

Home Performance Program Evaluation, Measurement, and Verification Report 2014

Prepared for FirstEnergy Ohio Companies:

*Ohio Edison Company
The Cleveland Electric Illuminating Company
The Toledo Edison Company*

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1. Executive Summary

During 2014, The Cleveland Electric Illuminating Company (CEI), Ohio Edison (OE), and The Toledo Edison Company (TE) (collectively Companies) implemented the demand side management (DSM) Home Performance Program for the Companies' residential customers in their respective service territories.

Under contract with the Companies, ADM Associates, Inc. (ADM) performed evaluation, measurement and verification (EM&V) activities for the Home Performance Program. The procedures used to perform the EM&V activities described in this report were informed by the approved State of Ohio Energy Efficiency Technical Reference Manual ("TRM")¹ and ADM's previous experience performing EM&V activities for the Companies DSM programs. In addition, the procedures chosen build on information collected during a project initiation meeting and succeeding discussions with Company staff.

This report describes the methodologies, procedures and data tracking systems utilized to conduct program evaluation activities, including data gathering, sampling and analysis methods. The major conclusions and recommendations for each Home Performance subprogram are summarized below.

1.1 Audits

1.1.1 Residential Energy Audit

The target market for the Residential Energy Audit (REA) is residential single-family homeowners. The program provides residential customers a comprehensive home energy audit with air infiltration testing through the use of a blower door diagnostic test for improving the thermal integrity of the building envelope. It also evaluates home appliance, lighting and HVAC system efficiencies. In the REA subprogram, customers paid the full price of the audit (not to exceed \$350), then submitted a rebate application form for up to \$250 once they had achieved a minimum of 350 kWh in energy savings. In PY2014, the rebates for additional recommended measures changed from a specific dollar amount per measure to a specific dollar amount dependent upon kWh saved: with the addition of a bonus rebate of either \$100 for saving over 2,000 kWh or \$150 for saving at least 3,000 kWh.

The Companies contracted with Honeywell to be the Conservation Service Partner or Provider (CSP) to administer the REA Program.

¹ Vermont Energy Investment Corporation (VEIC), *State of Ohio Energy Efficiency Technical Reference Manual*, Prepared for Public Utilities Commission of Ohio, Draft of August 6, 2010.

The energy audit includes:

- An evaluation of the home's heating and cooling system, insulation levels, windows, doors, appliances, and lighting;
- A blower door diagnostic test to detect air leaks in the home's building envelope; and
- An energy audit report that recommends specific energy-saving measures appropriate for the home. Customers who choose to implement the recommended measures are entitled to rebates available from the Companies.

Energy efficiency measures that can be direct installed at the time of the home energy audit include:

- ENERGY STAR Compact Fluorescent Lamps (CFLs)
- LED Nightlights
- Low Flow Showerheads
- Energy Smart Strips
- Faucet Aerators (kitchens and bathrooms)
- Pipe Wrap insulation
- Furnace Whistles

Additional home improvement measures that may be recommended at the time a residential energy audit is performed include the following items:

- Roof and Ceiling Insulation
- Wall Insulation
- ENERGY STAR qualified Windows
- Duct Sealing
- Air Sealing
- HVAC Early Replacement

During 2014, 573 of the Companies' customers participated in the REA subprogram. Participation by operating company is shown in Table 1-1:²

² Unique account numbers were used to determine the participant count.

Table 1-1: Residential Energy Audit Participation by Operating Company

Operating Company	Participating Households
CEI	225
OE	246
TE	102
All Companies	573

The overall subprogram level verified gross kWh energy savings and kW peak demand reductions for the REA program in 2014 are summarized in Table 1-2.

Table 1-2: Residential Energy Audit Energy Impacts

Operating Company	Ex Ante kWh	Ex Ante kW	Ex Post kWh	Ex Post kW
CEI	138,406	30	142,524	30
OE	174,178	34	170,436	38
TE	53,455	13	52,123	13
Total	366,038	77	365,083	80

Table 1-2 yield a realization rate for kWh savings of approximately 100%, as determined by the ratio of verified gross kWh savings to expected gross kWh savings. The realization rate for kW reductions was approximately 104%.

Taken together, the various types of CFLs directly installed through the program accounted for 71% of the total verified kWh savings, ENERGY STAR windows for 21%, and all other measures for the remaining 8%.

1.1.2 Online Audits

During 2014, the Companies continued to offer the Online Audit (OA) Program. An evaluation of the 2014 OA program was conducted that had three main components.

- *Impact Evaluation.* The energy savings of the 2014 OA program were examined for both online and telephone audits using regression analysis of monthly billing data for customers who participated in the program and for a control sample of non-participants.
- *Process Evaluation.* Surveys were used to determine the customers use of the different home energy audit methods and to identify the actual benefits that users realize from each method. Of particular interest was determining the actions customers take as a result of a home energy audit.

- *Persistence Analysis.* Billing data for customers who participated in the OA program in 2010, 2011, 2012, and 2013 were analyzed to determine the extent to which their savings persisted into 2014. Surveys were also used to examine the persistence of the 2010, 2011, 2012, and 2013 cohort and to identify the actions they had taken to save energy.

Participants in the 2014 OA program could receive a home energy audit either online or by telephone.

- For an online audit, a participant initiates the audit process and uses *Home Energy Analyzer* software to understand how she/he can become more efficient in using electricity in the home. Online users learned about the *Home Energy Analyzer* primarily through a utility company website and received a customized home energy report.
- Telephone participants generally are administered audit questions when they call a customer service center regarding a high bill. A telephone audit user is asked if they are interested in receiving a brochure on energy saving tips in the mail.

A total of 12,828 customers participated in the OA program in 2014 as shown in Table 1-3.

- Of these customers, 8,791 (69 percent) conducted online audits.
- There were 4,037 customers (31 percent of all participants) who participated in telephone audits.

Table 1-3 Participation Levels for 2014 OA Program by Utility and Type of Audit

EDC	All Online	All Telephone	Totals
CEI	3,161	1,342	4,503
OE	4,289	2,041	6,330
TE	1,341	654	1,995
Total Program	8,791	4,037	12,828

Note. Participation counts are for January 1 through December 31, 2014.

As shown in Table 1-4, verified ex post electric savings were 2,120,374 kWh for all home energy audits combined. Of the total kWh savings, 1,133,580 kWh (53.5 percent) were from online audits and 986,794 kWh (46.5 percent) were from telephone audits. Realization rates for electric savings were 39.15 percent for online audits, 79.9 percent for telephone audits, and 51.3 percent overall. Table 1-4 also shows that verified critical peak demand reduction was 410.3 kW. Of the total demand reduction, 275.5 kW (67 percent) was from online audits and 134.8 kW (33 percent) was from telephone audits.

Table 1-4: Summary of Annualized Energy and Demand Savings Impacts

Operating Company	Ex Ante Savings		Ex Post Savings	
	kWh	kW	kWh	kW
Savings by Utility Company				
CEI	1,440,266	291	1,191,273	257
OE	2,051,020	398	897,709	147
TE	638,987	131	31,392	6.5
Savings by Type of Audit				
Online Audits	2,857,964	541.7	1,133,580	275.5
Telephone Audits	1,272,309	279.3	986,764	134.8
Savings for All Audits				
All Audits	4,130,273	820	2,120,374	410.3

Table 1-5: Ex Post Program-Level Savings (kWh) and kW Reductions by Operating Company and Audit Method

CEI			
	Telephone	Online	All Audits
Total kWh Saved	473,726	717,547	1,191,273
Total kW Reduced	67.1	189.7	256.76
OE			
	Telephone	Online	All Audits
Total kWh Saved	481,676	416,033	897,709
Total kW Reduced	61.2	85.8	147
TE			
	Telephone	Online	All Audits
Total kWh Saved	31,392	-	31,392
Total kW Reduced	6.5	-	6.5
Totals for All Three Companies			
	Telephone	Online	All Audits
Total kWh Saved	986,794	1,133,580	2,120,374
Total kW Reduced	134.8	275.5	410.3

1.2 Energy Conservation Kits

The 2014 Efficiency Kits Subprogram was comprised of two efforts:

- Energy Conservation Kit Program
- Schools Education and Kit Program

Power Direct Energy implemented the Energy Conservation Kit Program with a target demographic of residential single-family homeowners. The Companies provided residential customers with an energy conservation kit containing energy saving products. The energy conservation kits were distributed through a direct mail distribution channel and consisted of the following components:

- ENERGY STAR Compact Fluorescent Lamps (CFLs)
- Smart Power Strips
- LED Night Lights
- Furnace Whistles
- Faucet Aerators (for customers with electric water heaters only)
- Low Flow Showerheads (for customers with electric water heaters only)

The School Education and Kit Program implemented by AM Conservation Group in collaboration with National Theatre Company (NTC) delivered "live performances" for students in kindergarten thru 5th grade to learn about energy conservation. Students were supplied with a permission slip to receive a schools energy conservation kit. Students that returned the permission slip were sent through the mail a Schools Kit that consisted of the following components:

- ENERGY STAR Compact Fluorescent Lamps (CFLs)
- Faucet Aerators
- LED Night Light

The total number of kits distributed by the Companies in 2014 by type and operating company is shown in Table 1-6.³

Table 1-6: Count of Kit Types Delivered by Operating Company

Kit Type	Operating Company			
	CEI	OE	TE	Total
Electric	4,259	5,466	2,964	12,689
Standard	30,645	29,266	17,824	77,735
Schools	1,701	8,476	2,632	12,809
Total	36,605	43,208	23,420	103,233

Ex post verified electric savings was 49,547,277 kWh annually (a realization rate of 96 percent). *Ex post* verified peak demand reduction was 5,512 kW. *Ex post* gross energy savings (kWh) and peak demand reduction (kW) for the subprogram in the three service territories are reported in Table 1-7.

³ Unique project numbers were used to tally the total number of kits distributed.

Table 1-7: Energy Conservation Kits Energy Impacts

Operating Company	Ex Ante kWh	Ex Ante kW	Ex Post kWh	Ex Post kW
CEI	19,691,682	2,007	18,532,445	2,062
OE	21,241,452	2,188	19,961,492	2,223
TE	10,441,251	1,090	11,053,340	1,227
Total	51,374,385	5,285	49,547,277	5,512

1.3 New Homes

The Companies sought to increase the energy efficiency of new homes in 2014 by providing incentives to home builders that construct their homes to be at least 15% better than the minimum building code standards (IECC 2009⁴) and receive ENERGY STAR® Version 3.0 certification. Eligibility was determined by certified Home Energy Rating System (HERS) Raters in accordance with RESNET standards. Participants received a rebate based on the calculated energy savings related to the home's construction as reported on the FirstEnergy Ohio Report in REM/Rate software or similar. Rebates for appliances, lighting and other plug loads were aggregated within the Residential New Homes program. The Companies contracted with Performance Systems Development (PSD) to provide supporting program components including builder recruiting, verification of building plans and documentation to qualify for the incentives, provision of on-site notification of receipt of award under the program, as well as for marketing and outreach services to the builder community.

A total of 921 homes in the service territories of the Companies received rebates through the Residential New Homes Program in 2014.

The number of incentivized homes by operating company is shown in Table 1-8.⁵

⁴ 2009 IECC and 2009 International Residential Code were incorporated into the Residential Code of Ohio effective January 1st, 2013.

⁵ Unique project numbers were used to tally the total number of participating homes.

Table 1-8: Participating Homes by Operating Company

Operating Company	Number of Participants
CEI	187
OE	675
TE	59
All Companies	921

The number of participating builders by operating company is shown in Table 1-9.

Table 1-9: Builder Participation by Utility

Operating Company	Number of Participants
CEI	8
OE	22
TE	2
All Companies	32

Ex post gross electric savings were estimated through detailed analysis of program tracking data and participant survey data. ADM verified program savings through REM/Rate by comparing the user-defined reference home as specified in the TRM to the as-built home model generated by the HERS rating company from plan sets and field data.

Ex post verified electric savings was 2,339,659 kWh annually (a realization rate of 104 percent). *Ex post* verified peak demand reduction was 591 kW. *Ex post* gross energy savings (kWh) and peak demand reduction (kW) for the subprogram in the three service territories are reported in Table 1-10.

Table 1-10: New Homes Energy Impacts

Operating Company	Ex Ante Expected Gross Savings		Ex Post Verified Gross Savings	
	kWh	kW	kWh	kW
CEI	495,726	169	527,277	160
OE	1,638,211	441	1,686,076	397
TE	123,294	38	126,307	34
All Companies	2,257,231	648	2,339,660	591

In addition to the impact evaluations, ADM also implemented a process evaluation to determine how effective the program is in terms of: customer satisfaction, builder and home buyer awareness, and stakeholder interactions. Key findings from the process evaluation of the 2014 Residential New Homes program include:

- Builders have a good understanding of the program requirements.
- Satisfaction with the program is high among builders and raters.
- Raters report the COMPASS software provided by PSD as being easy to use although improvements can be made.

Going into the fifth year, the program is building on the previous years' momentum. Program requirements are clear for builders and raters, and training has been on target. All of which has been successful in helping move the program forward.

1.4 Behavioral Modification

During 2014, the Companies contracted with Opower to administer a Behavior Modification (Behavioral) Program targeted at residential customers. An evaluation of the 2014 Behavioral program was conducted that had two main components:

- *Impact Evaluation.* The energy savings of the 2014 Behavioral program were examined using regression analysis of monthly billing data for customers who participated in the program and for a control sample of non-participants.
- *Process Evaluation.* Surveys were used to determine the usefulness of comparative energy usage reports and the actions customers took in response to the information provided.

Participants in the 2014 Behavioral program received monthly usage reports which contained information about their energy use, compared the household's energy use to that of a group of similar households (both average and most efficient neighbors), and educated them on low-cost measures, practices or behaviors to reduce their energy use. The reports were delivered via the United States Postal Service with the option of also receiving the report through e-mail.

A total of 21,543 customers participated in the Behavioral program in 2014. Table 1-11 below details participant counts by operating company.⁶

Table 1-11: Participation Levels for 2014 Behavioral Program by Utility

Utility Company	Participants
CEI	7,352
OE	10,311
TE	3,880
Total	21,543

As shown in Table 1-12, verified annualized ex post electric savings were 5,798,800 kWh.

The realization rate for kWh savings was 75.44 percent. The realization rate equals the ratio of ex post 2014 continued annual savings from ADM to ex ante 2014 continued annual electricity savings from Opower for the 2014 Behavioral program. Table 1-12 also shows that verified critical peak demand reduction was 662 kW.

Table 1-12: Summary of Annualized Energy and Demand Savings for 2014 Customers Impacts

	Ex Ante Savings						Ex Post Savings ⁷	
	kWh			kW			kWh	kW
Savings by Utility Company								
	2014 Participants (Received Report in 2014)	2014 Persistence (Received report in 2013)	Sum of Participants+ Persistence	2014 Participants	2014 Persistence	Sum of Participants+ Persistence	2014 Participants	2014 Participants
CEI	2,908,322	2,,632,356	5,540,678	472	541	1,013	2,057,955	235
OE	3,708,593	5,562,962	9,271,555	403	815	1,218	2,853,723	326
TE	1,069,417	653,916	1,732,332	218	162	380	887,122	101
Total	7,686,331	8,849,234	16,535,565	1,093	1518	2,611	5,798,800	662

⁶ Participation counts determined from data supplied by the implementation contractor.

⁷ Ex Post savings are based on 2014 participant savings only, thus yielding a realization rate for kWh and kW of 75% and 61% respectively.

2. Introduction and Purpose of Study

The purpose of this report is to present the results of the impact evaluation effort undertaken by ADM to verify the energy savings and peak demand reductions that resulted from the implementation of the Home Performance Program during the 2014 program year. Additionally, this report presents the results of the process evaluation of the program focusing on participant and program staff perspectives regarding the program's implementation.

The research questions derived from the Program objectives listed in the Companies' filings documents that ADM addressed for each of the Home Performance subprograms are presented in this chapter.

2.1 Audits

2.1.1 Residential Energy Audit

The research questions for the REA subprogram are presented below:

- What is the number of customers registering for a home energy audit in 2014? What is the number of home energy audits that are completed in 2014?
- What is the number and types of retrofit jobs that have been recommended by the residential energy auditors? What is the number and types of retrofit jobs that have been completed?
- What is the number of contractors participating in the Program in 2014? What is the rate of jobs completed by each contractor?
- How do customers proceed in completing recommended retrofit jobs? What choices do they make in financing retrofit jobs?
- What is the number of customers that access rebates through the Program in completing retrofit jobs? What is the number of customers that access rebates and services through other utility programs in completing retrofit jobs?
- What are the estimated costs of completed retrofit projects?
- To what extent have contractors increased their capacity to deliver energy efficiency services in Ohio?
- To what extent are customers satisfied with the Program?
- What are the energy savings and peak demand reduction impacts for the measures installed as a result of the energy audits and rebated retrofit jobs completed in response to audit recommendations?

2.1.2 Online Audit

The evaluation of the 2014 OA program had three main components.

- **Impact Evaluation.** The energy savings of the 2014 OA program were examined for both online and telephone audits using regression analysis of monthly billing data for customers who participated in the program and for a control sample of non-participants.
- **Process Evaluation.** Surveys were used to determine the customers use of the different home energy audit methods and to identify the actual benefits that users realize from each method. Of particular interest was determining the actions customers take as a result of a home energy audit.
- **Persistence Analysis.** Billing data for customers who participated in the OA program in 2010, 2011, 2012 and 2013 were analyzed to determine the extent to which their savings persisted through 2014. Surveys were also used to examine the persistence of the actions taken to save energy by 2010, 2011, 2012 and 2013 OA participants.

The impact evaluation addressed the following research questions.

- To what extent has the 2014 Online Audit program resulted in electric energy savings for participating customers (compared to similar non-participating customers) for the Companies, as measured by annualized reductions in kilowatt hours (kWh) per customer?
- How do the two energy audit methods – online vs. telephone – compare in producing electric energy savings for customers?
- How effective is the program for online audit users compared to telephone audit users?
- To what extent have energy savings persisted from previous program cohorts?

The goal of the process evaluation component was to determine (a) the differences in information that customers receive from the two types of audit methods (b) the differences in information that customers receive from the different levels of an online audit, (c) the actions taken by customers as a result of the different types and levels of a home energy audit, and (d) the extent to which these actions persisted from 2010, 2011, 2012 and 2013 through 2014. The process evaluation was therefore framed by the following research questions.

- How did customers learn of the availability of the home energy audit?

- How is the information provided in a telephone audit different from the information provided in an online audit?
- What actions did telephone audit users take to save energy and how did these actions differ from the energy saving actions of online audit users?

The purpose of the persistence analysis was to analyze customer billing data to determine the extent to which savings achieved by participants in the OA program during 2010, 2011, 2012 and 2013 persisted through 2014. Surveys were also used to collect information with which to examine the persistence of the actions taken to save energy by 2010, 2011, 2012 and 2013 OA participants (i.e., to determine the extent to which customers who initiated energy saving actions in 2010, 2011, 2012 and 2013 continued with those practices through 2014).

2.2 Energy Conservation Kits

The research questions for the Efficiency Kits subprogram are presented below:

- How many customers requested kits?
- What are the total number of measures installed by customers and the location of installed lighting measures?
- How much energy savings can be attributed to the Program?
- How much peak demand reduction can be attributed to the Program?
- How satisfied were customers with each measure and the program as a whole?

2.3 New Homes

The impact evaluation component in 2014 estimated gross energy savings (kWh) and peak demand reduction (kW) was framed by the following research questions:

- How many builders participated in the program and how many homes were constructed per plan type per builder?
- What was the correct baseline energy code for each permitted home?
- Do the sample homes modeled in the energy modeling software reflect the as-built homes in the field? Do they reflect the architectural details shown on the city approved plan set?
- What were the savings generated per model home for each sample home?

The goal of the process evaluation component was to determine how effective the program is in terms of customer satisfaction, builder and home buyer awareness, and

stakeholder interaction. The process evaluation was framed, therefore, by the following research questions:

- What were the most common measures installed to meet program eligibility guidelines?
- How effective were the marketing efforts for the program? Which marketing methods were most effective?
- How well did Company staff and the implementation team work together?

Additional research questions that were answered during the course of the evaluation year are:

- Which installed measure have the greatest homebuyer perceived value and the least homebuyer perceived value?
- What did builders feel are the greatest challenges or obstacles to program participation?
- Which individual measure types were generating the greatest kWh and kW savings?

2.4 Behavioral

The impact evaluation component in 2014 estimated energy savings (kWh) and peak demand reduction (kW) as framed by the following research questions.

- To what extent has the 2014 Behavioral Modification program resulted in electric energy savings for participating customers (compared to similar non-participating customers) in each of the three Ohio utilities, as measured by annualized reductions in kilowatt hours (kWh) per customer?
- What kinds of energy efficiency changes (behavioral or structural) made by customers are responsible for producing the observed energy savings?
- What percentage of home energy efficiency changes made by Home Energy Report recipients are behavioral versus structural?

The goal of the process evaluation component was to determine participant satisfaction and program efficacy. The process evaluation was framed, therefore, by the following research questions.

- Did customers remember receiving the Home Energy Reports (HER), and if so, had they done anything to save electricity in the home in response to the information in the report?
- If customer did not do anything in response to the HER, why not?

- How satisfied are customers with the Behavioral Modification program?

3. Program Description

This chapter presents a description of each of the four subprograms that comprise the Home Performance Program.

3.1 Audits

3.1.1 Residential Energy Audit

The REA sub program, which was administered by Honeywell, had three main elements during 2014:

- Residential customers paid the full price of the audit (not to exceed \$350), then submitted a rebate application form for up to \$250 once they had achieved a minimum of 350 kWh in energy savings.
- At the time of the energy audit, several direct install measures were available at no additional charge to the customer.
- Energy auditors would also recommended additional, rebate eligible, improvements that could be installed by a participating home improvement contractor.

The energy audits were performed by contractors certified through the Building Performance Institute (BPI). The audit service included the following:

- Evaluation of the home's heating and cooling system, insulation, windows, doors, appliances, and lighting;
- Diagnostic testing with a blower door to detect air leaks in the home's building envelope; and
- Providing an energy audit report that recommends energy-saving projects and measures appropriate to the home.

As part of an audit, the auditor could install, for no additional charge, several types of measures. These direct install measures included:

- ENERGY STAR® Compact Fluorescent Lamps (CFLs).
- Water reduction measures (low flow showerheads, faucet aerators)
- Pipe wrap insulation
- LED night lights
- Furnace whistle
- Smart strip

In addition, energy auditors might also recommended other measures to improve energy efficiency that could be installed by a participating home improvement contractor. The

Companies offered rebates for having the following types of measures installed by a contractor:

- Attic Insulation
- Wall Insulation
- Duct Sealing
- ENERGY STAR Qualified Window

3.1.2 Online Audits

The Online Audit Program, first implemented in Ohio in December 2009, allows residential customers who reside in single family or multi-family housing to analyze their home energy use and billing history. Customers of the Companies can take a home energy audit at any time during the year, either by accessing an online software application (i.e., the *Home Energy Analyzer*) through the Companies' website or by conducting a home energy audit by telephone with assistance from a Contact Center Customer Service Representative.

Online Audits

In an online audit, a customer uses the *Home Energy Analyzer* online software to develop a personalized assessment of her/his home energy use, to see how their energy use compares to that of similar homes, and to identify ways to improve the efficiency of their energy use. A user controls the depth of the investigation into home energy use and the exploration into ways to save energy. The *Home Energy Analyzer* software provides for three levels of energy usage analysis, depending on how deeply a customer chooses to go. Using the Online Audit, a customer can create a report that lists the major sources of energy usage in their home, learn how home weatherization can save money every month, and identify energy efficient appliances.

Telephone Audits

A telephone home energy audit is typically initiated when a customer telephones the Companies' Customer Service Center with questions about an electricity bill. A Customer Service Representative (CSR) explains the bill to the customer in terms of the key factors that contribute to the customer's energy use. The customer is offered a home energy audit that includes a review of the customer's billing history. For the telephone audit, a CSR walks a customer through the audit application, inputting the customer's data for them.

Once a telephone audit participant's data has been entered, the CSR provides the conservation and savings findings over the telephone. During the telephone conversation, the customer service representative will suggest ways in which the customer can save

energy, given identification of the main energy uses in the home. The customer service representative will estimate what the customer's bill should be in light of the billing history review and the home/appliance profile and offer a judgment as to whether the customer's electric bill is reasonable or not.

A telephone audit typically concludes with a customer service representative offering to send the customer literature on how to save energy in the home. Materials offered to telephone audit participants by mail include the following:

- A 2-page document titled "*Understanding Electricity Usage and Costs*" that shows the customer a formula for costing out kWh values and a chart of appliances with columns for Watts, average hours of use, average kWh used per month and average cost for that appliance;
- A 21-page document titled "*More than 100 ways to improve your electric bill*"; and
- A computer link to the *Home Energy Analyzer*.

