focus our efforts, we will request a list of nonparticipating trade ally contacts (from Georgia Power or ICF) who may be more likely to provide feedback. These nonparticipants are likely to be the same as those for the custom program. Our survey of the non-participating trade allies may help to determine potential barriers to participation, attitudes towards the program, perceived value of energy efficiency, and concerns about participation.

10.3.4 Sampling Approach

Our sampling approach will be closely coordinated with the sampling approach of the impact team to ensure that data provided from the surveys yield results at the required precision level. In instances where there are overlapping sample populations, we will combine the surveys and interviews for the commercial prescriptive and custom programs.

Table 10-4: Commercial Custom Sampling Approach Summary

Target population	Target Number	Type
GPC Commercial Auditors	2-3	Interview
GPC Program Managers	3	Interview
ICF Program Implementers	6	Interview
GPC Account Managers	8	Interview
Participating Customers	90/10 confidence/precision	Field survey (on tablet PC) administered by evaluation team staff members
Non-participant Customers* (optional)	90/10	SRBI survey
Participating Trade Allies	90/10 confidence/precision	SRBI survey
Non-participating Trade Allies* (optional)	TBD	TBD

*Non-participants are a difficult population to reach and, given the limited time the commercial programs have been running, could also be a very small population depending on how it's defined. Approach and timing for reaching this population will be determined based on further discussions with Georgia Power.

10.4 IMPACT EVALUATION

The impact evaluation for the lighting measures will follow IPMVP Option A (Retrofit Isolation: Key Parameter Measurement) methods, and engineering activities will include installation verification, determination of operational hours, spot-metering of fixture energy consumption, and savings calculations. Information will be typically gathered on:

- Baseline/Retrofit Power Consumption
- Operating Hours
- Controls and Sequence of Operation

10.4.1 Data Collection Methods

As explained in Section 3, the Custom program will be assigned a specific number of telephone surveys, desk reviews, and site inspections based on overall portfolio savings. Once the samples are identified, desk reviews of project files will verify basic information and will inform telephone surveys, on-site inspections, and M&V activities.

Table 10-5 summarizes the general information that will be collected for each Custom project. Since lighting savings are generally the product of wattage reduction and operating hours, particular attention will be given to those parameters with a significant impact on calculated wattage, and metering with lighting on/off data loggers will be used to develop an accurate estimate of operating hours.

Table 10-5: Commercial Custom Incentive Program On-Site Checklist

BASELINE	RETROFIT
Year facility was built Number of occupants Number of stories Business type Operating Hours, posted or otherwise Total conditioned square footage Heating system type/age/efficiency/size/condition Cooling system type/age/efficiency/size/condition	
Lamp Type (e.g., T8, T12) Ballast Type (mag. or elec.) and Factor Lamp Size (e.g., 4 ft.) Quantity of Lamps per Fixture Wattage per Lamp Fixture Quantity **Operating Hours**	Lamp Type Confirm Electronic Ballast and Factor Lamp Size Quantity of Lamps per Fixture Wattage per Lamp Fixture Quantity **Operating Hours** Confirm ENERGY STAR Rating, if applicable

Based on the Evaluation Team's experience evaluating customer projects in the commercial sector, 50% to 75% of lighting projects will require on-site trend measurements, because of certainty of the variables and/or available trustworthy customer data. Most projects will be evaluated with measurements of operating hours of the program equipment for a minimum of seven (7) days. This information will be used to confirm operating hours. This collected measured data will be compared to lighting operating hours as determined through on-site interviews and surveys of control strategies (dimmers, timers, etc.) to inform the balance of the yearly operating hours.

The evaluation team will conduct interviews with program staff, implementers and auditors to understand any available documented baseline data noted above. The evaluation team will also utilize other methods as described in section 3.4.5 to determine the baseline conditions.

10.4.2 Sampling Approach

Table 10-6 summarizes the anticipated confidence/precision level and sample sizes for the Commercial Custom Program. The samples will be selected to meet a 90% confidence and 10% precision level for program and on-site inspections. The higher confidence/precision level is due to the large composition of the portfolio energy saving impacts and certainty of savings.