Although a telephone audit resembles an online audit in that the customer gets a review of usage history and feedback on basic ways to save energy, the customer does not get a written, customized home energy analysis report. Rather, customers receiving a telephone audit are offered a brochure on tips for saving energy in the home.

3.2 Energy Conservation Kits

The Energy Conservation Kit Program provides the Companies' customers with energy efficiency measures and educational materials to encourage residential energy usage reduction. The target market for the Program is residential single-family homeowners.

Kits are provided to customers upon request, and the contents of kits vary slightly depending on the customers' water heating fuel source. Participants receive measure descriptions and installation guidelines with their kits, and are able to choose which measures to install. The conservation kits also contain educational materials regarding residential energy saving behaviors, which encourage kit recipients to further reduce their electricity usage. Additionally, the kits include promotional materials for other of the Companies' energy efficiency incentive opportunities such as appliance recycling rebates and ENERGY STAR® appliance rebates. This practice takes advantage of the unique kit distribution marketing channel, and encourages cross-participation in multiple of the Companies' programs.

The Energy Conservation program requires customers to request kits via the electronic application on the Ohio Energy Kit website or by calling a toll-free telephone number. The

Companies verify that the prospective participant is a customer of one of the participating EDCs, and that they have not already received a kit during the program year. Kits are typically shipped to customers within a few weeks of the request date. The conservation kits include a help line telephone number that allows participants to report measure defects or ask questions regarding the program and specific measures.

The School Education and Kit Program provide an opportunity for parents or guardians of students in grades kindergarten thru 5th grade to request an Energy Conservation Kit after the school has participated in the program. The program includes a 25-minute performance on energy conservation and corresponding curriculum for the classroom. Parents are able to request a kit through an electronic application on the Student Energy Kit website or request a kit through permission slip with their teacher. Kits are shipped to the student's homes within a few weeks of the request.

3.3 New Homes

In 2014, The Residential New Home Program encourages the building of energy efficient homes for increased comfort, enhanced energy performance and savings, and increased marketability of the home. Homes must meet third-party verification standards for energy efficiency to qualify for incentives. A full remodel of an existing home (gutting the home down to the studs) also qualifies under this program.

The Companies offer rebates for builders of new, energy efficient homes. Each newly built home is eligible for a rebate of \$400, plus an additional \$0.10/kWh saved over the reference home, as calculated by the modeling software, REM/Rate. The ENERGY STAR® rating or equivalent Home Energy Rating System Program (HERS) score is used to determine eligibility. Participants can receive a rebate based on the calculated energy savings related to the home's construction as reported on the "fuel summary report" or similar modeling software output. Qualifying homes will be built to ENERGY STAR® Version 3.0 requirements, be at least 15 percent more efficient than the 2009 IECC, and be located within the service areas of one of the Companies.

Builders will typically bring a rater in during the design phase of the building. It is here where the rater would suggest modifications to become ENERGY STAR Version 3.0 compliant. Some raters will present more than one proposal for builders to choose from, outlining different upgrades and the potential savings they would achieve. This is effective for an incentive-based program because builders can essentially choose their investment and corresponding incentive amount. All of the raters we spoke with said they actively promote the program to builders.

Once a building has been completed, a certified HERS rater will conduct a blower-door test and other visual checks to determine whether or not it meets the requirements of the program. If so, the rater submits the results in PSD's COMPASS software and uploads the REM/Rate results.

After submission by raters, the PSD QA manager reviews 100 percent of the entries using pre-programmed mathematical checks in the system to catch any simple data entry errors, such as a wall not being documented. Once approved by the QA manager, arrangements are made for an on-site QA check. Ten percent of all submissions will require an on-site QA—8 percent will receive a full comprehensive review with a blower-door test and other mechanisms, and 2 percent consist of only a visual review, ensuring the correct number of bulbs is installed, the right equipment models are reported, etc. Similar to last year, there were no issues reported by builders or raters regarding the onsite QA process.

If the calculated savings between the raters' reports and the QA's results are within a 15 percent difference, the rating is accepted and a check is issued to the builder. If the savings difference is greater than 15 percent or PSD's QA review results in a failed rating, PSD will go back to the rater and either have them correct the rating or give them the opportunity to work with the builder to become compliant.

In addition to paying cash incentives, this program also represents a market transformation program, aimed at reducing multiple barriers to this higher level of construction standards. Builders can attend training sessions which highlight the improved energy performance of the homes, promote the program, and communicate the associated benefits of buying a program-qualified home. The following are examples of the types of training opportunities that are provided:

- Sales staff training sessions on how to use the program and energy efficiency as a strong selling point
- Technical training sessions on building to program specifications and energy-efficient construction practices

Program participation is contingent upon an internal eligibility review and verification process conducted by PSD. This process provides a first layer of assurance to the Companies and the participating builders that the homes will meet program specifications and be at least 15% more efficient than required by code (IECC 2009). The first level of quality control is implemented through HERS (Home Energy Rating System) Raters who implement the RESNET (Residential Energy Services Network) testing processes and procedures or the equivalent. All participating builders must meet the quality control requirements of the approved HERS Providers including the use of certified HERS Raters to perform inspections of the home during construction and just prior to occupancy. The

second level of quality control involves plan reviews for each plan type and for all participants. The plan review is conducted by PSD. All participating homebuilders are assigned an Account Manager to help them maximize their benefits from participation and leverage available incentives and opportunities for market differentiation.

3.4 Behavioral Modification

The Companies contracted with Opower to administer a behavioral based program targeted at residential customers. The Behavioral program is designed to generate greater awareness of energy use and of how to manage energy use through energy efficiency education in the form of Home Energy Reports (HERs). The program provided customers with information about their energy use, compared the household's energy use to that of a group of similar households (both average and most efficient neighbors), and educated them on low-cost measures, practices or behaviors to reduce their energy use. It was expected that through this education, customers implemented measures or adopted practices that lead to more efficiency energy use in their homes.

Customers received reports about energy use by U.S. mail or email on a monthly basis.

4. Methodology

This chapter provides a description of the methodology applied by ADM in the evaluation of the 2014 Home Performance Program. In this chapter, each section is divided into subsections: impact evaluation methodology and process evaluation methodology.

4.1 Audits

4.1.1 Residential Energy Audit Impact Evaluation Methodology

ADM used an evaluation audit strategy in performing an impact evaluation of the program. The audit strategy involved four major activities:

- Ex ante review
- Customer and contractor surveys
- On-site verification visits
- Performing impact analysis calculations using the TRM algorithms

Using the audit strategy, ADM estimated energy savings and demand reduction for each program measure using the TRM algorithms with data obtained from the program's tracking database and augmented as necessary from site visits, surveys, and contractor job invoices. The evaluation audit strategy is discussed in more detail in the following sections.

Ex Ante Review

During June 2014, ADM reviewed all of Honeywell's savings and demand reduction calculations for the program. This review was followed by ongoing dialogue to clarify the program's rebate policies and savings calculations. As a result of this dialogue, the Companies and Honeywell modified some of the program's rebate policies and savings calculations to be more consistent with the TRM and the Joint Utility Comments documents, where applicable.

The Ex Ante review also helped ADM reach an understanding of the additional data needed to verify claims for program energy savings and demand reduction. Honeywell provided all necessary data points in order to calculate savings per the algorithms in the TRM in a supplemental data set. The list below outlines the necessary data ADM needed provided by Honeywell prior to the delivery of the final data set.

Insulation Improvement

- Baseline R-value of the pre-existing ceiling and/or wall insulation
- New R-value after ceiling or wall insulation has been added
- Square footage of insulated area
- SEER of Air Conditioning equipment
- COP of Heat Pump

Window Retrofits

- Average U factor value of the windows installed (manually verified by Honeywell)
- Number of ENERGY STAR windows installed
- Square footage of the windows installed

Water Measures

- GPM ratings of installed aerators and showerheads
- R-Value of pipe wrap installed
- Verification of water heater as electric or gas

After the close of the program year, the Companies provided the tracking system data for the program and Honeywell provided the additional technical information required to verify savings. ADM reviewed these data sets and performed data cleaning. The data cleaning steps were as follows:

- Verification of rebate status as completed
- Verification of measure rebate requirements (e.g. ENERGY STAR qualified windows) for completed rebate applications
- Identification of duplicate data entries
- Identification of cases with incomplete data (e.g. no model number provided)

The per unit ex ante estimates of kWh savings and kW reduction for Home Energy Audit are shown in Table 4-1.

Table 4-1: Ex Ante Estimates of per Unit Annual kWh Savings and kW Reduction for Home Energy Audit

Measure	kWh	kW
12/22/33 Watt 3-way CFL	64	0.008
13 Watt CFL (60 watt)	38	0.005
14W Globe CFL	45	0.005
20 Watt CFL (75 watt)	59	0.007
25 Watt CFL (100 watt)	67	0.008
7W Candelabra CFL	23	0.003
9W Candelabra CFL	29	0.005
LED Nightlight	26	0.000
Smart Power Strips	60	0.006
Kitchen Aerator	31	0.004
Bath Aerator	53	0.007
Low Flow Showerhead	194	0.025
Pipe Insulation	22	0.003
Furnace Whistle	149	0.000
Attic Insulation*	127	0.059
Wall Insulation*	103	0.053
ENERGY STAR Windows*	233	0.103
*Due to the many variables involved in the savings calculations, the values presented are the average savings per site.		

Customer Surveys, Contractor Surveys, and Site Visits

The data collection process consisted of interviews with customers, site visits at the homes of a subset of these customers and interviews with contractors. The sampling plan for site visits by operating company is shown in Table 4-2 through Table 4-4.

Table 4-2: Sampling Plan for CEI

<i>Strata</i>	<i>Count of kWh (annual)</i>	<i>Minimum kWh</i>	<i>Average kWh (annual)</i>	<i>Maximum kWh</i>	<i>Sum of Ex Ante kWh</i>	<i>Standard Deviation, Annual kWh</i>	<i>CV</i>	<i>Uncertainty</i>	<i>Sample</i>
CEI1	28	4	57	95	1,593	30	0.531	829.88	2
CEI2	132	105	191	297	25,173	50	0.260	6,619.47	2
CEI3	64	304	551	946	35,269	175	0.317	9,070.95	3
CEI4	26	1,037	1,472	1,866	38,267	213	0.144	5,409.32	2
CEI5	15	2,051	2,540	3,153	38,105	330	0.130	4,685.91	2
Total									11
Precision at 90% confidence interval:									9.64

Table 4-3: Sampling Plan for OE

Strata	Count of kWh (annual)	Minimum kWh	Average kWh (annual)	Maximum kWh	Sum of Ex Ante kWh	Standard Deviation, Annual kWh	CV	Uncertainty	Sample
OE1	62	3	56	99	3,475	28	0.501	1,742.79	2
OE2	101	101	186	299	18,827	54	0.288	4,432.92	3
OE3	93	306	510	772	47,387	130	0.256	9,909.86	3
OE4	42	800	1,238	2,288	51,986	440	0.356	9,191.59	7
OE5	13	2,526	4,039	5,523	52,503	1,076	0.266	8,378.54	4
Total									19
Precision at 90% confidence interval:									9.53

Table 4-4: Sampling Plan for TE

Strata	Count of kWh (annual)	Minimum kWh	Average kWh (annual)	Maximum kWh	Sum of Ex Ante kWh	Standard Deviation, Annual kWh	CV	Uncertainty	Sample
TE1	25	2	44	94	1,099	30	0.694	744.65	2
TE2	52	102	177	288	9,212	48	0.272	2,502.60	2
TE3	38	302	479	1,093	18,218	189	0.395	3,538.54	7
TE4	8	1,278	1,880	2,220	15,037	380	0.202	1,998.17	3
TE5	3	2,631	3,296	4,589	9,889	1,120	0.340	1,974.57	2
Total									16
Precision at 90% confidence interval:									9.76

Customer Surveys

A customer survey was conducted to verify CFL in-service rates (ISR) for the various CFL measures installed and to estimate annual CFL hours of operation.⁸ Any other measures on record as installed by the program were also verified with customers. A random sample of customers were administered the phone survey.

On-Site Verification Visits

On-site verification visits were conducted to verify installation of measures. Data was collected to verify the values needed as inputs for computing energy and demand

⁸ Survey instrument found in Appendix B

savings using the relevant Ohio TRM algorithms. ADM field staff conducted on-site visits expressly to collect relevant data for the following measures:

Wall and Attic Insulation

- SEER rating of the central air conditioner
- Capacity of the central air conditioner in BTUH
- COP of the heat pump
- Baseline R-Value of the insulation (interview contractor or home owner)
- Upgraded R-Value of the insulation installed
- Square footage of the area insulated

ENERGY STAR Windows

- $U \leq 0.30$ (verification of triple pane windows installed)
- Number of ENERGY STAR windows installed
- Square footage of the windows installed

Water Measures

- ISR verification of faucet aerators and low-flow showerheads
- Verification of GPM ratings of installed aerators and showerheads
- R-Value of pipe wrap installed
- Visual verification of pipe wrap installed and conformation of approximate footage.
- Verification of water heater as electric or gas
- Water heater size and type. (e.g. instant, conventional)

For the remainder of the measures, ADM verified that the measures were installed correctly and functioning.

Impact Analysis Methods

Senate Bill 310 (SB 310), passed in 2014, states that the following is countable toward compliance requirements:

Energy efficiency savings and peak demand reduction achieved on and after the effective date of S.B. 310 of the 130th general assembly shall be measured on the higher of an as found or deemed basis, except that, solely at the option of the electric distribution utility, such savings and reduction achieved since 2006 may also be measured using this method.

The incremental savings resulting from using the existing equipment as the baseline were calculated for the 2014 program year. The existing equipment baselines were taken from the Ohio TRM. Some measure baselines have been adjusted as applicable based on the savings provisions of Ohio Senate Bill 310 and are reflected in the sections below.

For each Home Energy Audit measure installed in 2014, total energy (kWh) savings and total peak demand (kW) reduction for that measure were determined as a function of the number of measures verified as being installed and the energy savings determined per measure. The algorithms utilized by ADM to determine total energy savings and total peak demand reduction are reviewed in this section for the following measures:

- CFLs categorized by type and wattage
- Kitchen and bathroom faucet aerators
- Low flow showerheads
- Pipe wrap
- Attic and wall insulation
- Duct sealing
- ENERGY STAR qualified windows

The calculations for the following measures are reviewed in an upcoming section of this plan:

- Furnace Whistles
- LED Nightlights

The data elements needed to verify per-unit savings for the program's energy audit measures, as described below, were either obtained from Honeywell's tracking and reporting database, obtained by ADM through onsite visits to a sample of customer homes, estimated from surveys with samples of customers, or from job invoices obtained from a sample of the contractors as discussed in the last section.

Compact Fluorescent Lamps (CFL)

Energy and demand savings for CFLs were calculated using the TRM algorithms for residential direct installation of ENERGY STAR CFLs using an early replacement scenario.⁹

Equation 1: CFLs Calculation of Annual Energy Savings

$$\text{kWh Savings} = (\Delta\text{Watt}/1,000) * \text{ISR} * \text{Hours} * \text{WHFe}$$

Where:

$$\Delta\text{Watts for CFLs} = \text{CFL watts} * \text{delta watts multiplier};$$

⁹ 2010 Ohio Technical Reference Manual, August 6, 2010. Vermont Energy Investment Corporation, pp. 17-21.

CFL watts = wattage of installed CFL, as verified

Delta watts multiplier = factor to account for baseline

Conditions = 3.25 (from TRM)

ISR = In Service Rate = .81 (From TRM)

Hours = Average hours of use per year = 1040 (From TRM)

WHFe= Waste Heat Factor for energy = 1.07 (From TRM) ¹⁰

Equation 2: CFL Calculation of Summer Coincident Peak Demand Savings

$$\Delta kW = ((\Delta Watts)/1000)*ISR*WHFd*CF$$

The delta watts multiplier utilized for calculating energy savings is the same as that used for calculating demand savings.

Where:

WHFd = Waste Heat Factor for Demand¹¹

= 1.21

CF = Summer Peak Coincidence Factor

= 0.11

Smart Power Strips

Energy and demand savings for are deemed based on the plug size (5-plug or 7-plug) of the smart strip. Table 4-5 shows the deemed savings values specified in the TRM (p. 76).

Table 4-5: Deemed Savings Values for Smart Strips

<i>Plug Size</i>	<i>Annual kWh Savings per Unit</i>	<i>Peak Demand kW Reduction per Unit</i>
5-Plug	56.5	0.0063
7-Plug	102.8	0.012

¹⁰ Parameter to account for effects on heating/cooling from efficient lighting

¹¹ Parameter to account for cooling savings from efficient lighting

Low Flow Showerheads

Energy and demand savings for low flow showerheads were calculated using the TRM algorithms for residential low flow showerheads in which the Program intends for auditors to implement a direct installation/early replacement¹² policy. Only savings pertaining to electric hot water heating were calculated.

Equation 3: Low Flow Showerheads Calculation of Annual Energy Savings

$$\Delta \text{kWh} = \text{ISR} * (\text{GPM}_{\text{base}} - \text{GPM}_{\text{low}}) * \text{kWh/GPM}_{\text{reduced}}$$

Where:

ISR = verified In Service Rate as verified by ADM onsite visits and surveys.¹³

GPM_{base} = Gallons per minute of baseline showerhead
= 2.87 (From TRM)¹⁴

GPM_{low} = Gallons per minute of low flow showerhead¹⁵

kWh/GPM_{reduced} = Assumed kWh savings per GPM reduction¹⁶
= 173

Equation 4: Low Flow Showerheads Calculation of Summer Coincident Peak Demand Savings

$$\Delta \text{kW} = \Delta \text{kWh/Hours} * \text{CF}$$

Where:

Hours = 29

CF = Summer Peak Coincidence Factor
= 0.00371

¹² 2010 Ohio Technical Reference Manual, August 6, 2010. Vermont Energy Investment Corporation, pp. 93-96.

¹³ Assumed value is 1.0, based on direct install Program policy.

Ohio TRM for a baseline standard showerhead; see footnote 236 on p. 93 of the Ohio TRM.

¹⁵ This rate was captured by ADM through install verification visits and participant surveys.

¹⁶ Ohio TRM with VEIC replies to Joint utility comments

Faucet Aerators

Energy and demand savings for faucet aerators were calculated using the TRM algorithms for residential low flow faucet aerators in which the program intends for auditors to directly install.¹⁷ Only savings pertaining to electric hot water heating were calculated. The auditor may install aerators for either kitchen or bathroom faucets, or both.

Equation 5: Faucet Aerators Calculation of Annual Energy Savings

$$\Delta \text{kWh} = \text{ISR} * (((\text{GPM}_{\text{base}} - \text{GPM}_{\text{low}}) / \text{GPM}_{\text{base}}) * \# \text{ people} * \text{gals/day} * \text{days/year} * \text{DR}) / \text{F/home}) * 8.3 * (\text{T}_{\text{ft}} - \text{T}_{\text{mains}}) / 1,000,000 / \text{DHW Recovery Efficiency} / 0.003412$$

Where:

ISR = verified In Service Rate as verified by ADM onsite visits and surveys.¹⁸

GPM_{base} = Gallons per minute of baseline faucet
= 2.2¹⁹

GPM_{low} = Gallons per minute²⁰ of low flow faucet²¹

people = Average number of people per household
= 2.46²²

Gals/day = Average gallons per person per day used by all faucets in the home = 10.9²³

Days/year = 365

DR = Percentage of water flowing down the drain
= 63%²⁴

F/home = Average number of faucets in the home

¹⁷ 2010 Ohio Technical Reference Manual, August 6, 2010. Vermont Energy Investment Corporation, pp. 89-92.

¹⁸ Assumed value is 1.0, based on direct install Program policy.

¹⁹ Ohio TRM; see footnote 227 on p.90 of the Ohio TRM.

²⁰ This rate was captured by ADM through install verification visits and participant surveys.

²¹ Assumed value is 1.5 for kitchen faucets and 1.0 for bathroom faucets, based on Program installation policy.

²² Ohio TRM; see footnote 228 on p.90 of the Ohio TRM.

²³ Ohio TRM; see footnote 229 on p.90 of the Ohio TRM.

²⁴ If water is collected in a sink, a faucet aerator will not result in any saved water.

$= 3.5^{25}$
 8.3 = Constant to convert gallons to pounds
 Tft = Assumed temperature of the water used by faucet
 $= 80^{26}$
 Tmains = Assumed temperature of water entering house
 $= 57.8^{27}$
 DHW Recovery Efficiency = Recovery efficiency of electric hot water heater
 $= 0.98$
 0.003412 = Constant to convert MMBtu to kWh

Equation 6: Faucet Aerators Calculation of Summer Coincident Peak Demand Savings

$$\Delta kW = \Delta kWh / \text{Hours} * CF$$

Where:

Hours = 21
 CF = Summer Peak Coincidence Factor
 $= 0.00262$

Pipe Wrap

Energy and demand savings for adding insulation to un-insulated domestic hot water pipes were calculated using the TRM algorithms for domestic hot water pipe insulation in which the program intends for auditors to directly install.²⁸ Only savings pertaining to electric hot water heating were calculated. Care was taken to insure that savings are not over reported due to interactive effects.

Equation 7: Pipe Wrap Calculation of Annual Energy Savings

$$\Delta kWh = (1/R_{exist} - 1/R_{new}) * (L * C) * \Delta T * 8,760 / \eta_{DHW} / 3413$$

²⁵ Ohio TRM; see footnote 231 on p.90 of the Ohio TRM.

²⁶ Ohio TRM; see footnote 232 on p.90 of the Ohio TRM.

²⁷ Ohio TRM; see footnote 233 on p.90 of the Ohio TRM.

²⁸ 2010 Ohio Technical Reference Manual, August 6, 2010. Vermont Energy Investment Corporation, pp. 97-99.

Where:

R _{exist}	= R-value of un-insulated pipe = 1.0 ²⁹
R _{new}	= R-value of hot water pipe after being wrapped with insulation.
L	= Length of pipe wrapped by insulation from water heater up to the first elbow
C	= Circumference of pipe wrapped by insulation in feet
ΔT	= 65° F ³⁰
8,760	= Number of hours in a year.
η _{DHW}	= Recovery efficiency of electric hot water heater = 0.98 ³¹
3,413	= Conversion from Btu to kWh.

Equation 8: Pipe Wrap Calculation of Summer Coincident Peak Demand Savings

$$\Delta kW = \Delta kWh / 8760$$

Where:

ΔkWh	= Savings from pipe wrap installation
8760	= Number of hours in a year

Insulation

Energy and demand savings for improving the insulation of attics, ceilings, and walls were calculated using a single set of algorithms in the TRM that apply equally to retrofitting the insulation in attics, roofs, ceilings, and walls.³² Savings were calculated for both cooling and heating if an electric heat pump is used by the customer. The program accomplishes domestic insulation retrofits through participating home improvement contractors hired by customers who decide to implement recommendations made by the home energy auditors.

²⁹ See Ohio TRM, p. 97, footnote 250.

³⁰ Average temperature difference between supplied water and outside air temperature = (see Ohio TRM, p. 97, footnote 251).

³¹ See Ohio TRM, p.97, footnote 252.

³² 2010 Ohio Technical Reference Manual, August 6, 2010. Vermont Energy Investment Corporation, pp. 36-39 and pp. 100-103.

Equation 9: Insulation Calculation of Annual Energy Savings

$$\Delta kWh = ((1/R_{exist} - 1/R_{new}) * CDH * DUA * Area / 1000 / \eta_{Cool}$$

Where:

R _{exist}	= R-value of baseline insulation
R _{new}	= R-value of improved insulation
CDH	= Cooling Degree Hours
DUA	= Discretionary Use Adjustment ³³
Area	= Square footage of insulated area
η_{Cool}	= SEER of air conditioning equipment

Equation 10: Insulation Calculation of Summer Coincident Peak Demand Savings

$$\Delta kW = \Delta kWh / FLH_{cool} * CF$$

Where:

FLH _{cool}	= Full load cooling hours ³⁴
CF	= 0.5 ³⁵

Equation 11: Insulation Calculation of Annual Energy Savings for Electric Heating

$$\Delta kWh = ((1/R_{exist} - 1/R_{new}) * HDD * 24 * Area / 1000 / \eta_{Heat}$$

Where:

HDD	= Heating Degree Days ³⁶
η_{Heat}	= COP of electric heating equipment (resistance or heat pump)

ENERGY STAR Windows

Energy and demand savings for the purchase of ENERGY STAR windows were calculated using a deemed savings approach, as specified in the TRM for electric heating

³³ This is a parameter to account for the fact that people do not always operate air conditioning systems when the outside temperature is greater than 75° F = 0.75 (see Ohio TRM, p. 37, footnote 74).

³⁴ This is a location dependent variable which depends on customer's location (defined by zip code) and corresponding FLH value in look-up table.

³⁵ See Ohio TRM, p. 38, footnote 76.

³⁶ This is a location dependent variable which depends on customer's location (defined by zip code) and corresponding HDD value in look-up table.

and cooling savings.³⁷ The TRM specifies that all deemed savings values for ENERGY STAR windows are per 100 square feet of windows and depends on the type of heating and cooling equipment in the home, as shown in Table 4-6.

Table 4-6: Deemed Savings Values for ENERGY STAR Qualified Windows

Type of Energy Savings	Average Annual kWh Savings (per 100 square feet of ENERGY STAR windows)	Average Summer Coincident Peak kW Savings (per 100 square feet of ENERGY STAR windows)
Heating Savings (Electric Resistance)	302	NA
Heating Savings (Heat Pump)	237	NA
Cooling Savings (Central AC)	126	0.063

ADM visited a sample of customer homes to verify that the windows installed were ENERGY STAR qualified and met U factor requirements for Ohio's northern climate zone. Energy and demand savings for ENERGY STAR qualified windows were computed as the product of the deemed savings values associated with the heating and cooling equipment in the home and the square footage of ENERGY STAR windows installed.

Impact Analysis Summary

Table 4-7 summarizes the impact analysis approach and relevant evaluation question to be determined for each energy savings audit measure.

Table 4-7: Impact Analysis Summary of Impact Evaluation Questions and Methods

Evaluation Question	Data Collection Methods	Data Analysis Method
Energy savings per rebated audit measure?	Desk review; customer survey; on-site visits; tracking database.	TRM algorithms
Demand savings per rebated audit measure?	Desk review; customer survey; on-site visits; tracking database.	TRM algorithms

³⁷ 2010 Ohio Technical Reference Manual, August 6, 2010. Vermont Energy Investment Corporation, pp. 115-117.

4.1.2 Residential Energy Audit Process Evaluation Methodology

NMR completed the following research activities as part of the process evaluation for the REA subprogram:

Twelve semi-structured in-depth interviews

- One each with program management and implementation contractor staff (collectively referred to in this report as program managers)

A total of 14 contractors participated in the 2014 REA subprogram. NMR contacted all 14 participating contractors and conducted the following in-depth interviews:

- Three with contractors who submitted one or more rebate applications (referred to in this report as active participating contractors)
- Seven with contractors who submitted zero rebate applications (referred to in this report as inactive participating contractors)

In-Depth Interviews

The in-depth interviews focused on identifying implementation issues and concerns relating to the REA subprogram. General topics included:

- Program design and objectives
- Rebates
- Training and quality control
- Marketing
- Program strengths and weaknesses
- Satisfaction
- Market effects

Separate interview guides were developed for the three groups of respondents: 1) program management staff from the Companies and the implementation contractor Honeywell, 2) active participating contractors, and 3) inactive participating contractors.

Program Staff Interviews

NMR completed one in-depth interview with the Companies' program manager and one in-depth interview with the Honeywell program manager.

Contractor Interviews

A total of 14 contractors participated in the 2014 Ohio REA program. The evaluation team classified contractors as *active* or *inactive* based on the number of rebate applications they submitted to the program.

- Active contractors submitted at least one rebate application in 2014.
- Inactive contractors submitted zero rebate applications in 2014.³⁸

Four contractors submitted at least one rebate application in 2014 and were classified as active. Ten contractors did not submit any rebate applications in 2014 and were classified as inactive. The inactive contractors did not perform any energy audits through the 2014 REA program. The evaluation team attempted to contact all 14 contractors and was able to interview three active contractors and seven inactive contractors. The three active contractors interviewed conducted 44 out of 55 (80%) of the audits performed through the program in 2014. The number of energy audits conducted through the 2014 REA program by the three active contractors ranged from 11 to 21.

Table 4-8: Contractor Sample

	2012			2013			2014		
	Active (≥ 8 rebates)	Inactive (< 3 rebates)	Total	Active (≥ 15 rebates)	Inactive (< 15 rebates)	Total	Active (≥ 1 rebate)	Inactive (0 rebates)	Total
Total Number of Contractors	33	57	90	22	135	157	4	10	14
Contractors Interviewed	8	8	16	14	10	24	3	7	10

All three of the active contractors and five of the seven inactive contractors interviewed perform residential energy audits. One of the three active contractors and six of the seven inactive contractors interviewed sell or install energy-efficient equipment for residential homes. One of the active contractors enrolled in the program for the first time in 2014; the remaining two active contractors interviewed were involved in the program prior to 2014.

³⁸ The classification of active and inactive contractors in PY2012, PY2013, and PY2014 differed because the distribution of program activity among the participating contractors varied from year to year. In PY2013, contractors were classified as active if they submitted at least 15 rebate applications and classified as inactive if they submitted fewer than 15 rebate applications. In PY2012, contractors were classified as active if they submitted at least eight rebate applications and classified as inactive if they submitted fewer than three applications. In PY2014, only 4 of the 14 participating contractors submitted any rebate applications and were classified as active.

Five of the seven inactive contractors interviewed enrolled in the program for the first time in 2014.

4.1.3 Online Audits Impact Evaluation Methodology

The activities involved in conducting the impact evaluation of energy and demand savings included the following.

- Specifying a regression model with which to analyze energy consumption of households and how participation in the OA program affected electricity use;
- Preparing billing and weather data;
- Estimating the coefficients of regression models, using customer billing data and actual weather data for Ohio locations;
- Using the results from the regression analysis to determine weather-sensitive and non-weather sensitive kWh savings and annual kWh savings;
- Applying kW factors independently to weather sensitive kWh and non-weather sensitive kWh savings values to determine peak kW reductions.

Each of these activities is discussed in turn.

Specification for Regression Modeling

To determine the savings resulting from the 2014 OA program, a “difference in differences” method was used for the analysis. With this method, changes in energy use for customers receiving an audit are compared to changes in energy use for customers in a comparison group who did not participate in the program, with both groups being compared against a baseline “pre” period occurring prior to the participants’ receipt of an audit.

The changes in energy use for different groups are determined using the results from regression analysis of the energy usage data for participants and non-participants. ADM used the regression analysis to estimate the amounts of electricity used and to quantify the impacts of receiving an audit on energy consumption after controlling for the effects of weather and other factors. The regression analysis isolates and quantifies the effects of different factors on the changes in energy usage. The technique also lends itself to the analysis of interactions of savings with weather, operating practices, etc.

The basic specification for the regression modeling can be illustrated as follows. Consider modeling the energy use of a customer who received an audit. In simplest terms, average

daily electricity use can be separated between weather-sensitive and non-weather-sensitive factors. A model to represent this is:

Equation 12: Base Regression Model

$$AEC_t = \alpha_0 + \alpha_1 HDDperDay_t + \alpha_2 CDDperDay_t + E_{et}$$

Where:

- AEC_t is average daily use of electricity for period t for a customer (determined by dividing total usage over a billing period by number of days in that period);
- $HDDperDay$ is heating degree days per day (determined by dividing total heating degree days usage over a billing period by number of days in that period);
- $CDDperDay$ is cooling degree days per day (determined by dividing total cooling degree days usage over a billing period by number of days in that period);
- E_{et} is an error term;
- α_0 is the intercept term;
- α_1 and α_2 are regression coefficients showing the changes in use that occurs for a change in either heating degree days or cooling degree days.

The working hypothesis for the analysis is that customers receiving an audit will make changes that affect their electricity usage. For the illustrative model above, these changes will affect either the intercept term (α_0) or the responsiveness to changes in weather conditions (as measured by the coefficients α_1 and α_2). To capture this effect, α_0 , α_1 , and α_2 can be specified as follows:

Equation 13: Modeling of Customer Interactive Effects in Response to an Audit

$$\alpha_0 = \alpha_{01} + \alpha_{02}POST$$

$$\alpha_1 = \alpha_{11} + \alpha_{12}POST$$

$$\alpha_2 = \alpha_{21} + \alpha_{22}POST$$

Where, $POST$ is a dummy variable that is 0 if the monthly period is before the customer received an audit and 1 if the monthly period is after the customer received the audit. With this formulation, the model for the regression analysis becomes:

Equation 14: Difference-in-Differences Regression Model Specification

$$\begin{aligned} AEC_t = & \alpha_{01} + \alpha_{02}POST + \alpha_{11}HDDperDay_t + \alpha_{12}POST*HDDperDay_t \\ & + \alpha_{21}CDDperDay_t + \alpha_{22}POST*CDDperDay_t + E_{et} \end{aligned}$$

With the difference-in-differences method, the simple model is expanded to include a sample of non-participants. The implicit assumption for the difference-in-differences analysis is that a change in energy use in response to a change in weather conditions would be the same for the non-participant (comparison) group and the participant (audit) group in the absence of the program. If this assumption holds, then the change in energy usage of the non-participant group in response to a change in weather conditions can be applied to predict what the (counterfactual) energy use of the participant group would have been under the changed weather conditions in the absence of the program. This allows the difference between actual post-audit energy use of the audit group and the counterfactual predicted energy use to be calculated as the savings attributable to the program.

Preparation of Billing and Weather Data

The Companies provided ADM with billing data on monthly electricity use for participants in the OA program who had initiated a home energy audit either online or by telephone during 2014. These data included:

- Monthly kWh consumption billed for each customer for 24 months (January 2013 – December 2014);
- Beginning and end dates for each monthly electric bill, and number of days billed;

The Companies also supplied data for the following variables for each participant.

- Utility customer ID and premise ID;
- Service address zip code;
- Audit method (online or telephone); and
- Dates of completion for each audit level (three possible).

The data were prepared for analysis through the following activities.

- Any customer with a zero, negative or excessively high (>10,000 kWh/Month) kWh entry was removed from the analysis file.

- A customer was also expunged from the analysis file if they had less than 20 or greater than 26 monthly observations.

For the regression analysis, billing data for the 60 days immediately preceding the date of a customer's audit were also excluded to account for any unusual changes in billed energy use that might have prompted a customer to decide to have an audit.

The regression analysis also took account of the possible energy savings associated with the participation of 2014 OA participants in other residential energy conservation programs of the Companies. Estimated impacts of the OA program would likely be biased if the regression were to include participants who also were enrolled in other programs. Lists of participants for other residential programs were used to flag OA participants with dual enrollments. The residential conservation programs and subprograms that were considered in this flagging exercise were the following:

- Easy Cool Rewards Program (rebates for programmable thermostats)
- Appliance Turn-In
- Appliance Rebates (part of the Energy Efficient Products Program)
- CFL Retail Program (part of the Energy Efficient Products Program)
- HVAC Tune-ups and Rebates (part of the Energy Efficient Products Program)
- Community Connections (Low-Income) Program
- Comprehensive Residential Home Energy Audits
- Energy Conservation Kits
- Residential New Homes Program
- Behavioral Modification Program

With a flag variable created that identified dual enrollments, the regression models could be run with dual enrollment participants excluded.

This data cleaning process removed participant customers from the analysis data set. The final analysis file was composed of a sample of 5,368 participants who passed all data screening checks. Customers removed from the regression were still accounted for in the final kWh and kW savings calculations, since the data errors detected were simply billing related and had nothing to do with their participation in the program.

Similar data, except for audit method and date, were supplied by the Companies for a random sample of customers who did not participate in the OA program; these customers

represented a comparison group. The cleaning procedures applied to the billing data for program participants were also applied to the billing data for the comparison group. This cleaning resulted in a comparison group sample consisting of 14,751 customers.

Estimating Coefficients of Regression Models

The coefficients of the regression models were estimated by applying estimation procedures that took into account both the cross-sectional and the time-series dimensions of the data. In particular, regression models were estimated by pooling cross-sectional observations (i.e., customers) with time-series observations (i.e., monthly consumption).

A “fixed-effects” specification was used for the panel regression modeling. The purpose of this specification is to control for those determinants of a household’s electricity use that are constant over time. The basic idea underlying this specification is that each customer household acts as its own control, both for household characteristics that are easily measured (like house size and age) and for characteristics more difficult to measure (like interest in conservation, etc.) Time-varying variables are handled by measuring and putting them as covariates in a “fixed effects” regression model.

Conceptually, a “fixed effects” regression analysis involves applying a least squares dummy variable (LSDV) covariance estimate procedure. In this approach, as described in Allison³⁹, a binary dummy variable is created for each customer in the sample, with the variable assigned a value of 1 for each observation that is associated with the customer and a value of 0 for each observation that is not. The full set of these dummy variables is included in the regression analysis. In effect, the equation estimated contains a unique constant term for each customer that captures the effects of all the determinants of that customer’s electricity use that are constant over time. This approach automatically controls for differences among households that influence the average level of consumption across customer households. The specification of customer-specific effects allows the regression model to capture much of the baseline differences across customers while obtaining reliable estimates of the effects of the audits.

In practice, with a large number of customers participating in the OA program, an analysis where an explicit dummy variable could be created for each household was problematic. The computational requirement in estimating coefficients for all the dummy variables would have been burdensome for the large sample. Accordingly, the estimation was accomplished using a mean deviation method that is described in Allison. This procedure

³⁹Allison, P., 2006. “Fixed Effects Regression Methods in SAS.” *SAS Conference Proceedings: SAS Users Group International 31*, Paper 184-31, March.

was implemented using R, with customer ID being used as a variable for the *absorb* option in the *areg* regression command.⁴⁰

Method for Calculating kWh Savings

Once an appropriate regression model was estimated, the regression results were used in the calculation of per-participant and program-level kWh savings. Estimates of savings were developed for two groups of customers as defined by type of audit. The two groups are as follows:

- Telephone audits
- Online audits

Summarized, the steps in the calculation are as follows.

- **For Step 1**, assume the estimated regression model represents “typical” customer behavior. Apply the estimated regression coefficients to “average” heating and cooling degree days to calculate kWh savings. Although the same regression coefficients are used for each operating company, heating and cooling degree day values were used that were specific to each company’s service territory, thus providing separate estimates of savings for each utility for the four audit groups.
- **In Step 2**, determine program-level kWh savings for each audit group for each utility company by multiplying the per-participant kWh savings value for a group by the number of customers who were participants in that group for a utility company.

Method for Calculating kW Reductions

- **In Step 1**, determine the amount of annual per-participant kWh savings that occurs in the critical period months of June, July, and August. This is determined by using the data on monthly kWh savings that are calculated during Step 1 of the kWh savings calculations. Also use that data to allocate kWh savings during the critical peak months between heating-related and cooling-related savings.
- **In Step 2**, using TMY weather data, calculate the percentage of heating degree hours and cooling degree hours during the critical peak months that occur during the critical peak hours for those months (i.e., during the hours from 3 PM to 6 PM on non-holiday weekdays). Use these percentages to determine how much of the heating-related and

⁴⁰ The procedure for the mean deviation approach is as follows. For each customer, means over time are first computed for each time-varying variable (both response and predictor variables). The customer-specific means are then subtracted from the observed values of each variable for that customer. The resulting variables are then used in the regression analysis. As noted in the text, this is accomplished in Stata using the *areg* regression command with the *absorb* option.

cooling-related kWh savings calculated in Step 1 occurred during the critical peak hours.

- **In Step 3**, divide the sum of heating-related and cooling-related kWh savings during critical peak hours by the number of critical peak hours to determine the per-participant per-hour kW reduction occurring during critical peak hours.⁴¹
- **In Step 4**, determine program-level kW reductions for each audit group for each utility company by multiplying the per-participant kW reduction value for a group by the number of customers who were participants in that group for a utility company.

Method for Identifying Persistence Effects through Analysis of Billing Data

An analysis of customer billing data was used to identify whether the effects of the OA program on energy use persisted over time. This analysis addressed persistence of savings for the 2010, 2011, 2012, and 2013 cohorts of program participants.

As previously discussed, each cohort can be divided into two groups defined by type of audit. Using the regression model specification described in Section 4.1.3 (with average daily electricity use being related to heating and cooling degree day variables), two regression models were estimated for each group in each cohort. One model was estimated using data for the period before an audit was performed, and a second model was estimated using billing and weather data for 2014.

Given the estimated regression models, estimates of weather-normalized annual energy use are developed for each group in each cohort. By using this approach, the effects of weather are controlled in the analysis. The analysis then involves comparing estimated annual energy use in 2014 to energy use in the pre-audit period to determine whether there are reductions in energy use that are correlated with program participation.

To take into account the effects of factors other than program participation, regression models are also estimated for each cohort's comparison group. Because these comparison groups are formed by taking random samples from the non-participant population of residential customers, the estimates of per-customer annual energy use developed for these groups provide a measure of how electricity use changed over time because of factors other than program participation.

⁴¹ For June, July, and August, there are 65 non-holiday weekdays. With 3 critical peak hours for each of these days, the total number of critical peak hours is 195.

Analysis of Billing Data

To analyze the persistence of savings, billing data for the original treatment and control group samples from the evaluation of the 2010, 2011, 2012, and 2013 OA programs were updated with 2014 billing data.

The persistence analysis compares energy consumption for the samples of 2010, 2011, 2012, and 2013 OA participants with their consumption for the 12 months prior to their audit. The amount of persistence data available depends on the time of year when the audit occurred. The original treatment effect will encompass the 12 months post audit, and the persistence period will include all available data for 13 or more months after the audit.

The final regression specification chosen for the analysis of savings for the 2014 program is also used as the specification for the model used to develop savings estimates for analyzing persistence. Using the regression results, persistence effects were analyzed for those customers who participated in an energy audit in 2010, 2011, 2012, and 2013 by comparing their average energy consumption 13+ months post audit to their consumption in the baseline year (i.e., the 12 months prior to their energy audit).

Survey Data Collection for Persistence Analysis

Additional data with which to analyze the persistence of savings from customers who participated in the OA Program in 2010, 2011, 2012, and 2013 were collected through surveys of samples of customers from several groups of the Companies' residential customers in Ohio. These groups were as follows:

- Online audit participants in the OA program in 2010, 2011, 2012, and 2013
- Telephone audit participants in the OA program in 2010, 2011, 2012, and 2013

Survey Data Collection Procedures

The sampling plan for the survey of these customers is shown in Table 4-9.

Table 4-9: Sampling Plan for Persistence Survey

Cohort	Audit Type	Sample sizes
2010 OA Participants	Telephone Audits	n = 21
	Online Audits	n = 49
2011 OA Participants	Telephone Audits	n = 21
	Online Audits	n = 49
2012 OA Participants	Telephone Audits	n = 21
	Online Audits	n = 49
2013 OA Participants	Telephone Audits	n = 70
	Online Audits	n = 70

The persistence surveys with 2010, 2011, 2012, and 2013 participants in the OA program was conducted over the phone using VuPoint Research. The survey was directed at obtaining information with which to determine the extent to which any energy saving actions (either structural or behavioral changes) that were taken by these groups in 2010, 2011, 2012, and 2013 were still in place or were continuing to be practiced by these customers in 2014. Interview questions included the following:

- For structural changes: How is that working out? Is it still installed?
- For behavioral changes: Are you still continuing to do that or are you doing something else now? Have you made any other energy saving changes?

Analysis of Survey Data to Determine Persistence Effects

The survey data were analyzed using descriptive statistics and cross tabulations. Responses to open-end questions were content analyzed and coded using a set of structured response categories. The data for online and telephone audit savers were analyzed to determine whether the behavioral and structural changes they reported in 2010, 2011, 2012, and 2013 had persisted through 2014. For online audit savers, persistence rates for behavioral and structural changes were compared by audit level.

4.1.4 Online Audits Process Evaluation Methodology

The process evaluation of the 2014 OA program was based on data collected through surveys of samples of customers from three groups of residential customers in Ohio. These groups were as follows:

- 2014 online audit participants
- 2014 telephone audit participants
- 2014 comparison group customers

Collection of Data for 2014 Online Audit Participants

Data were collected from one random sample of 2014 online audit participants. The sample sizes for each audit method meet the requirement for ± 10 percent precision at the 90 percent confidence level for the utilities combined. The sampling plan for allocating the sample to the individual utilities is shown in Table 4-10.

Table 4-10: Sampling Plan for Survey of 2014 OA Participants

Utility Company	Sampling Proportion	Sample Size (Completes)
OE	0.60	n = 84
CEI	0.26	n = 36
TE	0.14	n = 20
Total	1.00	n = 140

Data for the sample of online audit participants were collected through a telephone survey using VuPoint Research. The survey questionnaire was structured to include questions with which to determine the kind of information customers received and to assess how well the information met their needs. Customers were also asked about actions, if any, they took after completing the audit. Actions taken were characterized as either structural (i.e., primarily equipment upgrades) or behavioral.

Examples of questions included the following:

- Why did you conduct an online energy audit? What were your concerns?
- What information did you get from the online energy audit?
- How well did this information meet your needs? How or why? Or why not?
- What were you able to do with this information? What actions did you take as a result of the online audit, if any, to conserve energy in your home?

A copy of the survey administered to the 2014 online audit group is provided in Appendix B.

After the survey was completed, responses to open-end questions were coded according to structured response categories.

Collection of Data for 2014 Telephone Audit Participants

Data was collected from a random sample of 2014 OA participants who received telephone audits. The sample size was calculated to meet the requirement for ± 10 percent precision at the 90 percent confidence level for the utilities combined. The total sample was allocated to the individual utilities in the proportions shown in Table 4-11.

Table 4-11: Sampling Plan for Survey of Telephone Audit Participants

Utility Company	Sampling Proportion	Sample Size (Completes)
CEI	0.26	n = 18
OE	0.60	n = 42
TE	0.14	n = 10
Total	1.00	n = 70

Data for the sample of telephone audit participants were collected through a telephone survey using VuPoint Research. Participants were asked questions with which to determine the kind of information that was provided by Contact Center Representatives to help address customer concerns about high energy bills. Customers were also asked questions about the usefulness of this information to them and the actions customers took in response to the information provided.

Examples of interview questions for telephone audit participants included the following:

- Why did you call the contact center? What were your concerns?
- What did the customer service representative discuss with you?
- Did you receive any information by mail or email as a follow-up?
- How helpful was the information provided?
- What were you able to do with this information? What actions did you take as a result of the telephone audit, if any, to conserve energy in your home?

A copy of the survey that was administered to telephone audit participants is provided in Appendix B.

Collection of Data from Comparison Group of Non-Participants

Data was collected from a random sample of residential customers who had not participated in the OA program in 2010, 2011, 2012, 2013, or 2014. The total sample size was calculated to meet the requirement for ± 10 percent precision at the 90 percent confidence level across the three service territories combined. The total sample was allocated to the individual utilities at the proportions shown in Table 4-12.

Table 4-12: Sampling Plan for Survey of Non-Participants

Utility Company	Sampling Proportion	Control Sample
CEI	0.26	n = 18
OE	0.60	n = 42
TE	0.14	n = 10
Total	1.00	n = 70

The survey of non-participants was conducted by telephone by Research America. The telephone interviews were used to collect information with which to determine the actions that non-participant customers took in 2014 to save energy. Actions taken were characterized either as structural (i.e., primarily equipment upgrades) or behavioral. The non-participants surveyed were explicitly asked whether they had participated in other energy conservation programs offered by the Companies.

A copy of the survey that was administered to non-participants is provided in Appendix B.

Analysis of Survey Data for 2014 Participants and Non-Participants

The survey data were analyzed using descriptive statistics and cross tabulations. The data for online and telephone audit participants and nonparticipants were analyzed to determine whether they had made behavioral or structural changes as a result of the audit and whether they were doing things differently now to save energy in hot and cold weather.

4.2 Energy Conservation Kits

4.2.1 Impact Evaluation Methodology

The impact evaluation strategy was identical for Energy Conservation Kits and School Education Kits. Two major activities were performed in the audit analysis of the Energy Conservation Kits subprogram:

- Ex ante review of program data
- Participant survey to determine measure specific in-service rates
- Performing impact analysis calculations using measure specific TRM algorithms

Ex Ante Review

ADM audited a census of the energy conservation kits data and found the data to be adequate for impact evaluation. The average ex ante estimates of kWh savings and kW reduction for the Energy Conservation Kits and the School Education Kits are shown in Table 4-13.

Table 4-13: Ex Ante Estimates of per Unit Average Annual kWh Savings and kW Reduction per Kit Type

<i>Kit Type</i>	<i>Ex Ante kWh</i>	<i>Ex Ante kW</i>
<i><u>CEI</u></i>		
Electric	621	0.063
Standard	546	0.056
Schools	188	0.022
<i><u>OE</u></i>		
Electric	626	0.063
Standard	559	0.057
Schools	172	0.021
<i><u>TE</u></i>		
Electric	571	0.058
Standard	467	0.048
Schools	168	0.021

The measures distributed in each kit and the source of the method utilized by ADM to determine energy and demand savings are presented in Table 4-14 and Table 4-15.