Table 10-6: Commercial Custom Sampling Approach

Program	Desk Analysis With Telephone Survey Verification Method		On-Site Analysis Verification Method (Subset-Sample)	
	Target Confidence / Precision	Anticipated Sample Size	Target Confidence / Precision	Anticipated Subset-Sample Size
Commercial Programs				
Commercial Custom	90/10[(2)]	68	90/10[(2)]	

(1) C/P = Statistical Confidence / Precision at assumed CV of 0.5

(2) Final Target confidence/precision will be based on final participation quantity. Site inspections for the commercial custom program to be fixed at 68, unless population counts are less than 100.

10.5 COMMERCIAL CUSTOM EVALUATION TIMELINE

Table 10-7: Commercial Custom Evaluation Timeline

Commercial Custom Program	Timeline
Interview Guide Development	May 2-6, 2011
GPC Program Manager Interviews	May 25-27, 2011
GPC Commercial Auditor Interviews	May 25-27, 2011
GPC Account Manager Interviews	May 25-27, 2011
Material & Logic Model Review	April - June, 2011
ICF Staff Interviews	June 1-8, 2011
Interim Process Evaluation Key Findings	September 30, 2011
Draft Surveys For Review	January 2012
Comments From GPC On Surveys	February 2012
Programming Surveys	February 2011
Field Testing Surveys	February 2011
Implementing Surveys	February 2012
Cleaning, Coding & Analyzing Data	March 2012
On-Site Inspections	**Commencing January 2012**

10.6 COMMERCIAL CUSTOM DATA NEEDS

We require access to updated custom program manuals/implementation plans from ICF for review. In addition, we require names and contact information for the interviewees described in Table 10-3. Next we would like to obtain extracts of all applicant, trade ally, and marketing databases.

Appendix A SUPPORTING CALCULATION METHODOLOGY

A.1 RESIDENTIAL WATER HEATING PROGRAM - WATER HEATER BLANKET

The base case annual energy consumption of an electric water heater can be calculated with the following equations:

where:

r_{tank} = radius of the water tank (ft)

V = volume of the tank (gallons)

h = height of the tank (ft)

where:

$A_{tank\ walls}$ = surface area of the walls of the tank (the area of the tank excluding the base and the top) (ft^2)

where:

q_{base} = base case heat loss through the walls of the tank (Btu/hr)

T = temperature (°F)

R_{tank} = thermal resistance of the water heater ($hr*ft^2*°F/Btu$)

Then, the base case annual energy consumption becomes:

where:

AEC_{base} = Base case annual energy consumption (kWh)

H = Hours of use (assumed to be 8760)

η = efficiency of the hot water heater (energy factor)

For the retrofit case, we make the following changes:

where:

$A_{retrofit}$ = surface area of the outer edge of the water heater blanket (ft^2)

t = thickness of the insulation (ft)

where:

$q_{retrofit}$ = retrofit case heat loss through the insulation (Btu/hr)

$R_{blanket}$ = thermal resistance of the water heater blanket ($hr*ft^2*°F/Btu$)

Then, the retrofit annual energy consumption becomes:

where:

$AEC_{retrofit}$ = Retrofit case annual energy consumption (kWh)

Thus, annual energy savings are the difference between the base case annual energy consumption and the retrofit case annual energy consumption, or:

If any of the variables discussed above cannot be obtained, deemed values will be used. Deemed values will be gathered from a review of available secondary sources.

A.2 RESIDENTIAL WATER HEATING PROGRAM - WATER PIPE INSULATION

Calculating energy savings for water pipe insulation from on-site observations is very difficult without a long metering study that captures both pre and post retrofit energy consumption. Therefore, the Evaluation Team will use deemed values. The following formula will be used to calculate energy savings:

If annual energy consumption is displayed on the water heater, or it can be found by looking up the make and model number, it will be used in the above equation. If not, a value of 2,763 kWh[17] will be used.

The deemed savings value of 3% used in the above equation represents the annual energy savings as reported in the Pennsylvania Technical Reference Manual for a 10ft length of pipe insulation[18].