Table 4-14: Lighting Measures Distributed by Kit Type

Kit Type	13W CFL	18W CFL	20W CFL	23W or 26W CFL	3 Way CFL	9W or 11W Globe CFL
Electric	4 or 5	-	1 or 2	1 or 3	0 or 1	0 or 1
Standard	4 or 5	-	1 or 2	1 or 3	0 or 1	0 or 1
Schools	3	1	-	-	-	-
Source for Analysis Method	Ohio TRM	Ohio TRM	Ohio TRM	Ohio TRM	Ohio TRM	Ohio TRM

Table 4-15: Non-Lighting Measures Distributed by Kit Type

Kit Type	Smart Power Strip	LED Night Lights	Furnace Whistle	Aerators	Showerhead
Electric	1	2 or 3	1	2	1
Standard	1	2 or 3	1	-	-
Schools	1	3	1	-	-
Schools Kits	-	1	-	2	-
Source for Analysis Method	Ohio TRM	Pennsylvania TRM	Pennsylvania TRM	Ohio TRM	Ohio TRM

Customer Survey

To determine measure specific in-service rates, a customer survey was distributed to a statistically valid random selection of program participants.⁴² Customers with email addresses were administered an online survey, and customers who did not provide emails were administered a phone survey.

Impact Analysis Methods

For each energy conservation kit measure installed in 2014, total energy (kWh) savings and total peak demand (kW) reduction for that measure were determined as a product of the number of measures verified as being installed and the savings estimated per measure. ADM used the algorithms specified in the Ohio TRM or as revised based on recommendations contained in the Ohio TRM Joint Utility Comments and approved by the Vermont Energy Investment Corporation. In the case of furnace whistles and LED nightlights, the TRM does not specify an algorithm; the savings for these measures were

⁴² See appendix C for survey instruments.

calculated according to industry best practices. The calculations for the following measures are reviewed in previous sections of this plan:

- CFLs
- Kitchen and bathroom faucet aerators
- Low flow showerheads

The calculations for measures not previously specified are presented here.

Furnace Whistles

The TRM does not specify an algorithm for furnace whistles, so energy savings were calculated using the Pennsylvania TRM algorithm as follows:⁴³

Equation 15: Furnace Whistle Calculation of Energy Savings

$$\Delta kWh = MkW \times EFLH \times EI \times ISR$$

Where:

MkW	= Average motor full load electric demand (kW) = 0.5 kW
EFLH	= Estimated Full Load Hours (Heating and Cooling) ⁴⁴ = Will be taken from Ohio TRM
EI	= Efficiency Improvement = 15%
ISR	= In-service Rate ⁴⁵

According to the PA TRM, there are no measureable peak demand savings attributed to furnace whistles.

LED Nightlights

The TRM does not specify an algorithm for LED night lights, so energy savings were calculated using the Pennsylvania TRM (PA TRM) algorithm as follows:

Equation 16: LED Nightlights Calculation of Energy Savings

$$\Delta kWh = ((Watts_{base} - Watts_{NL}) \times (NL_{hours} \times 365)) / 1000 \times ISR$$

⁴³ Pennsylvania Public Utility Commission, *Technical Reference Manual*, June 2013

⁴⁴ This is a location dependent variable which depends on customer's location (defined by zip code) and corresponding EFLH value in look-up table.

⁴⁵ This rate was captured by ADM through participant surveys.

Where:

Wattsbase = Wattage of baseline nightlight

WattsNL = Wattage of LED nightlight

NLhours = Average hours of use per day per Nightlight

ISR = In-service rate

According to the PA TRM, there are no measureable peak demand savings attributed to LED night lights.

Seven Plug Smart Power Strips

The energy savings for seven plug smart power strips are deemed in the TRM as 102.8 kWh per year.⁴⁶

Equation 17: Smart Power Strip Calculation of Summer Coincident Demand Savings

$$\Delta kW = kWh/Hours * CF$$

Where:

Hours = Annual number of hours during which the controlled standby loads are turned off by the Smart Power Strip.

CF = Summer Peak Coincidence Factor for measure
=0.8

4.2.2 Process Evaluation Methodology

Energy Conservation Kits

The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework. The process evaluation findings are based upon analysis of program structure and interviews and surveys of participating customers, the Companies' program staff, and program tracking data. Additionally, the process evaluation includes a documentation review of program literature such as marketing materials and program planning documents.

Evaluation Objectives

The purpose of the process evaluation is to examine program operations and results for the operating year, and to identify potential program improvements. This process

⁴⁶ Deemed value for seven plug smart power strips based on NYSERDA measure characterization for advanced power strips.

evaluation was designed to document the operations and delivery of the Energy Conservation Kit Program during 2014.

Key research questions that were addressed by this evaluation of 2014 activity include:

- How do participants learn about the program?
- Why did customers participate in the program?
- How satisfied are participants with the program?
- What are participant attitudes towards individual measures? Are some measure types favored over others?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the Energy Conservation Kit Program is developed from an online and telephone survey of program participants. The internal organization and operational perspective on the program is examined through the program staff interview.

Collection of Data for 2014 Energy Conservation Kits Participants

In the 2014 program year evaluation, ADM reviewed relevant program documents, promotional literature, and other materials to gain an understanding of program objectives and design features. Specifically, this provided insight into kit distribution goals, conservation kit contents, marketing messages, and program educational materials.

Participant surveys were the primary data source for providing insight into the customer perspective on the program. The participant surveys provided feedback and insight regarding customer experiences with the Energy Conservation Kit Program. Respondents reported on their satisfaction with the program, the usefulness of the measures and educational materials, and whether they installed the measures provided in the kit. Installation rates obtained through the participant survey effort were used to inform the savings impact analysis.

Data were collected from one random sample of 2014 energy conservation kits participants. The sample sizes for each audit method meet the requirement for ± 10 percent precision at the 90 percent confidence level for the utilities combined. The sampling plan for allocating the sample to the individual utilities is shown in Table 4-16.

Table 4-16: Sampling Plan for Survey of 2014 Energy Conservation Kits Participants

<i>Utility Company</i>	<i>Sampling Proportion</i>	<i>Sample Size (Completes)</i>
OE	0.33	n = 70
CEI	0.33	n = 70
TE	0.33	n = 70
Total	1.00	n = 210

Data for the sample of conservation kits participants were collected through a telephone survey using VuPoint Research and an online survey using SurveyGizmo.

An interview with the program manager provided insight into program operation and implementation. Specifically, program management staff discussed key program objectives, design considerations, and overall program performance thus far.

Schools Kits

The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework.

The process evaluation findings are based upon analysis of program structure and interviews and surveys of participating customers, program staff, and program tracking data. Additionally, the process evaluation includes a documentation review of program literature such as marketing materials and program planning documents.

Evaluation Objectives

The purpose of the process evaluation is to examine program operations and results for the operating year, and to identify potential program improvements. This process evaluation was designed to document the operations and delivery of the School Education and Kit Program during 2014.

Key research questions that were addressed by this evaluation of 2014 activity include:

- How did participants learn about the program?
- Why did customers participate in the program?
- How satisfied were participants with the program?
- What were participant attitudes towards individual measures? Are some measure types favored over others?

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the School Education and Kit Program was developed from an online and telephone survey

of program participants. The internal organization and operational perspective on the program is examined through the program staff interview.

Data were collected from one random sample of 2014 schools kits participants. The sample sizes for each audit method meet the requirement for ± 10 percent precision at the 90 percent confidence level for the utilities combined. The sampling plan for allocating the sample to the individual utilities is shown in Table 4-17.

Table 4-17 Sampling Plan for Survey of 2014 Schools Kits Participants

Utility Company	Sampling Proportion	Sample Size (Completes)
OE	0.33	n = 70
CEI	0.33	n = 70
TE	0.33	n = 70
Total	1.00	n = 210

Data for the sample of schools kits participants were collected through a telephone survey using VuPoint Research and an online survey using SurveyGizmo.

4.3 New Homes

4.3.1 Impact Evaluation Methodology

The M&V approach for the Residential New Homes Program included:

- Determining quantity of homes in population by builder
- Performing engineering calculations and desk reviews of energy modeling data
- On-site data collection

The impact evaluation component in 2014 estimated gross energy savings (kWh) and peak demand reduction (kW) as framed by the following research questions:

- How many builders participated in the program and how many homes were constructed per builder?
- Do the sample homes modeled in the energy modeling software reflect the as-built homes in the field?
- What were the savings generated per home for each sample home?

Data Collection and Verification of Program Population

The first aspect of conducting measurements of program activity was to verify the number of homes participating in the program. Our verification work was based on using program

tracking data. To begin the verification effort, we reviewed the tracking system data on reported homes to determine that all homes were eligible for the program. Additionally, the tracking system was reviewed to ensure that the proper data fields required to support this evaluation as well as future evaluations were included. The tracking system was reviewed for completeness, accuracy, and efficiency.

Engineering Review

ADM used various sources for the engineering review of the 2014 Residential New Homes program. There were several types of data collected for evaluation of the 2014 Residential New Homes program; homes had either the Companies' QA/QC field visit data, ride along data, rater interviews, builder interviews, homeowner surveys, or ADM's field visit verification information. QA/QC data included more detailed information, like duct testing values and infiltration, as well as insulation values. ADM's field visit verification data generally included; building orientation, insulation values, window u-values and SHGC, HVAC equipment model numbers, domestic water heater information, and lighting fixture and type counts. The review process used a combination of all available data sources for a particular site to assess the reasonability of the model's inputs and outputs.

For homes that were selected to be included in the M&V sample, ADM first reran each of the provided models to reproduce the *ex ante* savings estimates. This step served as an initial check to evaluate potential reasons for discrepancy between the *ex ante* and *ex post* savings (i.e. data entry error or variant models). All *ex post* savings were calculated using the same version of REM/Rate as the *ex ante* estimates (version 14.3, 14.4.1, or 14.5.1).

ADM used either data provided or data collected during field visits to determine if the REM/Rate models accurately represented that of the incentivized homes. Each of the builders was also interviewed with regards to construction practices and material selection. Then, ADM leveraged the data collected from visits to partially constructed homes to verify that the construction techniques and materials being modeled were appropriate. ADM then verified each home's orientation using satellite mapping techniques and/or on-site verification.⁴⁷ Finally, ADM verified the builder provided lighting and appliances by interviewing home builders and home owners over the phone.

⁴⁷ With respect to the four Cardinal points (North, South, East, and West)

On-Site Data Collection Procedures

ADM staff conducted on-site visits to verify home builders' construction practices and plan types. Builder provided appliances were verified against model numbers listed in site documentation and percentage of high efficiency lighting was documented. While on-site, ADM documented the following items:

- Attic insulation thickness, application and R-values
- Presence of radiant barriers
- Window glazing and frame materials
- Architectural plan options
- Window ratings
- Appliance model numbers
- Installation percentage of CFLs
- Air Conditioning and Furnace SEER rating

Gross Savings Estimates

The performance of each prototype home was verified by obtaining the original electronic data file from the builder's simulation software and updating it to match the as-built conditions observed during the on-site data collection and monitoring visit. To account for natural variation in building orientation and to verify major equipment efficiencies of the homes, a simple random sample from the tracking system data was taken. An on-site verification of this sample determined if the home was constructed or not, if it is occupied or not, and the home's actual cardinal orientation. While on-site, ADM also verified heating fuel type and outside unit air conditioner/heat pump efficiency. Updates to the prototype REM/Rate models may have included:

- HVAC systems (capacity and efficiencies)
- Window square footage
- Duct leakage
- House infiltration
- Actual window orientations
- Efficient Appliances, lighting, appliance, and other plug loads

The energy savings and demand reductions for any energy efficiency components not incorporated into the comprehensive building simulation model, and any measures installed through the other residential rebate programs, were determined based upon the methods outlined in those programs.

ADM used the REM/Rate “Fuel Summary” report to evaluate both the as-built and baseline simulated home’s annual energy use. An example of this report is given in Figure 4-1.

Figure 4-1: Example REM/Rate Fuel Summary Report

FUEL SUMMARY			
Date:	November 24, 2008	Rating No.:	2437
Building Name:	1202	Rating Org.:	Energy Inspectors
Owner's Name:		Phone No.:	(702)365-8080
Property:	Newcastle	Rater's Name:	
Address:	Las Vegas, NV	Rater's No.:	
Builder's Name:	American West Homes		
Weather Site:	Las Vegas, NV	Rating Type:	Based on Plans
File Name:	Plan 1202 ES Base.blg	Rating Date:	9/2/08
1202			
Annual Energy Cost (\$/yr)			
Natural gas	\$	397	
Electric	\$	1110	
Annual End-Use Cost (\$/yr)			
Heating	\$	251	
Cooling	\$	584	
Water Heating	\$	116	
Lights & Appliances	\$	556	
Photovoltaics	\$	-0	
Service Charges	\$	156	
Total	\$	1663	
Annual End-Use Consumption			
Heating (Therms)		326	
Heating (kWh)		428	
Cooling (kWh)		6614	
Water Heating (Therms)		177	
Lights & Appliances (Therms)		104	
Lights & Appliances (kWh)		5514	
Annual Energy Demands (kW)			
Heating		0.2	
Cooling		3.4	

REM/Rate calculates simulated energy use on an annual basis (not hourly) and reports maximum peak demand reduction instead of coincident peak demand. Therefore, ADM used the methodology defined in the TRM to calculate coincident peak demand reduction. Per the TRM, the coincident peak demand is calculated by multiplying the maximum demand reduction by 0.5.

4.3.2 Process Evaluation Methodology

The process evaluation component was designed to answer the following five research questions:

- How effective was the program's marketing
- How well did program staff and the implementation staff work together
- What changes can be made to the program's design/delivery to improve effectiveness

- What do builders and raters feel are the greatest challenges or obstacles to program participation
- What is the overall satisfaction level with the program

ADM initiated the impact and process evaluations in the fall of 2014 with the development of surveys and sampling frames and to field the telephone surveys beginning in February, 2015. Table 4-18 summarizes the focus of the five impact evaluation research questions along with their associated methods of data collection and analysis.

Table 4-18: Summary of Process Evaluation Questions and Methods

Evaluation Question	Data Collection Method	Data Analysis Method
How effective was the program marketing?	Stakeholder Interviews	Qualitative Analysis
How well did Company staff and the implementation staff work together?	Stakeholder Interviews	Qualitative Analysis
What changes can be made to the program's design/delivery to improve effectiveness?	Stakeholder Interviews	Qualitative Analysis
What do builders and raters feel are the greatest challenges or obstacles to program participation?	Stakeholder Interviews	Qualitative Analysis
What is the overall satisfaction level with the program?	Stakeholder Interviews	Qualitative Analysis

Effectiveness of Program Marketing

ADM relied on telephone interviews with builders and raters to determine the marketing channels through which participants become aware of the program. Builders and raters were asked a series of questions aimed at determining the reasons for participating in the program and their company's energy conservation objectives prior to participation. These questions helped determine how effective the marketing materials are at inducing

program participation and the general attitudes of the homebuilders about efficiently building practices prior to program implementation.

Stakeholder and Participant Interviews

To address the research questions, ADM and TetraTech conducted open-ended interviews by telephone and in-person with key program staff, including the:

- Companies' Program Manager
- Implementation Contractor Staff
- Builders and Raters

Interview topics varied by respondent, as appropriate to the respondent's role and history with the Residential New Homes program. General topics included program design, whether there have been any changes in implementation, communication between the utility and implementation staff, marketing efforts, quality control, customer communication, and implementation barriers

4.4 Behavioral

The four impact questions addressed in the 2014 evaluation were:

- To what extent has the 2014 Behavioral Modification program resulted in electric energy savings for participating customers (compared to similar non-participating customers) in each of the three Ohio utilities, as measured by annualized reductions in kilowatt hours (kWh) per customer?
- How did kWh savings vary depending on season and selected housing characteristics?
- What kinds of energy efficiency changes (behavioral or structural) made by customers were responsible for producing the observed energy savings?
- What percentage of home energy efficiency changes made by Home Electricity Report recipients were behavioral versus structural?

4.4.1 Impact Evaluation Methodology

Analysis of the impact of the Behavioral Modification program on energy savings was conducted using regression analysis of billing data. The main objectives of the analysis were to quantify the impact of program participation on energy consumption, after controlling for the effects of weather and other factors.

To determine the savings resulting from the 2014 Behavioral program, Post-only model and “difference in differences” method were used for the analysis.

With “difference in differences” method, changes in energy use for customers receiving HERs are compared to changes in energy use for customers in a comparison group who did not participate in the program, with both groups being compared against a baseline “pre” period occurring prior to the participants’ receipt of their first energy usage report.

This quasi-experiment utilizes a randomized control trial. The Companies targeted high energy users⁴⁸ as the target population for the Behavioral Modification program. After the initial target population was selected, OPower randomly allocated (in a manner that is not related to usage patterns, geography, house size, etc.) each household into either the treatment (household receives HER) or the control group (household receives no communication from OPower). This method creates two groups that are statistically equivalent, except for one group’s receipt of HERs. ADM confirmed that the treatment and control groups had equivalent distributions with respect to average pre-HER usage and the date when the first HER was received (i.e. parity with respect to the number of pre-HER and post-HER months per account).

The changes in energy use for different groups were determined using the results from regression analysis of the energy usage data for the treatment and control groups. ADM used regression analysis to estimate the amounts of electricity used and to quantify the impacts of receiving an energy usage report on energy consumption after controlling for the effects of weather and other factors. The regression analysis isolated and quantified the effects of different factors on the changes in energy usage.

Because of the large size of the dataset, the idiosyncrasies of electricity usage among households, and the limited number of independent variables available (mainly weather-related variables), inference on the effect of HERs is noisy, but robust, given the large size of the sample. Because this principle holds regardless of model complexity, a parsimonious (i.e. using a minimal number of variables) model was selected to estimate the effect of HERs on the treatment group.

The Evaluators utilized a post-only model with pre-usage controls. Other model specifications were tested (including fixed effects), but the post-only model was found to provide the highest precision level in results. The model specification applied uses one

⁴⁸ It is important to note that the targeting of high-use customers in the treatment and control groups in this program will produce savings estimates that apply only to similarly high-use customers. The savings of lower-usage customers will not be seen in the same proportion as exists in the full customer population.

year of pre-treatment data to construct control variables which capture the primary drivers of a household's energy use.

The model specification is as follows:

$$\begin{aligned} Usage_{it} = & \alpha_0 + \beta * treatment_i \\ & + \alpha_1 * PreUsage_i \\ & + \alpha_2 * PreSummer_i \\ & + \alpha_3 * PreWinter_i \\ & + \gamma * mm_t \\ & + \delta_1 * mm_t * PreUsage_i \\ & + \delta_2 * mm_t * PreSummer_i \\ & + \delta_3 * mm_t * PreWinter_i \\ & + \varepsilon_{it} \end{aligned}$$

Where

- i denotes the i th customer
- t denotes the first, second, third, etc. month of the post-treatment period
- $Usage_{it}$ is the average daily use for read t for household i during the post-treatment period
- $PreUsage_i$ is the average daily usage across household i 's available pre-treatment billing reads.
- $PreWinter_i$ is the average daily usage over the months of December January, February, and March over household i 's available pre-treatment meter reads.
- $PreSummer_i$ is the average daily usage over the months of June, July, August, and September over household i 's available pre-treatment meter reads.
- mm_t is a vector of month-year dummies

And parameter definitions are:

- α_0 is an intercept term
- $\alpha_1, \alpha_2, \alpha_3$ are effects of control variables $PreUsage_i, PreWinter_i, PreSummer_i$ on $Usage_{it}$ in the reference month.
- $\delta_1, \delta_2, \delta_3$ are the effect of the control variables in each month-year (mm_t) of the post period.

- ε_{it} is an error term.

The following linear model was also used to fit the data:

Equation 18: Behavioral Management Base Regression Model

$$kWh_{i,t} = a_1 \cdot CCD_{i,t} + a_2 \cdot HDD_{i,t} + a_3 \cdot post_{i,t} + a_4 \cdot treat_i + a_5 \cdot treat_i \times post_{i,t} + \varepsilon_{i,t}.$$

Where, i indexes individual accounts, and $t = 1, \dots, T(i)$ is a time index, denoting the distinct bills originating from that account. The terms in the model are

- $kWh_{i,t}$, which is the total consumption (billing_usage) divided by the number of days in the billing period (billing_duration), to normalize the bills to the average daily usage during the billing period.
- $CDD_{i,t}$ and $HDD_{i,t}$, which is the average number of cooling degree days (base 70) and heating degree days (base 55), respectively, during the billing period, as measured at a local weather station (KAKR for OE, KCLE for CEI, and KTUL for TE).
- $post_{i,t}$, which is an indicator variable, equal to 1 when the bill is received after the date listed in first_generated_date, and 0 otherwise (this field is also defined for accounts in the control group, and signifies when their treatment group counterparts begin receiving HERs). The value of a_3 is an estimate of the average change in usage (for both treatment and control groups) between the pre-HER and post-HER periods. This change is assumed to be independent of the effect of the HERs themselves.
- $treat_i$, which is an indicator variable, equal to 1 if an account's recipient_status field is equal to "RECIPIENT," and equal to 0 otherwise. The value of a_4 is an estimate of the average difference in usage between the treatment and control groups, when the bills are taken as a whole. For all of the models fitted, this coefficient was not significant at 5% confidence, serving as an additional confirmation of the randomization into treatment and controls.
- The interaction term $treat_i \times post_{i,t}$, is an indicator, which equal to 1 when a bill originates from a treatment account during the post-HER period, and 0 otherwise. Its coefficient a_5 is an estimate in daily energy usage among the treatment group during the post period, after controlling for the same pre-post change in the control group, and the systematic differences between treatment and control groups.

It should be noted, that the main quantity of interest, a_5 , is an average over the entire treatment group and does not distinguish between differences in, for example, date at which the first HER was generated. While it does not stratify the savings estimated among

all possible groupings of the treatment group, the value of a_5 is general, so it can be uniformly applied to all participants.

Estimating Coefficients of the Regression Models

The coefficients of the regression models were estimated by applying estimation procedures that take into account both the cross-sectional and the time-series dimensions of the data. In particular, regression models were estimated by pooling cross-sectional observations (i.e., customers) with time-series observations (i.e., daily consumption).

As a first pass, the linear model was fit using pooled ordinary least squares (using the “lm” command in the R language’s base library⁴⁹), which does not take into account heterogeneity due to individual households. This is done as a “reasonableness check” to see whether the model coefficients are within an expected range.

As a second pass, to achieve a better fit with the data, a “mixed-effects” specification was used for the panel regression modeling. The purpose of this specification is to control for those determinants of a household’s electricity use that are constant over time. The model specification is identical to that used for the OLS model, except that the error term is decomposed as:

Equation 19: Error Term Decomposition

$$\epsilon_{i,t} = u_i + v_{i,t}.$$

That is, the noise in the data is assumed to be accounted for by random differences (u_i) from the average usage among different accounts, and irreducible noise ($v_{i,t}$), which is due to the limitations of the model. Accounting for this noise structure in the data allows one to get better and less-biased inferences on the value of the model coefficients, as well as their uncertainties.

Standard statistical tests and regression diagnostics were used to evaluate the performance of the models. Each model is screened for implausible results. The statistical tests and diagnostics include evaluating the t-statistics for estimated coefficients and the R^2 for equation fit and examining residuals from the fitted models. The results of the statistical testing and diagnostic screening are used to select the model that explains the data best. The goodness-of-fit for the mixed effects models are given

⁴⁹ R Core Team (2014). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <http://www.R-project.org/>.

by two different numbers. The larger is the conditional R^2 , which is the amount of variation explained by the model variables and the random intercepts. The marginal R^2 is the smaller number that gives the amount of variation explained by the model variables alone and is more analogous to the r-squared value for the pooled OLS.

Method for Calculating Program Level Savings

Once an appropriate regression model is estimated, the regression results were used in the calculation of per-participant and program-level kWh savings and kW savings.

Method for Calculating Program kWh Savings

For the post-only model, savings is calculated by multiplying β across all days during which customers are active in the post treatment period.

Method for Calculating kW Reduction

For the estimation of demand impacts, it is assumed that the demand reductions achieved with HERs have a flat hourly profile (i.e. the same for all hours). Under this assumption, the demand reductions are derived from the daily energy savings estimates by dividing by 24 (which is equivalent to dividing the annual energy savings by 8760).

Dual Enrollment Effect

To control for energy savings associated with participation in other FirstEnergy residential energy conservation programs or subprograms, ADM obtained lists of program participants for the following programs and subprograms and conduct a data merge on the customer account field to flag participants with dual enrollments. The residential conservation programs that could produce energy savings for customers (as opposed to the utility company) are as follows:

- Easy Cool Rewards Program (incentives for programmable thermostats)
- Appliance Turn-In
- Appliance Rebates (part of the Energy Efficient Products Program)
- CFL Retail Program (part of the Energy Efficient Products Program)
- HVAC Tune-ups and Rebates (part of the Energy Efficient Products Program)
- Community Connections (Low-Income) Program
- Comprehensive Home Audits

- Energy Conservation Kits
- Residential New Homes
- Behavioral Modification

A flag variable was created that identified dual enrollments.

Data Elements for Billing Analysis

The following data elements were provided by Opower and the Companies for customers randomly selected into the treatment and control group samples.

- Utility customer ID (Account Number)
- Customer Name
- Service Address Zip Code
- Meter Type
- Beginning and end dates of monthly electric bills, and number of days billed.
- For the 2014 analysis: Monthly kWh consumption billed for each customer for 24 months: January 2012 – December 2014
- Billing Period Usage
- Dates of receipt of energy HERs for each customer
- Treatment and control group home characteristic data

Data for the 2014 treatment group members was provided for the 12 months prior to the first recorded energy usage report receipt date and then for all subsequent months up to the latest available date (e.g., through December 2014). Data for the 2014 control group members was also provided for the 24 month span covering 2012 and 2014. Table 4-19 summarizes the focus of the impact evaluation questions along with their associated methods of data collection and analysis.

The billing data for each operating company were screened for the following data points:

- Bills recording fewer than 7 days of usage, and more than 37 days were dropped.
- Bills recording fewer than 250 kWh of usage, and more than 7000 kWh of usage were dropped.
- Accounts that received no HERs (as indicated by a blank “first_generated_date” field) were dropped.

Together, these criteria excluded around 3% of the data points.

Table 4-19: Summary of Impact Evaluation Questions and Methods

Evaluation Question	Data Collection Method	Data Analysis Method
Is there a Behavioral Program effect?	24 months of billing records	Linear Multiple Regression
How do savings vary by weather and home characteristics?	Program tracking data and certified weather data	Linear Multiple Regression
What kinds of changes are made by participants?	Online/Telephone surveys	Qualitative Analysis
Behavioral vs. Structural changes?	Online/Telephone surveys	Qualitative Analysis

Sampling Plan

ADM received a near census of data for the 2014 Behavioral impact evaluation.

4.4.2 Process Evaluation Methodology

The process evaluation component was designed to answer the following research questions:

- Did customers remember receiving the Home Energy Reports, and if so, had they done anything to save energy in the home in response to the information in the report?
- If customer did not do anything in response to the HER, why not?
- How satisfied are customers with the Behavioral Modification program?

Approach to Evaluating Home Energy Reports

ADM selected a random sample of over 97 customers⁵⁰ (stratified across the three EDCs) who received HERs in 2014. Through online and telephone surveys, we determined whether or not the customer remembers receiving the HERs. We also determined the usefulness of this information to the participants and the actions customers took in response to the information provided. Actions taken were identified as structural (i.e., primarily equipment upgrades) or behavioral.

⁵⁰ A sample size of 70 meets Ohio sampling standards for achieving 90% confidence with at least 10% precision.

The sampling plan for conducting online/telephone surveys with customers receiving HERs is shown in Table 4-20. The sample met 90/10 requirements for confidence and precision and was stratified by utility.

*Table 4-20: Online/Telephone Survey
Sampling Plan for Customers receiving HERs*

Operating Company	Sampling Proportion	Sample Size (Completes)
OE	0.38	N=37
CEI	0.33	N=32
TE	0.29	N=28
Total	1.00	N=97

Process Survey Analysis

A total of 97 completed surveys were conducted by online surveys via SurveyGizmo or telephone surveys conducted by VuPoint.⁵¹ But not all of the customers answered all the questions. Interview questions included the following:

- Have you done anything in the past year or so in response to the personalized action steps or tips, or other information contained in the Home Energy Reports?
- How well did you understand the information provided?
- How well did this information meet your needs? How or why?
- What were you able to do with this information? What actions did you take as a result of the telephone audit, if any, to conserve energy in your home? Have you noticed any savings on your electric bill as a result of these actions?

⁵¹ Survey instrument found in Appendix E

5. Detailed Evaluation Findings

This chapter provides the findings of the impact evaluation component of this report.

5.1 Detailed Evaluation Findings: Audits

5.1.1 Verification of Residential Energy Audit Program Population

Table 5-1 shows the quantities of qualified energy efficient measures that were rebated per operating company and for the total REA Program in 2014.

Table 5-1: Quantities of Qualified Measures Installed through REA Program in 2014 by Operating Company and Type of Measure

Operating Company	CEI	OE	TE	Total
<u>Direct Install Measures</u>				
12/22/33 Watt 3-way CFL	53	69	28	150
13 Watt CFL (60 watt)	961	1,006	429	2,396
14W Globe CFL	113	185	8	306
20 Watt CFL (75 watt)	376	553	159	1,088
25 Watt CFL (100 watt)	390	539	157	1,086
7W Candelabra CFL	25	57	3	85
9W Candelabra CFL	6	-	-	6
LED Nightlight	6	4	-	10
Seven Plug Smart Power Strips	32	27	-	59
Kitchen Aerator	5	2	-	7
Bath Aerator	1	15	-	16
Low Flow Showerhead	9	14	-	23
Pipe Insulation	7	11	5	23
Furnace Whistle	1	2	-	3
Total Quantity of Direct Install Measures	1,985	2,484	789	5,258
<u>Rebate Measures</u>				
Attic Insulation	9	68	32	109
Wall Insulation	6	51	18	76
ENERGY STAR Windows	2,677	1,601	43	4,321
Total Quantity of Rebate Measures	2,692	1,720	93	4,506
Grand Total for Quantity of Measures	4,677	4,204	882	9,763

5.1.2 Residential Energy Audit Gross Annual kWh Savings

The program-level estimates of energy savings reported in this subsection and the peak demand reductions reported in the following subsection were developed by applying the methods described in Chapter 4. On a measure-by-measure basis, savings per unit were developed by applying TRM values and/or algorithms combined with in-situ data.

Annual kWh savings by measure and operating company, for the PY2014 REA Program are shown in Table 5-2 through Table 5-4. The verified kWh savings resulted in a program level realization rate of 100%. The direct install measures had a realization rate of 102%. Four lighting measures contributed to the variance from a 100 percent realization for direct install measures. For the 100W equivalent CFL, ADM verified that a 25W CFL was installed instead of a 23W CFL. For the 14W Globe CFL, 7W, and 9W candelabra CFL, the *ex-ante* estimated savings were calculated incorrectly. The rebated measures had a 94% realization rate because of lower verified savings for attic insulation measures due to errors in the program data.

- Total kWh savings for the REA program in 2014 were 365,083 kWh.
 - Among the three service territories, CEI accounted for 39 percent of total kWh savings, OE for 47 percent, and TE for 14 percent.
 - Of the total kWh savings, 74 percent resulted from direct install measures and 26 percent from rebate measures.
 - Taken together, the various types of CFLs directly installed through the program accounted for 71 percent of the total kWh savings, ENERGY STAR windows for 21 percent, and all other measures for the remaining 8 percent.

Table 5-2: Ex Post Annual kWh Savings by Measure for CEI

<i>Measure</i>	<i>Ex Ante kWh</i>	<i>Ex Post kWh</i>	<i>Realization Rate</i>
<u>Direct Install Measures</u>			
12/22/33 Watt 3-way CFL	3,413	3,416	100%
13 Watt CFL (60 watt)	36,614	36,598	100%
14W Globe CFL	5,096	4,634	91%
20 Watt CFL (75 watt)	22,034	22,029	100%
25 Watt CFL (100 watt)	26,286	28,562	109%
7W Candelabra CFL	563	513	91%
9W Candelabra CFL	174	158	91%
LED Nightlight	158	158	100%
Energy Savings Surge Protector	1,808	1,808	100%
Kitchen Aerator	155	154	100%
Bath Aerator	53	53	100%
Low Flow Showerhead	1,744	1,728	99%
EHW Pipe Insulation	577	577	100%
Furnace Whistle	149	149	100%
Total	98,823	100,537	102%
<u>Rebate Measure</u>			
Attic Insulation	454	2,784	613%
Wall Insulation	349	349	100%
ENERGY STAR Windows	38,780	38,853	100%
Total	39,583	41,986	106%
Grand	138,406	142,524	103%

Table 5-3: Ex Post Annual kWh Savings by Measure for OE

<i>Measure</i>	<i>Ex Ante kWh</i>	<i>Ex Post kWh</i>	<i>Realization Rate</i>
<u>Direct Install Measures</u>			
12/22/33 Watt 3-way CFL	4,444	4,447	100%
13 Watt CFL (60 watt)	38,329	38,311	100%
14W Globe CFL	8,344	7,587	91%
20 Watt CFL (75 watt)	32,406	32,400	100%
25 Watt CFL (100 watt)	36,329	39,474	109%
7W Candelabra CFL	1,283	1,169	91%
9W Candelabra CFL	-	-	-
LED Nightlight	105	105	100%
Energy Savings Surge Protector	1,721	1,526	89%
Kitchen Aerator	62	62	100%
Bath Aerator	795	794	100%
Low Flow Showerhead	2,713	2,688	99%
EHW Pipe Insulation	1,909	1,909	100%
Furnace Whistle	298	303	102%
Total	128,735	130,775	102%
<u>Rebate Measure</u>			
Attic Insulation	10,514	4,311	41%
Wall Insulation	5,582	5,584	100%
ENERGY STAR Windows	29,302	29,767	102%
Total	45,398	39,661	87%
Grand	174,133	170,436	98%

Table 5-4: Ex Post Annual kWh Savings by Measure for TE

<i>Measure</i>	<i>Ex Ante kWh</i>	<i>Ex Post kWh</i>	<i>Realization Rate</i>
<i>Direct Install Measures</i>			
12/22/33 Watt 3-way CFL	1,803	1,805	100%
13 Watt CFL (60 watt)	16,345	16,338	100%
14W Globe CFL	361	328	91%
20 Watt CFL (75 watt)	9,317	9,316	100%
25 Watt CFL (100 watt)	10,582	11,498	109%
7W Candelabra CFL	68	62	91%
9W Candelabra CFL	-	-	-
LED Nightlight	-	-	-
Energy Savings Surge Protector	-	-	-
Kitchen Aerator	-	-	-
Bath Aerator	-	-	-
Low Flow Showerhead	-	-	-
EHW Pipe Insulation	444	444	100%
Furnace Whistle	-	-	-
Total	38,920	39,789	102%
<i>Rebate Measure</i>			
Attic Insulation	2,850	613	22%
Wall Insulation	1,860	1,861	100%
ENERGY STAR Windows	9,825	9,860	100%
Total	14,535	12,334	85%
Grand	53,455	52,123	98%

5.1.3 Residential Energy Audit Gross Peak Demand (kW) Reduction

The verified kW reductions resulted in a program level realization rate of 104%. The direct install measures had a realization rate of 101%, and rebated measures had a realization rate of 107%. Estimates of annual kW reductions by measure and operating company for the PY2014 REA subprogram are shown in Table 5-5 through Table 5-7:

- Total kW reductions for the REA program in 2014 were 80 kW.
- Among the three service territories, CEI accounted for 37 percent of total kW reductions, OE for 47 percent, and TE for 16 percent.
- Of the total kW reductions, direct install measures accounted for 40 percent of kW demand reductions and rebate measures for 60 percent.
- Taken together, the various types of CFLs directly installed through the program accounted for 39 percent of the total kW reductions, ENERGY STAR windows for 43 percent, and all other measures for the remaining 18 percent.

Table 5-5: Ex Post Annual kW Savings by Measure for CEI

<i>Measure</i>	<i>Ex Ante kW</i>	<i>Ex Post kW</i>	<i>Realization Rate</i>
<i>Direct Install Measures</i>			
12/22/33 Watt 3-way CFL	0.408	0.409	100%
13 Watt CFL (60 watt)	4.417	4.377	99%
14W Globe CFL	0.609	0.554	91%
20 Watt CFL (75 watt)	2.632	2.635	100%
25 Watt CFL (100 watt)	3.158	3.416	108%
7W Candelabra CFL	0.068	0.061	90%
9W Candelabra CFL	0.028	0.019	68%
LED Nightlight	-	-	-
Energy Savings Surge Protector	0.198	0.202	102%
Kitchen Aerator	0.020	0.020	99%
Bath Aerator	0.007	0.007	97%
Low Flow Showerhead	0.225	0.221	98%
EHW Pipe Insulation	0.065	0.066	101%
Furnace Whistle	-	-	-
Total	11.835	11.987	101%
<i>Rebate Measure</i>			
Attic Insulation	0.336	0.363	108%
Wall Insulation	0.409	0.410	100%
ENERGY STAR Windows	17.023	17.331	102%
Total	17.768	18.104	102%
Grand	29.603	30.091	102%

Table 5-6: Ex Post Annual kW Savings by Measure for OE

<i>Measure</i>	<i>Ex Ante kW</i>	<i>Ex Post kW</i>	<i>Realization Rate</i>
<u>Direct Install Measures</u>			
12/22/33 Watt 3-way CFL	0.530	0.532	100%
13 Watt CFL (60 watt)	4.621	4.582	99%
14W Globe CFL	0.998	0.907	91%
20 Watt CFL (75 watt)	3.871	3.875	100%
25 Watt CFL (100 watt)	4.360	4.721	108%
7W Candelabra CFL	0.154	0.140	91%
9W Candelabra CFL	-	-	-
LED Nightlight	-	-	-
Energy Savings Surge Protector	0.166	0.170	102%
Kitchen Aerator	0.008	0.008	99%
Bath Aerator	0.102	0.102	100%
Low Flow Showerhead	0.350	0.344	98%
EHW Pipe Insulation	0.216	0.218	101%
Furnace Whistle	-	-	-
Total	15.376	15.600	101%
<u>Rebate Measure</u>			
Attic Insulation	4.005	3.222	80%
Wall Insulation	2.062	6.528	317%
ENERGY STAR Windows	12.703	12.186	96%
Total	18.770	21.936	117%
Grand	34.146	37.536	110%

Table 5-7 Ex Post Annual kW Savings by Measure for TE

<i>Measure</i>	<i>Ex Ante kW</i>	<i>Ex Post kW</i>	<i>Realization Rate</i>
<i>Direct Install Measures</i>			
12/22/33 Watt 3-way CFL	0.216	0.216	100%
13 Watt CFL (60 watt)	1.975	1.954	99%
14W Globe CFL	0.044	0.039	89%
20 Watt CFL (75 watt)	1.113	1.114	100%
25 Watt CFL (100 watt)	1.272	1.375	108%
7W Candelabra CFL	0.008	0.007	92%
9W Candelabra CFL	-	-	-
LED Nightlight	-	-	-
Energy Savings Surge Protector	-	-	-
Kitchen Aerator	-	-	-
Bath Aerator	-	-	-
Low Flow Showerhead	-	-	-
EHW Pipe Insulation	0.052	0.051	97%
Furnace Whistle	-	-	-
Total	4.680	4.757	102%
<i>Rebate Measure</i>			
Attic Insulation	2.068	0.708	34%
Wall Insulation	1.470	2.148	146%
ENERGY STAR Windows	4.896	5.069	104%
Total	8.434	7.925	94%
Grand	13.114	12.681	97%

5.1.4 Results of Regression Analysis for Online Audit

The results of the regression analysis (estimated coefficients and their corresponding standard errors) for the models used for determining kWh savings are reported in Table 5-8. Definitions for the variables in the model are provided in Table 5-9.

*Table 5-8: Results of Regression Analysis of Billing Data
for Models Used to Estimate kWh Savings for Participants in the 2014 OA Program*

Variable	Comparison Group	Telephone Audit	Online Audit
Constant	22.10	27.81	28.13
Heating degree-days (HDD) per day for billing period	0.205*** (0.002)	0.539*** (0.011)	0.353*** (0.007)
Cooling degree-days (CDD) per day for billing period	1.03*** (0.024)	1.048*** (0.099)	1.233*** (0.057)
Post	-5.806*** (0.215)	-11.254*** (0.917)	-11.205*** (0.504)
Post * HDD per day for billing period	0.158*** (0.009)	0.404*** (0.037)	0.382*** (0.019)
Post * CDD per day for billing period	1.387*** (0.053)	1.770*** (0.237)	2.208*** (0.133)
Mean of dependent variable	27.223	38.108	35.74
Number of customers	14,751	1,683	3,865
R-squared	0.04	0.12	0.07

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5-9: Definitions for Variables in Regression Models

Variable Name	Variable Definition	Measurement Scale
kWh per day	Average daily kWh for customer during billing period	Continuous variable
Customer ID	Customer contract account number	Continuous variable
Cooling degree-days per day	Cooling degree days, referenced to base temperature of 68°F during billing period	Continuous variable
Heating degree-days per day	Heating degree days, referenced to base temperature of 67°F during billing period	Continuous variable
Post	Post Audit indicator variable (0 = pre-audit; 1 = post-audit)	Binary variable

5.1.5 kWh Savings and kW Reductions for Participants in the 2014 Online Audit Program

The results from the regressions reported in Table 5-8 were used to determine annual kWh savings and kW reductions per participant for the 2014 OA program. All coefficients of interest that were significant at the 90% confidence level were used for this purpose.

The regression results reported in Table 5-8 were used to determine weather-normalized differences in pre- and post-audit annual kWh for customers in the 2014 OA program and in the comparison group. These weather-normalized values for differences in pre- and post-audit annual kWh are presented in Table 5-10 by utility and type of audit. Customers receiving an online audit in the TE territory had no change in annual usage. However, there were reductions in annual energy use for customers who received an audit by telephone in the TE territory, as well as customers in the other territories receiving audits either by telephone or online.

For each type of audit, annual kWh savings are calculated by subtracting the difference in annual pre-post kWh for the comparison group from the difference in annual pre-post kWh for the particular audit category. For example, using the values reported in Table 5-2 5-10, annual kWh savings for a CEI customer receiving an online audit are calculated as $622.69 - 395.295 = 227.395$ kWh savings per year. The annual kWh savings values determined through these calculations are reported by utility and type of audit in Table 5-11.

The average kW reductions during critical peak hours per participant are reported in Table 5-12. As defined by the PUCO, critical peak hours occur on weekdays during June, July, and August from 3 PM to 6 PM.

*Table 5-10: Differences in Pre and Post Audit Annual kWh per Participant
by Utility and Audit Method*

CEI					
Type of Audit	HDD per Day	CDD per Day	Daily kWh, Pre	Daily kWh, Post	Difference in Annual Pre-Post kwh
Comparison	17.961	1.364	27.185	26.102	395.295
Telephone	16.551	1.426	38.216	36.165	748.615
Online	16.830	1.393	35.782	34.076	622.69
OE					
Type of Audit	HDD per Day	CDD per Day	Daily kWh, Pre	Daily kWh, Post	Difference in Annual Pre-Post kwh
Comparison	18.869	1.618	27.634	27.046	214.620
Telephone	17.610	1.645	39.017	37.782	450.775
Online	17.734	1.623	36.386	35.534	310.98
TE					
Type of Audit	HDD per Day	CDD per Day	Daily kWh, Pre	Daily kWh, Post	Difference in Annual Pre-Post kwh
Comparison	20.671	1.279	27.654	26.881	282.145
Telephone	18.450	1.641	39.466	38.562	329.96
Online	18.450	1.498	36.804	36.804	0

*Table 5-11: Annual kWh Savings per Customer for 2014 OA Participants
by Utility and Type of Audit*

Type of Audit	CEI	OE	TE	Weighted Average across Utilities
Telephone Audit	353.32	236.155	47.89	248.005
Online Audit	227.395	96.36	0	127.369

Weighted average across utilities calculated using weights based on percentages of 2014 OA participants coming from different utilities.

*Table 5-12: kW Reduction per Hour per Participant during Critical Peak Hours
Summarized by Audit Method of Audit*

Type of Audit	CEI	OE	TE	Weighted Average across Utilities
Telephone	0.05	0.03	0.01	0.034
Online	0.06	0.02	-	0.031

Weighted average across utilities calculated using weights based on percentages of 2014 OA participants coming from different utilities, per Table 5-10.

5.1.6 Online Audits Gross Annual kWh Savings

Program-level savings for the 2014 OA program were determined by multiplying the per audit savings results from Table 5-13 by the number of participants who received audits by different methods in the different service territories. The program-level kWh savings by utility and audit method are shown in Table 5-13. Total kWh savings for the 2014 OA program were determined to be 2,120,374 kWh.

*Table 5-13: Program-Level Electric Energy Savings (kWh) for 2014 OA Program
by Utility and Type of Audit*

CEI			
	Telephone	Online	Totals
kWh saved per participant	353	227	
Number of participants	1,342	3,161	4,503
Total kWh saved	473,726	717,547	1,191,273
OE			
	Telephone	Online	Totals
kWh saved per participant	236	97	
Number of participants	2,041	4,289	6,330
Total kWh saved	481,676	416,033	897,709
TE			
	Telephone	Online	Totals
kWh saved per participant	48	-	
Number of participants	654	1,341	1,995
Total kWh saved	31,392	-	31,392
Totals across Utilities			
	Telephone	Online	Totals
Number of participants	8,791	4,037	12,828
Total kWh saved	986,794	1,133,580	2,120,374

5.1.7 Online Audits Gross Peak Demand (kW) Reduction

Program-level critical peak demand impacts for the 2014 OA program were determined by applying the per audit kW reduction values from Table 5-12. The program-level kW reductions by utility and type audit are shown in Table 5-14. Total kW reductions for the 2014 OA program were determined to be about 410 kW.

*Table 5-14: Program-Level kW Reductions during Critical Peak Hours
by Utility and Type of Audit*

CEI			
	Telephone	Online	Totals
kW reduction per participant	0.05	0.06	
Number of participants	1,342	3,161	4,503
Total kW reduction	67.1	189.7	256.76
OE			
	Telephone	Online	Totals
kW reduction per participant	0.03	0.02	
Number of participants	2,041	4,289	6,330
Total kW reduction	61.2	85.8	147
TE			
	Telephone	Online	Totals
kW reduction per participant	0.01	-	
Number of participants	654	1,341	1,995
Total kW reduction	6.5	0	6.5
Totals across Utilities			
	Telephone	Online	Totals
Number of participants	8,791	4,037	12,828
Total kW reduction	134.8	275.5	410.3

5.1.8 Online Audits Findings from the Persistence Analysis

In addition to the analysis of first year OA participants, a major aspect of the 2014 evaluation was to examine the degree to which the savings achieved by participants in the OA program in 2010, 2011, 2012, and 2013 persisted through 2014.

Findings on Persistence from Analysis of Billing Data

The procedure for using regression analysis of billing data to examine the persistence of savings for earlier cohorts of participants in the OA program was described in Section 4.1.3. The results of applying that procedure are presented here.

The results of applying the regression analysis results to determine savings persistence are reported in Table 5-15.

- For the 2010 cohort, the ratios of energy use in 2014 to pre-audit energy use show a lowering of energy use for all online and telephone audit participants. For this case, the ratio of energy use for the 2014 comparison group to that for the 2010 comparison group is 89.63 percent, indicating that energy among non-participants had decreased. Moreover, the decrease for non-participants was greater than for either of the audit groups. These observations imply that program-induced savings for the 2010 audit groups had not persisted.
- For the 2011 cohort, all of the ratios of energy use in 2014 to pre-audit energy use show an increase in energy use. However, the ratio of energy use for the 2014 comparison group to that for the 2011 comparison group is 103.68 percent, indicating that energy use among non-participants had increased to a greater degree than the 2011 telephone audit participant group but less than the degree of the 2011 online audit participant group. These observations imply that program-induced savings for the 2011 telephone audit group had persisted, but program-induced savings for the 2011 online audit group had not persisted.
- For the 2012 cohort, the ratios of energy use in 2014 to pre-audit energy use show that energy use has more or less remained the same. However, the ratio of energy use for the 2014 comparison group to that for the 2012 comparison group is 94.03 percent, indicating that energy use among non-participants had decreased. Taking these observations together imply that savings for the audit groups had not persisted.
- For the 2013 cohort, the ratios of energy use in 2014 to pre-audit energy use show that energy use has decreased for both audit participant groups. However, the ratio of energy use for the 2014 comparison group to that for the 2012 comparison group is 96.05 percent, indicating that energy use among non-participants had decreased to a greater degree than the 2013 telephone audit participant group but less than the degree of the 2013 online audit participant group. These observations imply that program-induced savings for the 2013 online audit group had persisted, but program-induced savings for the 2013 telephone audit group had not persisted.

Table 5-15: Results of Applying Regression Analysis of Billing Data to Determine Persistence of Savings for Past Participants in the OA Program

Type of Audit	Estimated Per-Customer Annual kWh Usage (Weather Normalized)		Ratio of Energy Use, 2014 to Pre-Audit
	Pre-Audit	In 2014	
2010 Cohort			
Telephone	14,469	13,596	93.97%
Online	13,250	13,198	99.61%
2011 Cohort			
Telephone	12,523	12,906	103.06%
Online	12,629	13,202	104.54%
2012 Cohort			
Telephone	12,629	12,702	100.58%
Online	12,556	12,447	99.13%
2013 Cohort			
Telephone	13,286	13,052	98.24%
Online	12,724	12,059	94.77%
Comparison Groups			
Non-Participants		Estimated Per-Customer Annual kWh Usage (Weather Normalized)	
For 2010 Cohort		10,914	
For 2011 Cohort		9,435	
For 2012 Cohort		10,403	
For 2013 Cohort		10,184	
For 2014 Cohort		9,782	
Ratio, 2014 to 2010		89.63%	
Ratio, 2014 to 2011		103.68%	
Ratio, 2014 to 2012		94.03%	
Ratio, 2014 to 2013		96.05%	

Findings on Persistence from Survey Responses

Samples of customers who received either a telephone audit or an online audit through the OA program in 2010, 2011, 2012, and 2013 were surveyed to determine whether they continued energy savings practices.