A.3 RESIDENTIAL WATER HEATING PROGRAM - LOW-FLOW SHOWERHEADS

The energy savings for low-flow showerheads can be calculated as:

where:

GPM_{base} = Gallons per minute of baseline showerhead = 2.5[19]

GPM_{low} = Gallons per minute of low-flow showerhead

people = number of people per household

gallons/day = Average gallons per day of hot water used for showering = 11.6[20]

days/year = number of days per year shower is used = 365

showers = average number of showers per household = 1.6[21]

lbs/gallon = pounds per gallon = 8.3

C_p = Specific heat of water = 1 Btu/lbs*°F

T_{sh} = Assumed temperature of water used for shower = 105°F[22]

[17] Average annual energy consumption for a residential hot water heater in the "South" region from the 2005 Residential Energy Consumption Survey. U.S. Energy Information Administration.

[18] Pennsylvania Public Utility Commission Technical Reference Manual. June 2011. Pg. 63. http://www.puc.state.pa.us/electric/Act129/TRM.aspx

[19] The Energy Policy Act of 1992 established the maximum flow rate for showerheads at 2.5 gallons per minute (GPM).

[20] See the U.S. Environmental Protection Agency's "water sense" documents: http://www.epa.gov/watersense/docs/home_suppstat508.pdf

[21] Estimated based on:

- Pacific Northwest Laboratory; "Energy Savings from Energy-Efficient Showerheads: REMP Case Study Results, Proposed Evaluation Algorithm, and Program Design Implications" http://www.osti.gov/bridge/purl.cover.jsp;jsessionid=80456EF00AAB94DB204E848BAE65F199?purl=/10185385-CEkZMk/native/
- East Bay Municipal Utility District; "Water Conservation Market Penetration Study" http://www.ebmud.com/sites/default/files/pdfs/market_penetration_study_0.pdf

T_{in} = Assumed temperature of water entering house = 55°F[23]

Energy Factor = energy factor of water heater

3,412 = Factor to convert Btu to kWh

Table 10-8 contains deemed values that can be used in case they cannot be obtained during telephone calls or on-site visits.

Table 10-8: Low Flow Showerhead Parameters

Variable	Deemed Value
GPM_{low}	2.2 GPM[24]
People/Household	2.5[25]
Energy Factor	0.9[26]

A.4 RESIDENTIAL WATER HEATING PROGRAM - FAUCET AERATORS

The energy savings for low-flow showerheads can be calculated as:

where:

GPM_{base} = Gallons per minute of baseline faucet = 2.2[27]

GPM_{low} = Gallons per minute of low-flow faucet

people = number of people per household

gallons/day = Average gallons per day of hot water used by faucet = 10.9[28]

[22] Connecticut Energy Efficiency Fund; CL&P and UI Program Savings Documentation for 2008 Program Year. Pg. 155.

[23] A good approximation of annual average water main temperature is the average annual ambient air temperature. Average water main temperature = 55° F based on: http://lwf.ncdc.noaa.gov/img/documentlibrary/clim81supp3/tempnormal_hires.jpg

[24] Connecticut Energy Efficiency Fund; CL&P and UI Program Savings Documentation for 2008 Program Year. Pg. 156.

[25] Average taken from household demographics survey in the "South" region from the 2005 Residential Energy Consumption Survey. U.S. Energy Information Administration.

[26] Current federal standard

[27] In 1998, the Department of Energy adopted a maximum flow rate standard of 2.2 gpm at 60 psi for all faucets: 63 Federal Register 13307; March 18, 1998.

days/year = number of days per year faucet is used = 365

faucets = average number of faucets per household = 3.5[29]

lbs/gallon = pounds per gallon = 8.3

C_p = Specific heat of water = 1 Btu/lbs*°F

T_f = Assumed temperature of water used for faucet = 80°F[30]

T_{in} = Assumed temperature of water entering house = 55°F[31]

Energy Factor = energy factor of water heater

3,412 = Factor to convert Btu to kWh

Table 10-9 contains deemed values that can be used in case they cannot be obtained during telephone calls or on-site visits.