Table 5-16 reports on actions that the surveyed customers reported taking in response to the audit they received. For 2010, 2011, 2012, and 2013, customers receiving an online audit were more likely to report taking energy saving actions than customers who received a telephone audit. Behavioral actions were the most likely to have been taken.

Table 5-16: Percentages of Participants in 2010, 2011, 2012, and 2013 OA Program Taking Different Types of Energy Saving Actions

<i>Type of Energy</i>	<i>Saving Action</i>	<i>Structural (Equipment)</i>	<i>Behavioral</i>	<i>No Changes Made</i>	<i>Did not know / did not recall</i>	<i>Sample sizes</i>
2010 OA Participants	Telephone Audits	10.71%	17.86%	57.14%	14.29%	n = 28
	Online	33.33%	47.37%	26.32%	5.00%	n = 57
2011 OA Participants	Telephone Audits	22.58%	16.13%	54.84%	6.47.%	n = 31
	Online	35.84%	52.83%	30.20%	4.20%	n = 53
2012 OA Participants	Telephone Audits	31.60%	34.20%	34.20%	13.20%	n = 38
	Online	27.60%	43.10%	25.90%	12.10%	n = 58
2013 OA Participants	Telephone Audits	28.40%	29.70%	36.50%	13.50%	n = 74
	Online	35.90%	51.30%	25.60%	6.40%	n = 78

Persistence rates varied substantially between cohorts and audit types. Table 5-17 reports the persistence of structural and behavioral changes for the various cohorts. For those customers taking actions, persistence rates varied substantially between cohorts and audit types.

*Table 5-17: Rates of Persistence for Structural and Behavioral Changes
for Participants in 2010, 2011, 2012, and 2013 OA Program*

		Percent making structural changes	Percent still having structural changes in place	Sample Size	Percent making behavioral changes	Percent still following changed behavioral practices	Sample Size
2010 OA Participants	Telephone Audits	10.71%	33.33%	n = 3	17.86%	100.00%	n = 3
	Online Audits	33.33%	94.74%	n = 19	47.37%	93.55%	n = 31
2011 OA Participants	Telephone Audits	22.58%	71.43%	n = 7	16.13%	100.00%	n = 3
	Online Audits	35.84%	93.75%	n = 16	52.83%	96.00%	n = 25
2012 OA Participants	Telephone Audits	31.60%	90.00%	n = 10	34.20%	50.00%	n = 8
	Online Audits	27.60%	90.90%	n = 11	43.10%	80.00%	n = 20
2013 OA Participants	Telephone Audits	28.40%	90.50%	n = 21	36.50%	100.00%	n = 15
	Online Audits	35.90%	96.20%	n = 26	51.30%	77.50%	n = 31

5.2 Detailed Evaluation Findings: Energy Conservation Kits

This section presents the findings of the impact evaluation of the Efficiency Kits subprogram.

5.2.1 Verification of Energy Conservation Kits Program Population

ADM delivered a survey to a random sample of program participants drawn from the participant data contained in the SSRS database. The purpose of the survey was to verify receipt of energy conservation kits and to determine the measure specific in-service rate (ISR). Table 5-18 shows the delivery totals by kit type by operating company.

Table 5-18: Count of Kit Types Delivered by Operating Company

Kit Type	Operating Company			
	CEI	OE	TE	Total
Electric	4,259	5,466	2,964	12,689
Standard	30,645	29,266	17,824	77,735
Schools	1,701	8,476	2,632	12,809
Total	36,605	43,208	23,420	103,233

The ISR, as determined from the participant survey, for each measure in the Energy Conservation Kit is shown in Table 5-19. The participant survey findings resulted in adjustments to the TRM measure specific algorithms which were applied for ex post analysis. The realization rates for each type of kit for kWh savings and kw reductions were impacted as result. For the standard CFL measures in-service rates were found to be greater than during program year 2013. For the non-standard bulbs, three way CFLs were found to have a greater in-service rate than the globe CFL. The LED night lights continued to have a significant percentage installed but not replacing inefficient incandescent night lights. The smart strip was installed correctly by customers at a greater rate than during program year 2013. The furnace whistle continued to have a low in-service rate. For the measures delivered to customers with electric water heaters, aerators were installed at an increased rate while the low-flow shower heads were installed at a decreased rate.

Table 5-19: Impact Evaluation ISRs Determined by Survey (Residential Kits)

Measure	N	Measure In-Service Rate (ISR)
13W CFL	257	74%
20W CFL	257	88%
23W and 26W CFL ⁵²	257	78%
3 Way CFL		76%
Globe CFL		67%
LED Night Lights (2)	210	Replacement for existing night light: 27% Directly installed night light: 50%
LED Night Lights (3)	195	Replacement for existing night light: 21% Directly installed night light: 40%
Furnace Whistle	202	14%
7 Plug Smart Strip	232	73%
Faucet Aerator ⁵³	45	32%
Showerhead ⁵⁴	81	20%

The ISR for each measure in the School Education Kit is shown in Table 5-20. The ISR for faucet aerators for schools kits accounts for how many of the aerators were installed in homes with electric water heaters as a percentage of the total number of schools kits distributed.

Table 5-20: Impact Evaluation ISRs Determined by Survey (Schools Kits)

Measure	N	Measure In-Service Rate (ISR)
13W CFL	255	84%
18W CFL	191	84%
LED Night Light	220	Replacement for existing night light: 45% Directly installed night light: 50%
Faucet Aerator	242	14%

5.2.2 Energy Conservation Kits Gross Annual kWh Savings

Table 5-21 below shows the Ex Post Annual kWh savings by kit type for each EDC. The subprogram level kWh realization rate was 96%. The less than 100% realization rate for the subprogram was due to variances of in-service rates. The ex ante estimates utilized in-service rates determined by ADM's 2013 evaluation while ADM utilized in-service rates determined from the 2014 participant surveys.

⁵² 100W incandescent equivalent.

⁵³ This measure only contained in the all-electric kits.

⁵⁴ Ibid.

Table 5-21: Ex Post Annual kWh Savings by Kit Type

<i>Kit Type</i>	<i>Ex Ante kWh</i>	<i>Ex Post kWh</i>	<i>Realization Rate</i>
<u>CEI</u>			
Electric	2,643,948	2,647,224	100%
Standard	16,727,572	15,562,997	93%
Schools	320,162	322,224	101%
Total	19,691,681	18,532,445	94%
<u>OE</u>			
Electric	3,419,140	3,415,981	100%
Standard	16,367,723	14,939,885	91%
Schools	1,454,588	1,605,626	110%
Total	21,241,451	19,961,492	94%
<u>TE</u>			
Electric	1,698,594	1,782,852	104%
Standard	8,300,133	8,771,903	106%
Schools	442,524	498,585	113%
Total	10,441,251	11,053,340	106%
Grand Total			
	51,374,385	49,547,277	96%

5.2.3 Energy Conservation Kits Gross Peak Demand (kW) Reduction

Table 5-22 below shows the Ex Post Annual kW demand savings by kit type for each EDC. The subprogram realization rate for demand savings was 104%. The slightly higher than 100% realization rate, in similar fashion to the variance in kWh savings, was due to ex ante demand reduction estimates that used different in-service rates than those utilized by ADM.

Table 5-22: Ex Post Annual kW Reduction by Kit Type

<i>Kit Type</i>	<i>Ex Ante kW</i>	<i>Ex Post kW</i>	<i>Realization Rate</i>
<u>CEI</u>			
Electric	267	289	108%
Standard	1,703	1,737	102%
Schools	37	37	98%
Total	2,007	2,062	103%
<u>OE</u>			
Electric	345	373	108%
Standard	1,662	1,668	100%
Schools	181	183	101%
Total	2,188	2,223	102%
<u>TE</u>			
Electric	173	194	111%
Standard	861	977	113%
Schools	56	57	101%
Total	1,090	1,227	112%
Grand Total	5,285	5,512	104%

5.3 Detailed Evaluation Findings: New Homes

This section presents the findings of the impact evaluation of the New Homes subprogram.

5.3.1 Verification of New Homes Program Population

As a first step toward determining program level kWh and kW impacts, ADM reviewed program tracking data provided by PSD as well as the final SSRS database information.

5.3.2 New Homes Gross Annual kWh Savings

Gross annual kWh savings were calculated as described in Chapter Four of this report. The details and results of these calculations are reported in this section.

Table 5-27 shows the quantities of homes, *ex ante* and *ex post* kWh, and realization rates for each stratum. For the final sampling plan, M&V sites were selected by EDC and by builder. Selecting sites by builder ensured a valid sample was taken across the complete population for each EDC. For each EDC, the builders were separated into strata based on number of homes built as well as size of homes. The final program *ex post* verified energy savings was 2,339,659, resulting in a program level realization rate of 104%.

Table 5-28 shows the variance of energy savings and realization rates by Company.

During the *ex post* analysis, ADM adjusted model parameters to match the information found during site visits, QA/QC checks, or other sources of data used for verification. The most common change to model parameters was the percentage of energy efficient lighting for each sampled site. If the percentage of lighting differed between the available data and the model, ADM would make the necessary changes to the Rem/Rate model as required. Other less common causes of variation between *ex ante* and *ex post* savings were SEER values on AC units, system efficiencies of water heaters, and higher tested duct leakages than modeled.

Table 5-27: New Homes Energy Impacts by Strata

Strata	Ex Ante Total (kWh)	Ex Ante Sampled (kWh)	Sites Included in Sample	Ex Post Sampled (kWh)	Ex Post Total (kWh)
CE					
C1	242,768	13,018	5	13,857	258,701
C2	185,767	11,916	4	12,849	200,882
C3	67,191	2,274	1	2,291	67,693
OE					
O1	615,638	7,080	8	7,015	646,015
O2	318,646	3,625	2	3,607	338,608
O3	68,339	17,313	7	17,313	67,764
O4	302,818	10,202	2	10,161	301,315
O5	292,059	21,632	3	22,581	291,250
O6	17,313	4,702	1	4,998	17,313
O7	23,398	23,398	1	23,810	23,810
TE					
T1	123,294	19,365	10	19,779	126,307
Program Totals	2,257,231	134,525	44	138,261	2,339,659

Table 5-28: Variance of Energy Savings and Realization Rate

EDC	Ex Ante Annual Energy Savings (kWh)	Ex Post Annual Energy Savings (kWh)	Realization Rate
CEI	495,726	527,277	106%
OE	1,638,211	1,686,076	103%
TE	123,294	126,307	102%
Total	2,257,231	2,339,659	104%

5.3.3 New Homes Gross Peak Demand (kW) Savings

Gross peak demand savings were calculated per the TRM. The difference in electricity demand for the user defined reference home (UDRH) and the rated home was calculated and multiplied by a coincidence factor of 0.5 (based on the Energy Center of Wisconsin, May 2008 metering study). ADM generated fuel savings reports for the rated home's RemRate model in the version of RemRate the home was originally modeled. This eliminated any possibility of savings discrepancies due to RemRate version changes. Gross peak demand for the 2014 program year was 591 kW.

5.4 Detailed Evaluation Findings: Behavioral

The sections below outline the results for the Opower Behavioral Program.

5.4.1 Results of Regression Analysis

The results of the regression analysis (estimated coefficients and their corresponding standard errors) for the fixed effect models used for determining kWh savings are reported in Table 5-29. Definitions for the variables in the model are provided in Table 5-30. The results of the regression analysis (estimated coefficients and their corresponding standard errors) for the post-only models used for determining kWh savings are reported in Table 5-31.

Table 5-29: Results of Regression Analysis of Billing Data for Models Used to Estimate kWh Savings for Participants in the 2014 Behavioral Program

Coefficient	OE	CEI	TE
	Fixed Effects	Fixed Effects	Fixed Effects
Intercept	44.56823 (0.19507)	39.01162 (0.22011)	37.46337 (0.23126)
HDD55	2.29605 (0.01020)	1.59322 (0.01131)	1.60839 (0.01239)
CDD75	3.95426 (0.03709)	4.68952 (0.04099)	5.12214 (0.04592)
Post	1.50544 (0.23811)	1.50544 (0.25726)	1.58776 (0.28684)
PostxHDD 55	-0.51417 (0.01259)	-0.12043 (0.01381)	-0.06332 (0.01605)
Post*CDD 75	-0.00374 (0.05641)	-0.94258 (0.06298)	0.03395 (0.07688)
Post x Treat	-0.76875 (0.15766)	-0.69115 (0.16369)	-0.56016 (0.18684)
R-squared	0.749	0.356	0.327

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5-30: Definitions for Variables in Regression Models

Variable Name	Variable Definition	Measurement Scale
kWh per day	Average daily kWh for customer during billing period	Continuous variable
Cooling degree-days per day	Cooling degree days, referenced to base temperature of 70°F during billing period	Continuous variable
Heating degree-days per day	Heating degree days, referenced to base temperature of 55°F during billing period	Continuous variable
Post	Post Audit indicator variable (0 = pre-HERS; 1 = post-HERS)	Binary variable
Treat	Recipient of HERS indicator variable	Binary variable
Post x Treat	Indicator variable that interacts Post and Treat variables	Binary variable

Table 5-31: Results of Regression Analysis of Billing Data for Post-Only Models Used to Estimate kWh Savings for Participants in the 2014 Behavioral Program

Coefficient	OE	CEI	TE
	Post-Only	Post-Only	Post-Only
Intercept	5.29686 (0.66833)	-0.111275 (0.621213)	6.66234 (0.77052)
treatment	-0.758267 (0.08828)	-0.766898 (0.091732)	-0.62641 (0.10911)
avg_preusage	0.33282 (0.03225)	0.521457 (0.048405)	0.42209 (0.04308)
avg_preusage_winter	0.69385 (0.01527)	0.645586 (0.022003)	0.65616 (0.01996)
avg_preusage_summer	-0.12629 (0.01444)	-0.201957 (0.023418)	-0.19366 (0.01975)
R-squared	0.6546	0.6055	0.6143

Note: Coefficient mmt, mmt*pre_usage, mmt*pre_winter and mmt*pre_summer are omitted here.

5.4.2 kWh Savings and kW Reductions for Participants in 2014 Behavioral Program

The results from the regressions reported in Table 5-31 were used to determine annual kWh savings and kW reductions per participant for the 2014 Behavioral program. All coefficients of interest that were significant at the 90% confidence level were used for this purpose.

As mentioned in the methodology section, the estimate of the “Treat” coefficient gives the average change in daily energy consumption from pre-HER to post-HER. For the first “Wave” of customers receiving HERs, the post period in 2014 extends from, at the earliest, January 2014 up to December 2014, meaning customers in the treatment group had received HERs for a full calendar year. To arrive at an estimate of energy savings on an annual basis (365 days a year), the value of “Treat” is multiplied by 365.

*Table 5-32: Annual Savings and Reductions
per Customer for 2014 Behavioral Participant by Utility*

<i>Savings Type</i>	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Weighted Average across Utilities</i>
kWh Savings	279.92	276.76	228.64	269.17
kW Reduction	0.7669	0.7583	0.6264	0.7375

Weighted average across utilities calculated using weights based on percentages of 2014 Behavioral participants across the Companies.

5.4.3 Program-Level kWh Savings

Program-level savings for the 2014 Behavioral program were determined by multiplying the per customer savings results from Table 5-32 above by the number of participants who received HERs in the different service territories. The program-level kWh savings by utility are shown in Table 5-33 below. Total kWh savings for the 2014 Behavioral program were determined to be 5,798,800 kWh.

*Table 5-33: Program-Level Electric
Energy Savings (kWh) for 2014 Behavioral Program by Utility*

Operating Company	Estimated Daily Savings (kWh/day)	Estimated Annual Savings (kWh/year)	# Of participants	Program Annual Savings (kWh)
CEI	0.7669	279.92	7,352	2,057,955
OE	0.7583	276.76	10,311	2,853,723
TE	0.6264	228.64	3,880	887,122
Totals			21,543	5,798,800

5.4.4 Program-Level Critical Peak Demand Impacts

Program-level critical peak demand impacts for the 2014 Behavioral program were determined by applying the per customer kW reduction values. The program-level kW reductions by utility are shown in Table 5-34. Total kW reductions for the 2014 Behavioral program were determined to be about 662 kW

*Table 5-34: Program-Level kW Reductions
During Critical Peak Hours by Utility*

Operating Company	Estimated Daily Savings (kWh/day)	Estimated Per-Participant Demand Reduction (kW)	# Of participants	Program Demand Reductions (kW)
OE	0.7583	0.03159	10,311	235
CEI	0.7669	0.03195	7,352	326
TE	0.6264	0.02610	3,880	101
Totals			21,543	662

5.4.5 Persistence Group Analysis

In addition to the analysis of first year behavioral participants, a major aspect of the 2014 evaluation was to examine the degree to which the savings achieved by participants in the behavioral program in 2013 persisted through 2014.

Billing data for customers who participated in the HER program in 2013 and 2014 were analyzed to determine the extent to which their savings persisted into 2014. Surveys were also used to examine the persistence of the 2013 and 2014 cohort and to identify the actions they had taken to save energy.

Findings on Persistence from Analysis of Billing Data

The result of applying the regression analysis results to determine savings persistence are reported in Table 5-35. To arrive at an estimate of energy savings on an annual basis (365 days a year), the value of “treatment” is multiplied by 365.

Table 5-35: Results of Applying Regression Analysis of Billing Data to Determine Persistence of Savings for Past Participants in the behavioral Program

	<i>Persistent Group kWh Savings (Per Participant)</i>	<i>Persistence Participants</i>	<i>Persistence Program kWh Annual Savings</i>	<i>kW Savings</i>
CEI	0.38642	15,666	2,209,584	252.24
OE	0.537602	25,812	5,064,953	578.19
TE	0.30609	5,280	589,897	67.34
Totals		46,758	7,864,434	897.77

Findings on Persistence from Survey Responses

Samples of customers who received HER through the behavioral program in 2013 were surveyed to determine whether they continued energy savings practices. Table 5-36 reports on actions that the surveyed customers reported taking in response to the behavioral changes.

Table 5-36: Distribution of Behavioral Changes for Persistence Group

<i>Are You Continuing to Do the Behavioral changes?</i>	<i>Percentage of Customers</i>
Yes, behavior still Practiced	35.0%
Don't Know	65.0 %
Totals	100%
Sample size	n = 40

As background for the process, Table 5-37 was prepared to show the type of dwelling occupied by behavioral program participants in persistence group.

Table 5-37: Type of Dwelling Occupied by Behavioral Program Participants in persistence group

<i>Type of Dwelling</i>	<i>Participants</i>
Single-family home, detached construction	85.7%
Single-family home, factory manufactured/modular	2.4%
Mobile home/Trailer	0.0%
Row house	0.0%
Two or Three family attached residence/Duplex	7.1%
Apartment with 4+ families	2.4%
Condominium	2.4%
Rural house	0.0%
Other	0.0%
Totals	100%
Sample sizes	n = 40

6. Detailed Process Evaluation Findings

This chapter presents the process evaluation findings for the Home Performance Program.

6.1 Audits

6.1.1 Residential Energy Audit

This section provides a summary of findings organized by topics of interest from the Home Energy Audit process evaluation completed by NMR.

Program Design Changes and Objectives

PY2014 program goals were similar to those in PY2013, i) help customers identify savings opportunities within their homes and ii) provide them with an incentive to install energy savings measures. Unlike in previous program years, where only audit contractors were required to be BPI certified, all contractors were required to be BPI certified to participate in the PY2014 REA Program. The purpose of this change was to improve the quality of the services delivered to program participants by ensuring that all participating contractors had the same level of training and education. However, many of the PY2013 installation contractors were not BPI certified and were no longer eligible to participate in the program, leading to a considerable drop in the number of participating contractors between 2013 and 2014. Additionally, another design change implemented in 2014 was a revised rebate structure, which required customers to achieve a minimum level of energy savings (350 kWh) in order to obtain a rebate. LED nightlights, furnace whistles, and smart power strips were added to the list of direct-install measures. Air sealing and HVAC equipment were added to the list of rebate-eligible measures, while ceiling fans were removed.

Audit Costs and Rebates

The 2014 rebate levels were set to stay within the budget established by the public utilities commission. In contrast to previous program years in which rebates took the form of a specific dollar amount per measure, the 2014 rebates were based on kWh savings achieved in the home. The rebate levels included 1) up to \$250 for saving at least 350 kWh, 2) \$0.10 for every kWh saved for major measures installed, 3) an additional \$100 for saving over 2,000 kWh, and 4) an additional \$150 for saving at least 3,000 kWh. In order for the customer to be eligible for the initial \$250 rebate, the cost of the audit could not exceed \$350.

Two of the three active contractors interviewed thought that the rebate of up to \$250 for an audit costing up to \$350 was sufficient to encourage customer participation. One of the contractors added that because customers had to pay the full cost of the audit prior to obtaining the rebate, the program reached homeowners who were more serious about making their homes more energy efficient than if the audit had been free or discounted up-front.

Marketing, Outreach, and Education Efforts

The Companies and Honeywell marketed the 2014 program through customer bill inserts. In addition, Honeywell provided participating contractors with a web banner ad for their websites and talked to contractors about how to introduce the program to customers.

Program Training and Quality Control

Honeywell provided contractors with a program training guide describing how the program worked and reviewed the quality control process with contractors when they enrolled in the program. The quality control process included quality assurance (QA) field visits followed by contractor re-education if QA issues were identified. Honeywell reached out to all participating PY2013 contractors to communicate the details of the PY2014 changes.

Contractor Participation

The number of participating contractors declined considerably between PY2013 and PY2014 as shown in Figure 6 -1. The total number of participating contractors decreased from 157 to 14. In PY2014 only 4 contractors submitted at least one rebate, compared to 84 contractors who submitted at least one rebate in PY2013. Only 4% (7 of 157) of the contractors who participated in PY2013 stayed on to participate in PY2014.

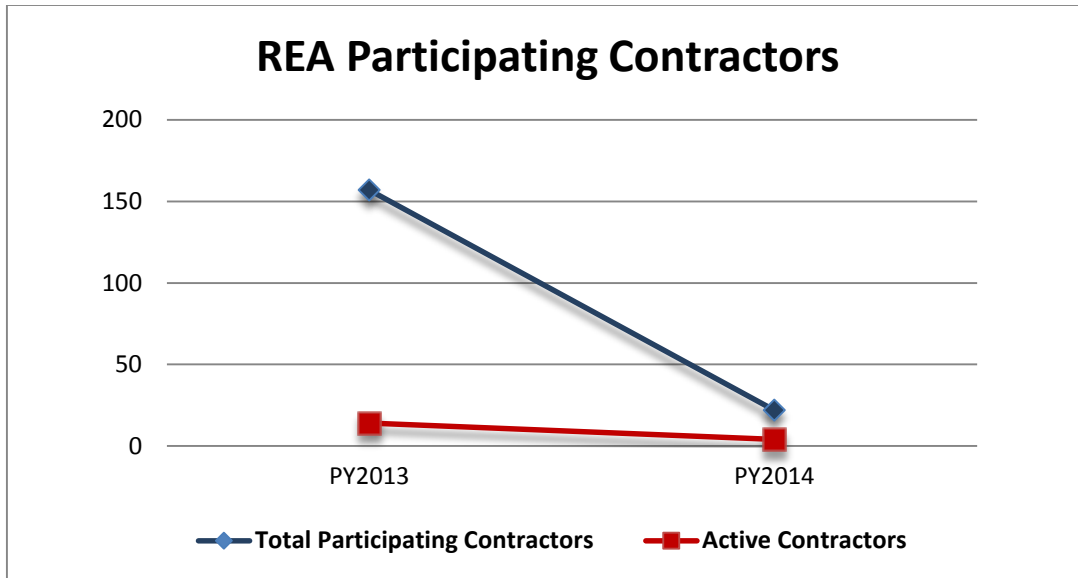


Figure 6 -1: Total and Active Participating Contractors

6.1.2 Online Audits

This section reports findings from the process evaluation of the OA Program. Findings are based on survey responses from samples of customers who participated in the OA program in 2014. The findings also draw on survey responses from a sample of nonparticipants. Table 6-1 shows the number of completions for each survey group.

As indicated in Table 6-1, the process evaluation's findings are based on the results of five telephone surveys administered to 320 of the Companies' customers.

Table 6-1: Surveys Completed for Process Evaluation of 2014 OA Program

Survey Group	Surveys Completed
Online audits	154
Telephone audits	87
Non-participant comparison group	79
Total	320

The customer surveys that were utilized for process evaluation of the OA Program addressed the following research questions:

- How did customers learn of the availability of the home energy audit?

- What actions did telephone audit users take to save energy? How did these actions differ from the energy saving actions of online audit users or a control group?

Characteristics of Dwellings for 2014 OA Program Participants

As background for the process evaluation, tabulations were prepared to compare the characteristics of the dwellings of participants in the 2014 OA program to those of non-participants. These comparisons are provided in Table 6-2 through 6-5.

Table 6-2: Type of Dwelling Occupied by 2014 OA Program Participants

<i>Type of Dwelling</i>	<i>Telephone Audit</i>	<i>Online Audit</i>	<i>Non-Participant Comparison</i>
Single-family home, detached construction	51.7%	67.5%	62.0%
Single-family home, factory manufactured/modular	11.5%	2.0%	6.3%
Mobile home	5.8%	7.1%	5.1%
Row house	2.3%	1.3%	0.0%
Two or Three family attached residence	1.2%	3.3%	2.5%
Apartment with 4+ families	18.4%	13.0%	7.6%
Condominium	6.9%	3.3%	2.5%
Other	1.2%	2.6%	5.1%
Don't know	1.2%		5.1%
Totals	100%	100%	100%
Sample sizes	n = 87	n = 154	n = 79

Table 6-3: Distribution of Owner/Renter for 2014 OA Program Participants

<i>Owned or Rented?</i>	<i>Telephone Audit</i>	<i>Online Audit</i>	<i>Non-Participant Comparison</i>
Owned	55.2%	66.2%	77.2%
Rented	42.5%	33.8%	19.0%
Did not know	2.3%		1.3%
Did not answer			2.5%
Totals	100%	100%	100%
Sample sizes	n = 87	n = 154	n =79

Table 6-4: Year Built for Dwellings Occupied by 2014 OA Program Participants

<i>Year Dwelling Was Built</i>	<i>Telephone Audit</i>	<i>Online Audit</i>	<i>Non-Participant Comparison</i>
Before 1960	23.0%	32.5%	35.4%
1960-1969	6.9%	9.7%	7.6%
1970-1979	11.5%	14.9%	13.9%
1980-1989	8.1%	9.7%	8.9%
1990-1999	6.9%	11.0%	10.1%
2000-2005	10.3%	4.6%	10.1%
2006 or Later	3.5%	9.7%	1.3%
Did not know	27.2%	7.8%	10.1%
Did not answer	2.3%		2.5%
Totals	100%	100%	100%
Sample sizes	n = 87	n = 154	n =79

*Table 6-5: Size of Dwelling Occupied by 2014 OA Program Participants
(As Measured by Square Feet of Above-Ground Living Space)*

Size of Dwelling	Telephone Audit	Online Audit	Non-Participant Comparison
Less than 1,000 square feet	12.6%	24.7%	16.5%
1,000-2,000 square feet	32.2%	45.5%	39.2%
2,000-3,000 square feet	14.9%	21.4%	16.5%
3,000-4,000 square feet	8.1%	4.6%	5.1%
4,000-5,000 square feet	0.00%	0.7%	1.3%
More than 5,000 square feet	3.5%	0.7%	5.1%
Don't know	28.7%	2.6%	13.9%
Totals	100%	100%	100%
Sample sizes	n = 87	n = 154	n =79

Customers' Experience in Receiving Telephone Audits through 2014 OA Program

About 30 percent of the customers who participated in the 2014 OA program received a telephone energy audit. These customers had called the Companies' Customer Service Center. The survey responses for customers who received a telephone energy audit indicated that about 58 percent had called the service center to register a "high bill complaint."

A customer calling the Customer Service Center could discuss different topics with the CSR. Percentages of telephone audit customers discussing different topics are shown in Table 6-6.

Table 6-6: Percentage of Telephone Audit Participants Discussing Different Topics with Customer Service Representatives

Topic of Discussion	Percentage of Customers Discussing Topic during Telephone Audit
Review changes in bill/usage over time	30.2%
Answer questions about home appliances	7.0%
Find out about top 3 home energy uses	11.6%
Offered literature about saving energy at home	9.3%
Discussion of something else	20.9%
Did not recall	37.2%
Sample size	n = 43

Table 6-7 shows how telephone audit customers rated the helpfulness of the information they received in their discussions with the customer service representatives.

Table 6-7: How Telephone Audit Participants Rated Helpfulness of Information Received in Telephone Conversation with CSRs

How Helpful Was Information Received in Telephone Discussion with CSR?	Percentage of Customers Responding
Very helpful	40.9%
Somewhat helpful	27.6%
Neither helpful nor unhelpful	2.3%
Somewhat unhelpful	2.3%
Not at all helpful	9.2%
Did not know / did not recall	18.4%
Sample size	n = 87

Besides conveying information to customers during the telephone conversations, CSRs would also send additional information to the customers. The percentages of telephone audit participants who reported having been sent different types of information are reported in Table 6-8.

Table 6-8: Percentage of Telephone Audit Participants Reporting That They Were Sent Information following Discussion with CSRs

<i>Type of Information Sent</i>	<i>Percentage of Telephone Audit Customers Reporting They Were Sent Information</i>
Brochure(s) on Energy Saving Tips	29.9%
PC link to Online Audit software	11.5%
Other	6.9%
Nothing was sent	59.8%
Sample size	n = 87

Table 6-9 shows how customers rated the helpfulness of the information they were sent.

Table 6-9: How Telephone Audit Participants Rated Helpfulness of Information They Were Sent after Telephone Conversation with CSRs

<i>How Helpful Was Information You Were Sent</i>	<i>Percentage of Customers Responding</i>
Very helpful	35.0%
Somewhat helpful	25.0%
Neither helpful nor unhelpful	5.0%
Somewhat unhelpful	0.0%
Not at all helpful	10.0%
Did not know / did not recall	25.0%
Sample size	n = 20

Table 6-10 shows the percentages of telephone audit participants in the 2014 OA program who reported making energy saving changes after the audit. Customers were more likely to report taking behavioral actions than structural actions.

*Table 6-10: Percentages of Telephone Audit Participants
In 2014 OA Program Taking Different Types of Energy Saving Actions*

Type of Energy Saving Action	Telephone Audit
Structural (Equipment)	11.6%
Behavioral	18.6%
No Changes Made	47.7%
Did not know / did not recall	29.1%
Sample Sizes	n=86

Table 6-11 shows how telephone audit participants rated their satisfaction with the analysis that was provided to them through the telephone audit.

*Table 6-11: How Telephone Audit Participants Rated
Their Satisfaction with the Analysis They Received through Telephone Audit*

Level of Satisfaction	Telephone Audit
Very satisfied	47.1%
Somewhat satisfied	24.1%
Neither satisfied nor dissatisfied	14.9%
Somewhat dissatisfied	3.5%
Very dissatisfied	9.2%
Did not know	1.2%
Sample Sizes	n=87

Customers' Experience in Receiving Online Audits through 2014 OA Program

A little less than 70 percent of the customers who participated in the 2014 HEA program received an online energy audit. The software for performing the online version of the home energy audit (i.e., the *Home Energy Analyzer*) was advertised on the utility website.

The reasons that customers gave for using the online energy audit software are reported in Table . While a "high bill" was one reason why customers used the online *Home Energy Analyzer*, the online users were also motivated to use the *Analyzer* to investigate how they could be more efficient in using electricity in their home.

Table 6-12: Reasons Why Customers Used Home Energy Analyzer

<i>Reasons for Using Home Energy Analyzer</i>	<i>Online Audit</i>
Curiosity	48.7%
Financial (high bill)	34.4%
Conserve energy	25.3%
Other	5.2%
Did not know / did not recall	9.1%
Total	n = 154

As with the telephone version of the home energy audit, the online version allowed customers to review changes in usage over time and to answer questions about home appliance usage. It also could answer customer questions about weatherizing a house or provide detailed energy savings ideas. Table 6-13 shows the percentages of participants who used different activities during an online audit.

Table 6-13: Percentage of Customers Participating in Different Audit Activities

<i>Audit Activities</i>	<i>Online Audit</i>
Review changes in usage	39.0%
Answer questions about home appliances	20.8%
Answer questions about weatherizing home	11.7%
Obtain detailed energy saving ideas for home	24.0%
Sample Size	n = 154

As shown in Table 6-13, over one third (39 percent) of the customers used the *Online Audit* program to review changes in usage over time. In addition, just under one quarter (24 percent) used the *Online Audit* program to obtain detailed energy savings ideas for the home. The kinds of ideas that were reported to customers are shown in Table 6-14.

Table 6-14: Percentages of Customers Provided Different Types of Energy Savings Ideas through Online Audit

Types of Energy Savings Ideas	Online Audit
No cost / low cost ways to save energy immediately	48.2%
Ways to save energy that require investment but will pay off	16.9%
Ways to save energy that would not be cost-justified	8.4%
Other ways to save energy	33.7%
Sample sizes	n = 154

Table 6-15 shows how customers rated the helpfulness of the information they received through their use of the Online Audit.

Table 6-15: How Online Audit Participants Rated Helpfulness of Information They Received through Online Audit

How Helpful Was Information Provided to You by Online Audit	Online Audit
Very helpful	23.4%
Somewhat helpful	50.0%
Neither helpful nor unhelpful	12.3%
Somewhat unhelpful	4.6%
Not at all helpful	2.0%
Did not know / did not recall	7.8%
Sample sizes	n = 154

Table 6-16: shows the percentages of online audit participants in the 2014 OA program who reported making energy saving changes after the audit. Customers were more likely to report taking behavioral actions than structural actions.

Table 6-16: Percentages of Participants in 2014 OA Program Taking Different Types of Energy Saving Actions

Type of Energy Saving Action	All Online Audits
Structural (Equipment)	32.5%
Behavioral	48.7%
No Changes Made	24.0%
Did not know / did not recall	7.1%
Sample Sizes	n = 154

Table 6-17: shows how online audit participants rated their satisfaction with the OA program.

Table 6-17: How Online Audit Participants Rated Their Satisfaction with OA Program

Level of Satisfaction	All Online Audits
Very satisfied	39.0%
Somewhat satisfied	37.7%
Neither satisfied nor dissatisfied	15.6%
Somewhat dissatisfied	2.6%
Very dissatisfied	2.0%
Did not know	3.33%
Sample Sizes	n = 154

6.2 Energy Conservation Kits

This section provides a summary of findings organized by topics of interest from the Efficiency Kits process evaluation.

6.2.1 Energy Conservation Kit Participant Survey

ADM conducted online and telephone surveys with program participants as part of the evaluation effort for the 2014 Energy Conservation Kit Program. This survey effort was designed to gather information regarding the participant perspective on program operations and delivery, specifically addressing participant satisfaction with individual program elements. Data collected via participant surveying were used in evaluating:

- Customer awareness of the program;
- Customer implementation of energy efficient equipment;
- Customer decision making; and

- Customer satisfaction with the program.

ADM administered one online survey and one telephone survey for participants whose email addresses were not listed in the program tracking data. Both instruments were identical, and results were combined for the purpose of process evaluation and impact analysis. In total, 378 participants responded to the telephone and online surveys.

This section highlights results of the participant survey effort for 2014, drawing comparisons between the 2014 program year and 2013 program year results where appropriate.

Household Characteristics

69 percent of respondents indicated that they have a non-electric water heater. Similar to the previous year, this result is roughly consistent with the Companies expected distribution of water heater types, although the presence of electric water heaters increased slightly.

Table 6-18: Participant Water Heating Type

<i>Water Heating Type</i>	<i>Percent of Respondents (n = 378)</i>
Electric	31%
Non-electric	69%

In addition, respondents indicated the number of residents who currently live in their household. The distribution of residents among participant homes was very similar to that found for the 2013 program year, with an average home population of 2.5 individuals.

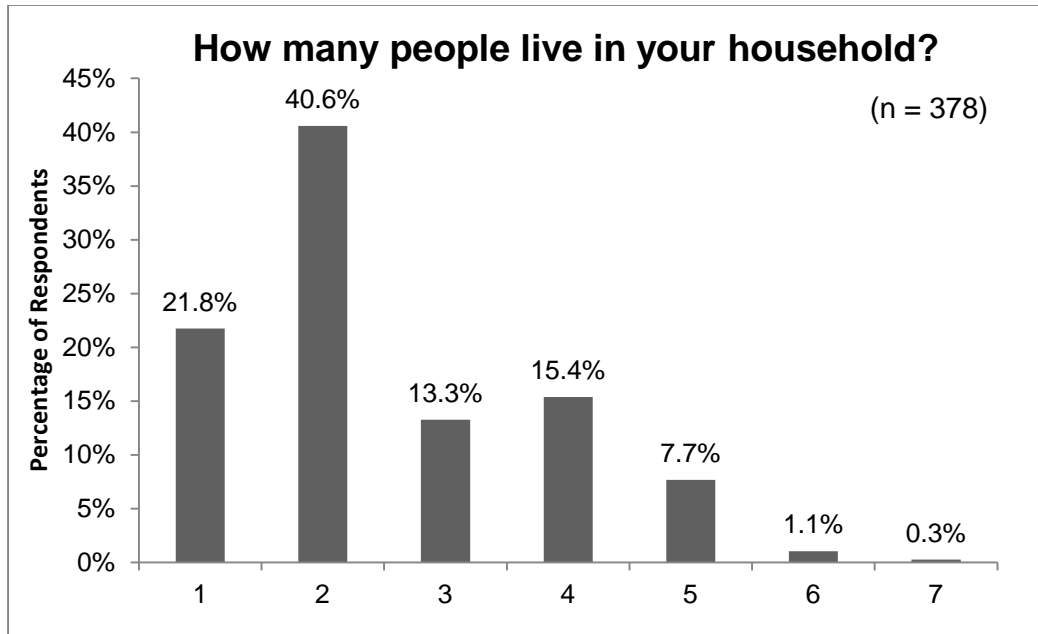


Figure 6-3: Participant Household Population

Customer Awareness of Program

Survey respondents were asked how they learned about the Energy Conservation Kit Program. As shown in 6-4, the majority of respondents indicated that they learned of the program through friends or family members. This is similar to the results for the 2013 program year, suggesting that the program has continued to utilize the same word-of-mouth promotional channels. Fewer respondents reported learning about the program through bill inserts and direct mail, which is to be expected as the direct marketing activities decreased in magnitude and frequency for the 2014 program year.

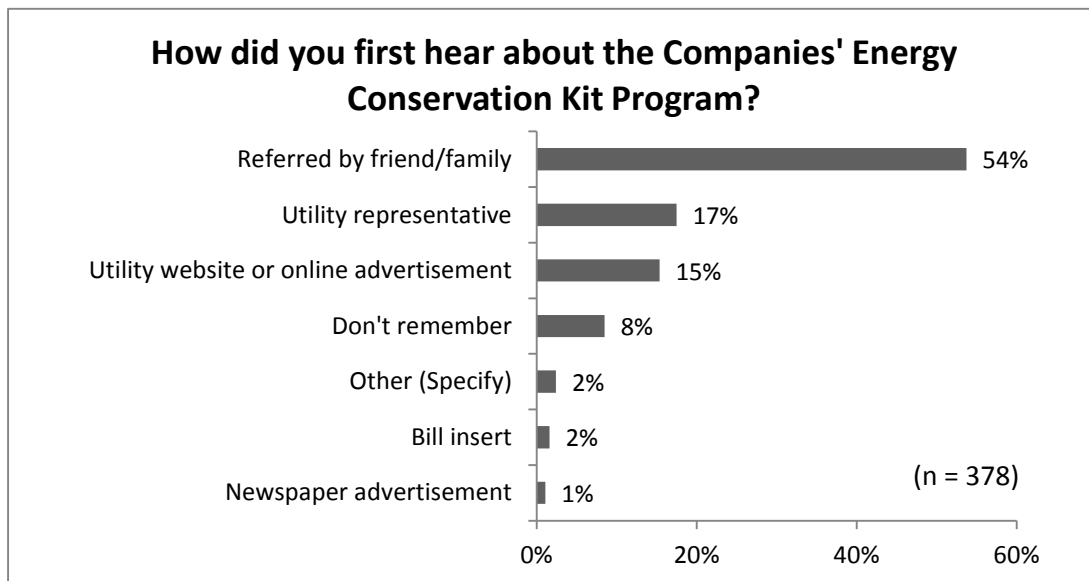


Figure 6-4: How Participants Learned about the Program

When asked how they enrolled in the program, nearly 50% of respondents reported that they used the online application. This is an increase from the results of the 2013 program evaluation, where closer to one-third of respondents indicated that they enrolled via the online application. This suggests that program promotion and marketing have successfully directed customers to the Ohio Energy Kit website.

Respondents were asked additional questions regarding their experience with enrolling in the program:

- **Online Enrollment Experience:** Nearly all (97%) of the respondents who reported enrolling in the program online stated that it was easy to find the sign up screen on the program website. Additionally, 94 percent of respondents reported that the website had answered all of their questions about the kit. These results are consistent with those from the 2013 program year and suggest that the program website is successfully meeting customer needs.
- **Telephone Enrollment Experience:** Nearly all respondents (98%) who enrolled via telephone reported that the program representative that they had spoken with was polite and courteous. Additionally, 90 percent of these respondents indicated that the representative was able to answer all of their questions about the program. None of these respondents indicated any specific issues with the telephone enrollment process or cited any specific questions that were not answered by the telephone representative.

Participant Motivations and Preferences

Survey respondents were asked a series of questions related to their decision making and prior experience with energy efficiency. As displayed in Table 6-22, 51 percent of respondents indicated that they chose to participate in the program because they wanted to save energy in their homes. This was also the most common answer during the 2013 program evaluation. Additionally, 48 percent of respondents stated that they requested the kit because the contents appeared to be useful and valuable, and 38% of respondents were motivated by the fact that the kit was provided at no additional cost. Only 10% of respondents reported that they specifically requested the kit due to needing light bulbs.

More than one-third (34%) percent of respondents cited a recommendation from a friend as a motivational factor in their participation decision. As with the prior program year, this further supports the importance of word-of-mouth marketing, which has continued to influence the rate of program awareness and enrollment.

Table 6-19: Factors Motivating Participation

	Response	Percent of Respondents*	N
What factors motivated you to request an Energy Conservation Kit from the Companies?	I was looking for ways to save energy in my home	51%	378
	The Energy Conservation Kit looked useful and valuable	48%	378
	It was free ⁵⁵	38%	378
	Recommendation from a friend	34%	378
	Environmental reasons	17%	378
	I needed light bulbs	10%	378
	Other	13%	378
	Health of family	4%	378

*Respondents were able to provide multiple responses, and the percentages shown are based on total respondents rather than total responses. Thus, the total of all displayed percentages exceeds 100%.

⁵⁵ As stated on the Companies' program website (www.firstenergycorp.com), "The cost of these kits, along with the costs of all energy efficiency programs, are recovered through residential rates in accordance with Senate Bill 221. No additional costs or handling fees will be charged to customers who request the kits."

In order to assess whether awareness of individual kit components may have motivated program enrollment, respondents were asked about their initial awareness of the conservation kit contents.

As shown in the following table, the majority of respondents reported being aware that the conservation kit contained CFLs. Nearly half of respondents stated that they were aware that the kit contained smart strips and LED night lights, and approximately one-quarter of respondents reported being aware of the furnace whistle.

Of the 50 respondents who received an all-electric kit, 50% reported being aware that the kit would contain a shower head, and 40% reported being aware that the kit would contain faucet aerators.

Table 6-20: Initial Participant Awareness of Kit Contents

<i>Did you know each of the following would be included in the kit?</i>	<i>Percentage of Respondents Stating 'Yes'</i>	<i>N</i>
CFLs	54%	377
Energy Efficient Showerhead	50%	50
Energy Smart Strip	48%	377
LED Night Lights	46%	377
Faucet Aerators	40%	50
Furnace Whistle	24%	377

Respondents were then asked to indicate which single item from the conservation kit was most useful, and 49% of respondents indicated that the CFLs were the most useful item. The next two most useful items were smart strips and LED night lights. Only six percent of respondents who received an all-electric kit indicated that the shower head was the most useful item, and six percent of these respondents stated that the faucet aerators were the most useful items. Only one percent of overall respondents reported that the furnace whistle was the most useful item.

Table 6-21: Usefulness of Individual Conservation Measures

	Measure	Percent of Respondents	N
What single item from the Energy Conservation Kit was MOST useful to you?	CFL Bulbs	49%	377
	Smart Power Strips	26%	377
	LED Night Lights	23%	377
	Energy Efficient Showerhead	6%	50
	Faucet Aerators	6%	50
	Furnace Whistle	1%	377

CFLs, smart strips, and LED night lights continue to be the most highly valued components of the conservation kits.

Prior and Current Energy Efficiency Involvement

As with the prior year, the 2014 participant survey included a series of questions related to participants' familiarity with energy efficiency measures, energy saving behaviors and the Companies' energy conservation programs prior to receiving an energy conservation kit. Survey respondents were asked whether they had previously installed any of the measures that were included in the conservation kit. The following table shows that the majority of respondents had CFLs previously installed and that 37% of respondents already had smart strips. Relatively fewer respondents reported having previously installed faucet aerators, low flow shower heads, and LED night lights. Only two percent of respondents had previously installed a furnace whistle. Similar to results from the 2013 program year, these results suggest that a substantial percentage of participants were already familiar with some of the items included in the kit, but that the program also introduces new measures to the majority of participants.

Table 6-22: Prior Installation of Individual Conservation Measures

<i>Measure Type</i>	<i>Percent of Respondents Indicating Prior Installation</i>	<i>N</i>
CFLs	59%	377
Energy smart strip	37%	377
Faucet Aerators	27%	377
Low flow shower head	21%	377
LED night lights	20%	377
Furnace whistle	2%	377

To determine potential effects of the program with regard to participant knowledge of energy efficiency, respondents were asked to rate their current familiarity with ways to save energy in their home. As shown in Figure 6-5 one-third of respondents indicated that they are now very familiar with ways to save energy in their home, and nearly half of the respondents stated that they are somewhat familiar with ways to save energy in their home. Only 16% of respondents indicated that they are only a little familiar or not at all familiar with ways to save energy in their home as a result of receiving the energy conservation kit.

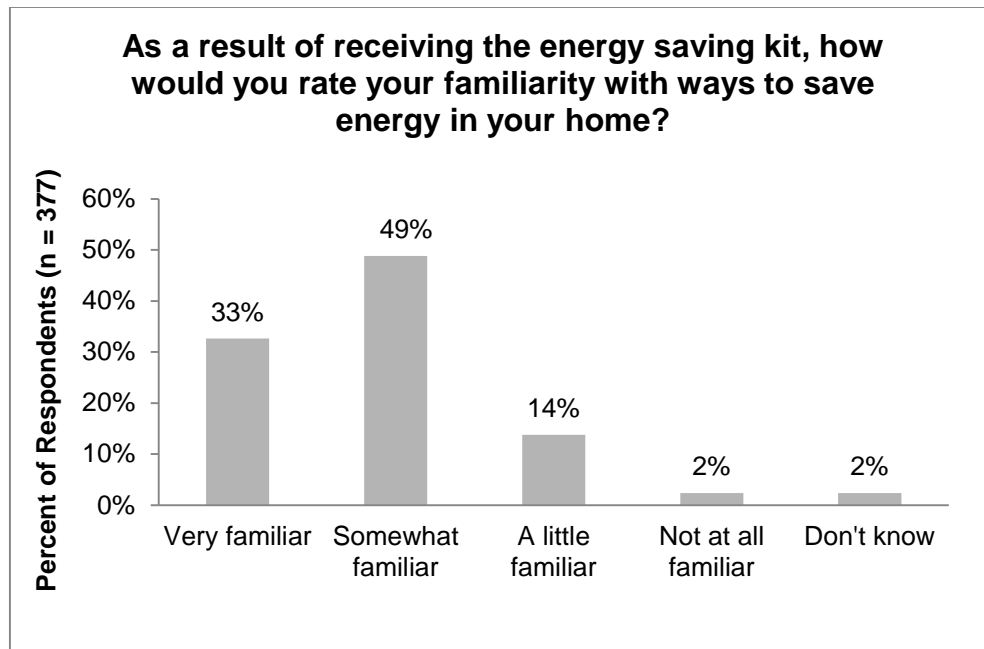


Figure 6-5: Post-Program Participant Familiarity with Energy Efficiency

As with the prior year, this suggests that the program is providing educational benefits to a substantial portion of the participant group. These participants may be more equipped to implement additional energy saving behaviors and measures that will further reduce their electrical and gas usage than they were prior to participating in the program.

Customer Installation of Measures

Participant survey respondents were asked which items in the conservation kit had been installed in their homes. These responses were used to develop the installation rates for the program. The impact evaluation chapter of this report applies these rates to program savings, and the process evaluation provides a brief overview of reported installation trends.

Greater than 90% of respondents indicated that they had installed at least one measure from the conservation kit. When asked why they had not installed any of the measures, the remaining respondents reported that they did not have time to install any measures or that they did not like any of the items that had been included in the kit.