Table 10-9 Faucet Aerator Parameters

Variable	Deemed Value
GPM_{low}	1.5 GPM[32]
People/Household	2.5[33]
Energy Factor	0.9[34]

A.5 RESIDENTIAL WATER HEATING PROGRAM - TEMPERATURE SETBACK

[28] See the U.S. Environmental Protection Agency's "water sense" documents: http://www.epa.gov/watersense/docs/home_suppstat508.pdf

[29] East Bay Municipal Utility District; "Water Conservation Market Penetration Study" http://www.ebmud.com/sites/default/files/pdfs/market_penetration_study_0.pdf

[30] Connecticut Energy Efficiency Fund; CL&P and UI Program Savings Documentation for 2008 Program Year. Pg. 157.

[31] A good approximation of annual average water main temperature is the average annual ambient air temperature. Average water main temperature = 55° F based on: http://lwf.ncdc.noaa.gov/img/documentlibrary/clim81supp3/tempnormal_hires.jpg

[32] Public Service Commission of Wisconsin Focus on Energy Evaluation Default Deemed Savings Review, June 2008. http://www.focusonenergy.com/files/Document_Management_System/Evaluation/acesdeemedsavingsreview_evaluationreport.pdf

[33] Average taken from household demographics survey in the "South" region from the 2005 Residential Energy Consumption Survey. U.S. Energy Information Administration.

[34] Current federal standard

The base case energy consumption calculation for a water heater temperature setback will follow the following formulas:

where:

r_{tank} = radius of the water tank (ft)

V = volume of the tank (gallons)

h = height of the tank (ft)

where:

A_{tank} = surface area of the tank (ft^2)

where:

q_{base} = base case heat loss through the walls of the tank (Btu/hr)

$T_{water,in}$ = Base case water temperature setpoint (°F)

$T_{ambient}$ = Ambient temperature of the room (°F)

R_{tank} = thermal resistance of the water heater ($hr*ft^2*°F/Btu$)

Then, the base case annual energy consumption becomes:

where:

AEC_{base} = Base case annual energy consumption (kWh)

H = Hours of use (assumed to be 8760)

η = efficiency of the hot water heater (energy factor)

For the retrofit case, we make the following changes:

where:

$q_{retrofit}$ = retrofit case heat loss through the walls of the tank (Btu/hr)

$T_{water,r}$ = the new temperature setpoint of the water heater

Then, the retrofit annual energy consumption becomes:

where:

$AEC_{retrofit}$ = Retrofit case annual energy consumption (kWh)

Thus, annual energy savings are the difference between the base case annual energy consumption and the retrofit case annual energy consumption, or:

If any of the variables discussed above cannot be obtained, deemed values will be used. Deemed values will be gathered from a review of available secondary sources.

A.6 RESIDENTIAL WATER HEATING AND LIGHT AND APPLIANCE PROGRAMS - CFL INSTALLATION

The energy savings of CFLs can be calculated by the following:

where:

$wattage_{base}$ = wattage of the pre-retrofit lamp

$wattage_{CFL}$ = wattage of the installed CFL

hours/day = hours of CFL operation per day

$WHCF_{energy}$ = Waste heat cooling factor for energy = 1.18[35] if residence is cooled, 1.00 if not

[35] Waste heat factor for energy to account for cooling savings from efficient lighting. The value is estimated at 1.18 (calculated as 1 + 0.45 / 2.5. Based on 0.45 ASHRAE Lighting waste heat cooling factor for Washington DC

Table 10-10 contains deemed values that can be used in case they cannot be obtained during telephone calls or on-site visits.

Table 10-10: CFL Parameters

Variable	Deemed Value	
$Wattage_{base}$	If CFL wattage is: 9 to 13 13 to 15 18 to 25 23 to 30 30 to 52	Base case wattage is[36]: 40 60 75 100 150
$Wattage_{CFL}$	If neither the base case nor retrofit case wattage is known, use 45.7[37] watts as the change in wattage	
Hours/day	3[38]	
$WHCF_{energy}$	1.17[39]	

A.7 LIGHTING AND APPLIANCE PROGRAM - REFRIGERATORS AND FREEZERS

If make and model number information can be obtained, the energy savings values will be calculated as the difference between the Energy Star listed annual energy use and the federal standard energy use[40].

If the model number cannot be ascertained, the savings values in the following table will be applied.

(http://lighting.bki.com/pubs/b6_tab1.htm) and assuming typical cooling system operating efficiency of 2.5 COP (accounting for distribution losses, inadequate airflow etc).

[36] Energy Star purchasing tips. http://www.energystar.gov/index.cfm?c=cfls.pr_tips_cfls. Accessed 4/22/2011.

[37] RLW Analytics, New England Residential Lighting Markdown Impact Evaluation, January 20, 2009.

[38] US Department of Energy, Energy Star Calculator. Accessed 4/22/2011.

[39] The value is estimated at 1.17 (calculated as 1 + (0.96*(0.45) / 2.5)). Based on 0.45 ASHRAE Lighting waste heat cooling factor for Washington DC (http://lighting.bki.com/pubs/b6_tab1.htm) and assuming typical cooling system operating efficiency of 2.5 COP (accounting for distribution losses, inadequate airflow etc). Assuming 96% of homes in South have cooling (from EIA).

[40] Refrigerators - http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=RF
Freezers - http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=FRZ

Table 10-11: Residential Refrigerator and Freezer Baseline

Type	Energy Savings[41]
Refrigerators	
Manual Defrost	72 kWh
Partial Automatic Defrost	72 kWh
Top Mount Freezer without door ice	80 kWh
Side Mount Freezer without door ice	95 kWh
Bottom Mount Freezer without door ice	87 kWh
Top Mount Freezer with door ice	94 kWh
Side Mount Freezer with door ice	100 kWh
Freezers	
Upright with manual defrost	55 kWh
Upright with automatic defrost	80 kWh
Chest Freezer	52 kWh
Compact Upright with manual defrost	62 kWh
Compact Upright with automatic defrost	83 kWh
Compact Chest Freezer	55 kWh

A.8 LIGHTING AND APPLIANCE PROGRAM - ROOM AIR CONDITIONERS

If make and model number information can be obtained, the energy savings values will be calculated using the Energy Star savings calculator for room air conditioners[42]. The closest major city listed in the calculator to the residence will be used as a reference for full load cooling hours.

[41] Values taken from Pennsylvania Public Utility Commission Technical Reference Manual. June 2011. Pg. 104. http://www.puc.state.pa.us/electric/Act129/TRM.aspx

[42] http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=AC

If the model number and/or capacity cannot be ascertained, the Evaluation Team will choose another participant in the sample for evaluation.

Appendix B ELIGIBLE COMMERCIAL RATES

The following table lists the commercial rates that are eligible to participate.

GS	General Service	SASB	Seasonal Agricultural Service (B)
PLS	Power & Light Small	IOP	Irrigation Off Peak
OGS	Optional General Service Comm.	APS	Agricultural Process Service
UC	Unmetered Communication	FS	Farm Service
TOU-EO	Time of Use Energy Only	SCH	School Service
PLM	Power & Light Medium	SLM	School Load Management
TOU-MB	Time of Use-Multiple Business	G	Governmental
TOU-GSD	Time of Use General Service Dem.	EOL	Energy for Outdoor Lighting
TOU-MAM	Time of Use Multiple Acct. Mgmt.	OLNG	Outdoor Lighting, Non-Gov't
PLL	Power & Light Large	RTPDA	Real Time Pricing Day Ahead Comm.
TOU-SSD	Time of Use - Special Service Dem.	RTPHA	Real Time Pricing Hour Ahead Comm.
MLM	Multiple Load Management	FPA	Fixed Pricing Alternative
TOU-HLF	Time of Use - High Load Factor	TOU-SC	Time of Use Supplier Choice
SASA	Seasonal Agricultural Service (A)		

Nexant, Inc.
1805 Old Alabama Rd
Suite no. 315
Roswell, GA 30076
T) 678 954 8156
F) 678 954 8157
www.nexant.com