The survey results indicate that a majority of participants installed their smart strip, at least one LED night light, and at least one CFL. Reported installation activity was substantially lower for energy efficient showerheads, faucet aerators, and furnace whistles. The following provides a summary of surveyed installation findings for each measure category:

- **Furnace Whistle:** 14% of respondents reported that they had installed the furnace whistle. When asked why they had not installed the furnace whistle, 30% of respondents who had not installed the whistle reported that they did not understand how to install it. Additionally, 23% of respondents stated that they did not know the purpose of the furnace whistle.
- **CFLs:** Approximately 30% of survey respondents reported that they had installed all of the CFLs from their energy conservation kit. Respondents who had not installed one or more of the CFLs were asked what they had done with the remaining CFLs, and the majority of respondents reported that they are storing them for future use. The remaining CFLs may be installed at a later date, which was factored into the impact analysis. Four percent of respondents who had not installed all of the CFLs from the kit indicated that they had given the remaining bulbs to friends or family.
- **Smart Strip:** The majority of respondents (80%) indicated that they had installed the smart strip that was provided in the kit; however, not all of the respondents installed the smart strip in a way that generated energy savings. When asked why they had not installed the smart strip, the remaining respondents most commonly (63%) indicated that they already have power strips installed in their home, or that they did not need the additional smart strip in general (21%). Very few respondents (5%) indicated that they did not understand how to use the smart strip.
- **LED Night Lights:** Approximately 88% of survey respondents indicated that they had installed at least one of the LED night lights that were included in their energy conservation kit.
- **Energy Efficient Showerheads:** 33% of respondents reported having installed their shower head; however, some of these respondents indicated having a non-electric water heater. The majority of respondents (48%) who had not installed the showerhead stated that they had not had time to install the item, while 37% of respondents reported that they prefer their existing showerheads.
- **Faucet Aerators:** 44% of respondents who had received faucet aerators indicated that they had installed at least one of these aerators; however, some of these respondents indicated having a non-electric water heater. The remaining respondents most commonly cited already having faucet aerators as the reason that they had not installed the aerators from the kit.

It is uncertain whether the items that have not been installed will be installed in the future, although a substantial percentage of respondents appear to have kept their uninstalled items in their home for future use rather than disposing of them or giving them away.

Customer Satisfaction

Survey respondents were asked about their levels of satisfaction with each measure they reported installing through the Energy Conservation Kit Program. Results are provided on a 5-point scale of “very satisfied” to “very dissatisfied”. As displayed in the following table, respondents generally reported high satisfaction levels with the majority of measures they had installed.

LED night lights, Energy efficient showerheads, and CFLs received the highest percentages of ‘very satisfied’ ratings. Satisfaction ratings were relatively lower for smart strips, furnace whistles, and faucet aerators, with 9% of respondents indicating that they were *dissatisfied* or *very dissatisfied* with the smart strip, and 11% of respondents indicating dissatisfaction with the furnace whistle.

Table 6-23: Participant Satisfaction with Individual Measures

Measure Type	Satisfaction with Measure Performance and Quality						N
	Very Satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Very Dissatisfied	Don't know	
LED Night Lights	74%	20%	3%	1%	1%	2%	188
Energy Efficient Showerhead	67%	13%	7%	-	7%	7%	15
CFLs	60%	33%	5%	1%	1%	-	216
Smart Strip	51%	33%	6%	6%	3%	-	177
Furnace Whistle	50%	11%	25%	7%	4%	4%	28
Faucet Aerators	45%	30%	15%	-	5%	5%	20

Respondents were then asked to rate their level of satisfaction with the time it took to receive the conservation kit. Results are provided on a 5-point scale of “very satisfied” to “very dissatisfied”. As shown in the following table, only approximately three percent of respondents indicated that they were *dissatisfied* or *very dissatisfied* with the time it had taken to receive the conservation kit.

Table 6-24: Participant Satisfaction with Kit Delivery Time

How satisfied or dissatisfied were you with the time it took to receive the kit?	Measure	Percent of Respondents (N = 378)
	Very Satisfied	42%
	Satisfied	35%
	Neither satisfied nor dissatisfied	17%
	Dissatisfied	3%
	Very Dissatisfied	0.3%
	Don't know	2%

As with the prior program year, the responses to the satisfaction portions of the participant survey suggest that participants were for the most part satisfied both with the individual measures they received and with the delivery procedures of the Energy Conservation Kit Program.

Cross-Program Participation

Respondents were also asked whether they had participated in any other energy efficiency programs offered by the Companies. As shown in Table 6-25, respondents most commonly reported having participated in the Energy Efficiency Products program, followed by the Appliance Turn-in Program. Overall, the majority of participants indicated that they had not participated in any programs other than the Energy Conservation Kit Program.

Table 6-25: Participant Cross-Program Participation

<i>Program Type/Description</i>	<i>Percent of Respondents Indicating Participation in Program (N = 377)</i>
Energy Efficiency Products (rebates for energy efficient appliances)	19%
Appliance Turn-In (refrigerator and freezer recycling)	15%
Easy Cool Rewards (A/C cycling on and off at peak usage times)	6%
Home Energy Analyzer	6%
HVAC Incentives	5%
Energy Audit (discounted energy audit of your home)	3%
Lighting Discounts (discounts and rebates for lighting products)	3%
Energy Efficient New Homes (incentives for remodeling your home)	2%

6.2.2 Power Direct Kits Program Staff Interview Findings

This section summarizes the findings from the Companies program staff and implementation contractor staff interview. As with the prior program year evaluation, an interview was conducted with the Energy Conservation Kit program manager. The purpose of this interview in the 2014 program evaluation was to discuss program performance and operation in 2014 and to identify any program changes that had occurred since the pilot year. Additionally, an interview was conducted with staff from Power Direct, the program implementation contractor, in order to gain insight into program implementation.

Key program features and trends addressed through these interviews include:

- **Increased Program Awareness and Decreased Direct Marketing:** Program staff noted that word-of-mouth promotion of the program has continued to serve as a substantial driver of program awareness and enrollment. As a result, promoting the program through direct marketing methods such as outbound telephone calls and bill inserts occurred to a lesser degree in the 2014 program year than in the 2013 program year.
- **Continued Effective Communication:** When asked about communication quality, both the program manager and Power Direct staff reported that the two parties have a very effective communication structure and that there have been no significant challenges with relaying important information, discussing program updates or performance metrics, or resolving any emerging issues. Power Direct sends the Companies a status report every week, and provides monthly update reports regarding enrollment

and kit delivery metrics. The program manager indicated that this level of communication is sufficient for managing the program effectively.

- Continued Program Performance Success: Program staff reported that the program continued to exceed its goals, and that the 3-year program goal had nearly been met after only two years of operation. Overall, program staff noted that the program has been able to meet increased levels of demand without any significant issues, and that the overall operation and performance of the program has exceeded expectations without any major challenges.

Overall, the interview results suggest that the Energy Conservation Kit Program's success during its pilot year has continued into the 2014 program year, and that there have been no major emerging challenges or operational issues during this time.

6.2.3 Schools Kits Participant Survey

This section presents key findings from surveys conducted with customers who participated in the 2014 School Kit Program provided by the Companies. As with the 2013 program year, ADM conducted online and telephone surveys with program participants as part of the evaluation effort for the 2014 School Kit Program.

As this was the second year of operation for the School Kit Program, the survey effort was designed to gather additional information regarding participant perspectives on the program and to identify any notable trends or changes between the experiences of participants in 2013 and 2014. Specifically, data collected via participant surveying are used in evaluating:

- Customer awareness of the program;
- Customer implementation of energy efficient equipment;
- Customer decision making; and
- Customer satisfaction with the program.

ADM administered an online survey, and a telephone survey for participants whose email addresses were not listed in the program tracking data. Both of these survey instruments were identical, and results were combined for the purpose of process evaluation and impact analysis. In total, 223 participants responded to the telephone and online surveys.

This section summarizes key findings from the 2014 participant survey effort, drawing comparisons between the results from the 2013 program year and 2014 program year where appropriate.

Household Characteristics

The majority of respondents indicated that they have a non-electric water heater, although the presence of electric water heaters among participants appears to have increased since the 2013 program year.⁵⁶

Table 6-26: Participant Water Heating Type

Water Heating Type	Percent of Respondents (n = 223)
Electric	44%
Non-electric	56%

Respondents also indicated the number of residents who currently live in their household. The average number of residents in participant homes was approximately 4.4 individuals, which is very consistent with the results from the 2013 program year. Only six percent of respondents indicated that fewer than three individuals live in their home.

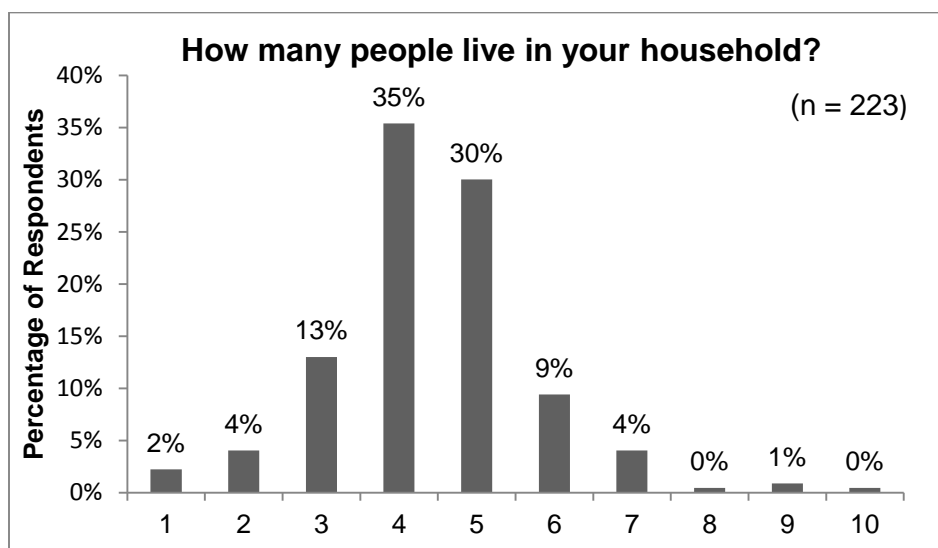


Figure 6-6: Participant Household Population

Participant Motivations and Preferences

Respondents were asked a series of questions related to their decision making and prior experience with energy efficiency. As displayed in the following table, 35% of respondents indicated that they chose to participate in the program because the kit was free, or provided at no additional cost.

⁵⁶ In 2013, 30% of respondents reported having an electric water heater, compared to 44% in 2014.

Approximately one-quarter of respondents (26%) provided open-ended commentary indicating that they enrolled in the program because of their child's request; this was converted from a response of 'other' to a categorized response below. This also occurred in 2013 and is expected, as the main source of program awareness for participants is their students bringing information about the program home from school.⁵⁷

Only eight percent of respondents indicated that they participated due to specific measures such as light bulbs.

Table 6-27: Factors Motivating Participation

What factors motivated you to request an Energy Conservation Kit from the Companies?	<i>Response</i>	<i>Percent of Respondents* (n = 223)</i>
	It was free ⁵⁸	35%
	My child asked me to request the kit	26%
	The Energy Conservation Kit looked useful and valuable	26%
	I was looking for ways to save energy in my home	23%
	Recommendation from a friend	10%
	Environmental reasons	9%
	I needed light bulbs	8%
	Health of family	7%
	Other	21%
	Other	21%

Although only a small percentage of respondents indicated that they participated in the program in order to obtain specific measures, awareness of individual measure types may have served as an implicit motivator of participation. As with the prior year, 2014

⁵⁷ During the 2013 program evaluation, participants were asked how they learned of the program, and more than 90% of respondents indicated that they learned of the program when their student brought information home from school.

⁵⁸ As stated on the Companies' website (www.firstenergycorp.com), "The cost of these kits, along with the costs of all energy efficiency programs, are recovered through residential rates in accordance with Senate Bill 221. No additional costs or handling fees will be charged to customers who request the kits."

participants were asked to state whether they had initially been aware that the Schools Kit would contain each of the conservation measures: CFLs, faucet aerators, and LED night lights.

As shown in the following table, respondents most commonly reported being aware that CFLs would be included in the School Education Kit, followed by the LED night lights. Overall, approximately 35% of respondents indicated that they had not known of any specific measures that would be included in the kits. These results are very similar to those obtained during the 2013 program evaluation and suggest that while individual kit components may have been a motivating factor for participation, there does not appear to be one specific measure that could have influenced the majority of participants to enroll in the program.

Table 6-28: Initial Participant Awareness of Kit Contents

<i>Did you know each of the following would be included in the kit?</i>	<i>Percentage of Respondents Stating 'Yes'</i>	<i>N</i>
CFLs	48%	223
Faucet Aerators	30%	223
LED Night Light	46%	223

Additionally, respondents were asked to indicate which single item from the School Education Kit was most useful. As shown in the following table, results were fairly evenly split between CFLs (51% of respondents) and LED Night lights (44% of respondents). Few respondents indicated that the faucet aerators were the most useful measure. These results are nearly identical to those obtained during the 2013 evaluation, and suggest that lighting measures continue to be the most highly valued item included in the conservation kits.

Table 6-29: Usefulness of Individual Conservation Measures

What single item from the Energy Conservation Kit was MOST useful to you?	<i>Response</i>	<i>Percent of Respondents (n=223)</i>
	LED Night Light	51%
	CFLs	44%
	Faucet Aerators	5%

Prior and Current Energy Efficiency Involvement

The survey included a series of questions related to participants' prior and current familiarity with energy efficiency measures, behaviors, and programs. First, survey respondents were asked whether they had previously installed any of the measures that were included in the Schools Kit.

The following table shows that the majority of respondents had previously installed CFLs. Additionally, 26% of respondents had LED night lights previously installed, and approximately one-quarter of respondents already had faucet aerators installed in their home. These results are consistent with the responses obtained through the 2013 participant survey effort, and suggest that there have been no significant changes in participants' prior measure use.

Overall, approximately one-quarter of respondents stated that they had not previously installed any of the items that were included in the kit. For these participants in particular, the School Kit Program may have served as an introduction to residential energy efficiency behaviors and opportunities.

Table 6-30: Prior Installation of Individual Conservation Measures

<i>Measure Type</i>	<i>Percent of Respondents Indicating Prior Installation</i>	<i>N</i>
CFLs	61%	223
LED Night Lights	26%	223
Faucet aerators	24%	223

Respondents were then asked a set of two questions in order to gauge potential effects of the program on participants' knowledge of and familiarity with energy efficiency behaviors and measures.

First, respondents were asked to rate their previous familiarity with ways to save energy in their home, before they received the school kit. Respondents were then asked to rate their current familiarity with ways to save energy in their home, as a result of receiving the kit. During the 2013 program evaluation, approximately one-third of respondents indicated that they have a higher level of familiarity with energy efficiency after receiving the energy conservation kit.

As shown in the following figure, participants in 2014 most commonly reported being "somewhat familiar" with energy efficiency methods prior to participating in the program.

The percentage of respondents rating themselves as “very familiar” with energy saving methods increased from 22% to 52% after receiving the conservation kit.

Only four percent of respondents reported that they are now only a little familiar, with ways to save energy in their home after receiving the kit.

Approximately 44% of respondents indicated that they have a higher level of familiarity with energy efficiency after receiving the energy conservation kit. This is a higher percentage than was found during the 2013 program evaluation. This suggests that the program has continued to provide participants with valuable information regarding energy efficiency behaviors and opportunities, and that program benefits may exceed the energy-saving benefits of individual measures.

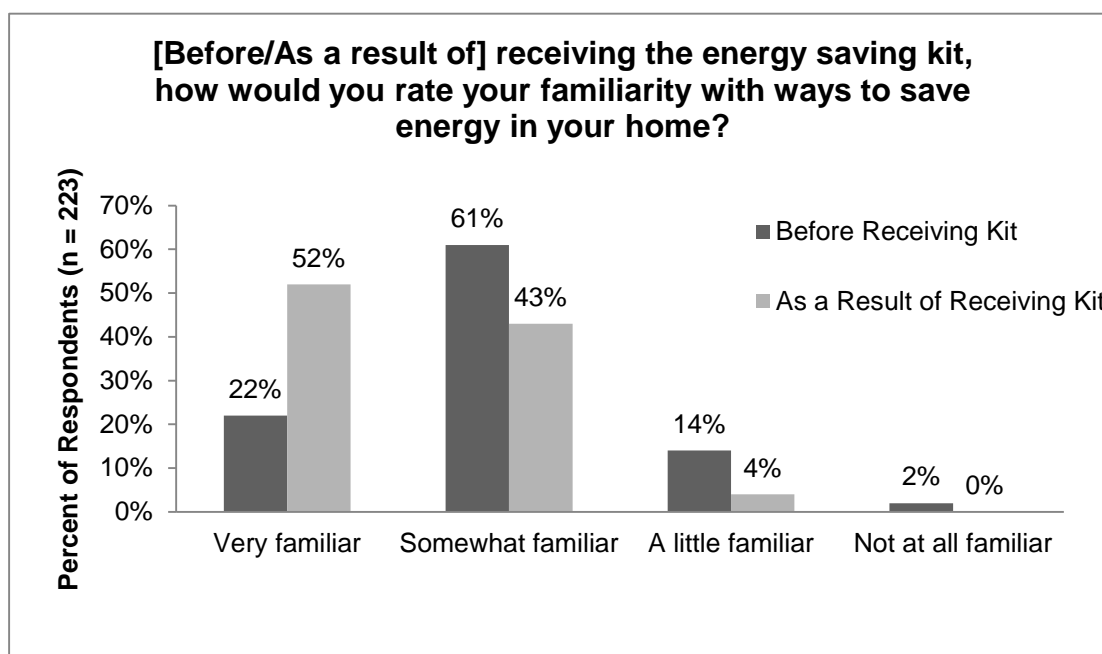


Figure 6-7: Comparative Participant Familiarity with Energy Efficiency

Customer Installation of Measures

As with the prior program year, participant survey respondents were asked which items in the school kit had been installed in their homes. These responses were used to develop the installation rates for the program. The impact evaluation chapter of this report applies these rates to program savings, and the process evaluation provides a brief overview of reported installation trends.

When asked, nearly all (97%) of the respondents indicated that they had installed at least one measure from the kit. This percentage is nearly identical to that obtained during the 2013 program evaluation (96%).

The survey results indicate that a high majority of participants installed at least one of the CFLs and the LED night light. Reported installation activity was substantially lower for faucet aerators, with 50% of respondents reporting installation. The following provides a summary of surveyed installation findings for each measure category:

- CFLs: Approximately 60% of respondents reported that they had installed the CFLs from their kit. Respondents who had not installed CFLs were asked why they had not installed the measures, and respondents explained that they chose to store the bulbs for future use. Additionally, respondents who had not installed CFLs reported that they did not recall receiving CFLs, and one respondent indicated that they had given their CFLs to friends or family members.
- LED Night Lights: Approximately 95% of survey respondents indicated they had installed the LED night light that was included in their kit. One respondent who had not installed the night light provided further information, and stated that they had disposed of the night light. Approximately 45% of respondents who installed the night light indicated that they had installed it in a location that was previously occupied by a standard-efficiency night light. When asked what they had done with the old night light, these respondents most commonly reported (48%) that they had placed the standard-efficiency night light in storage for possible future use.
- Faucet Aerators: Faucet Aerators: Approximately 23% of respondents indicated that they had installed at least one of the faucet aerators and that were provided; however, not all of these respondents reported having electric water heaters. Of the respondents who had not installed all of the faucet aerators, respondents (33%) indicated that they already have faucet aerators installed. Additionally, respondents (17%) reported that the aerators did not fit their faucets, and respondents (6%) stated that they did not understand how to install the faucet aerators.

Overall, installation rates appeared fairly high for the kit measures. As with the prior program year, comments from participants suggest that the measures that are not currently installed may be installed at a later date, potentially generating future energy savings.

Customer Satisfaction

Survey respondents were asked about their levels of satisfaction with each measure they reported installing through the School Kit Program. Results are provided on a 5-point scale of “very satisfied” to “very dissatisfied”. As displayed in the following table, respondents reported very high satisfaction levels with all three measure categories.

In total, approximately three percent of respondents stated that they were dissatisfied with any of the Schools Kit components. These results are very similar to those obtained during the 2013 program evaluation, and continue to suggest that the quality of measures provided through the program is sufficient to meet customer needs and preferences.

Table 6-31: Participant Satisfaction with Individual Measures

Measure Type	Satisfaction with Measure Performance and Quality						N
	Very Satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Very Dissatisfied	Don't know	
CFLs	71%	24%	2%	2%	-	1%	207
LED Night Lights	82%	16%	1%	1%	-	-	210
Faucet Aerator	64%	29%	5%	-	2%	-	56

Additionally, respondents were asked to rate their satisfaction with the program itself. Specifically, respondents indicated their level of satisfaction with the time it took to receive the conservation kit, and the process required to request the kit. Results are provided on a 5-point scale of “very satisfied” to “very dissatisfied”. As shown in the following table, none of the respondents indicated that they were “very dissatisfied” with either program element.

The four respondents who indicated being dissatisfied with the time taken to receive the kit stated that the kit had taken an average of six weeks to arrive. This is within the typical expected time frame for receiving kits through the Schools Kit Program.

Table 6-32: Participant Satisfaction with Program Experience

Program Element	Satisfaction with Program Experience						N
	Very Satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Very Dissatisfied	Don't know	
Time taken to receive conservation kit	61%	32%	5%	2%	-	-	223
Process used to request the kit	91%	7%	-	-	-	3%	223

As with the prior program year, participant satisfaction ratings and other commentary suggest that customers value the program and that there are no systematic issues with program delivery or the process of customer engagement.

Cross-Program Participation

Respondents were also asked whether they had participated in any other energy efficiency programs offered by the Companies. As shown in Table 6-33, respondents most commonly reported having participated in the Energy Efficiency Products program, followed by the Appliance Turn-in Program. Overall, the majority of participants indicated that they had not participated in any programs other than the Schools Kit Program.

Table 6-33: Participant Satisfaction with Program Experience

Program Type/Description	Percent of Respondents Indicating Participation in Program (N = 223)
Energy Efficiency Products (rebates for energy efficient appliances)	11%
Appliance Turn-In (refrigerator and freezer recycling)	7%
Energy Efficient New Homes (incentives for remodeling your home)	4%
Easy Cool Rewards (A/C cycling on and off at peak usage times)	3%
Lighting Discounts (discounts and rebates for lighting products)	3%
Home Energy Analyzer	2%
Energy Audit (discounted energy audit of your home)	2%
HVAC Incentives	1%

6.2.4 Schools Kits Instructor Feedback Review

The School Kit Program collects feedback from teachers in participating schools in order to gain insight into their perception of program effectiveness and overall structure. The Companies provided sample comments from these instructors for review, and this section presents examples of statements made by these respondents.

Many teachers praised the program for providing useful information to students in an enjoyable format, and reported that their students were excited to learn more about energy efficiency. Examples of positive commentary from instructors include:

“The kids enjoyed the program. It came at a good time. I am just starting my energy unit.”

“The presentation was awesome and got the students’ attention. Prior to the presentation I did the class experiment with the different light bulbs and the students really enjoyed learning about saving energy.”

“The program was very well received by the students and the message of conservation and use of energy and resources was beneficial to all.”

“It was very funny, but educational at the same time and the students liked it! They also learned some valuable information that will hopefully help them, their family and the environment.”

“Students were engaged and had a great time learning about energy conservation. This was a wonderful and meaningful program for the students. Thank you!”

Some of the instructors provided commentary indicating that the materials provided to students through the program were somewhat complex for younger children to understand. As the program targets students of varying ages, it may be difficult to design program materials that are equally appealing and usable by all students, but this issue was mentioned by a minority of teachers and does not likely represent a major barrier to participation. Overall, responding teachers appear to be satisfied with both the content of the theatrical presentation and the overall structure of the program.

6.2.5 Schools Kits Program Staff Interview Findings

This section summarizes the findings from the Companies program staff and implementation contractor interview. As with the prior program year evaluation, an

interview was conducted with the Schools Kit Program manager. The purpose of this interview in the 2014 program evaluation was to discuss program performance and operation in 2014 and to identify any program changes that had occurred since the 2013 program year. Additionally, an interview was conducted with staff from AM Conservation, the program implementation contractor, in order to gain insight into program implementation and communication with the Companies.

Key program features and trends addressed through the program staff interview include:

- **Continued Program Success:** Program staff reported that the School Kit Program's successful performance had continued into the 2014 program year, and that overall participation rates had increased substantially with the addition of more than 160 new schools to the program. Program staff reported that in 2014, approximately 55,000 students viewed the performance conducted by NTC. In terms of program goals, the program manager reported that the kit program had met its objectives for the 2014 program year, and AM Conservation staff noted that the program performed as expected.
- **Consistent Program Design:** Program staff explained that there had been no major changes to program design, operation, or delivery for the 2014 year. The program continued to target students in kindergarten through 5th grade, and recruited new schools based on a list provided by the Companies to AM Conservation. The program continued to provide the same program materials to teachers and schools in advance of the NTC performance, and did not make any additional changes to the contents of the conservation kits.
- **Effective Communication Procedures:** Program staff noted that communication between the Companies and AM Conservation had been very effective and that the two parties held regular meetings in order to discuss program updates and other topics related to program implementation. AM Conservation staff explained that meetings were more frequent during the beginning months of the pilot year in order to address program start-up tasks and other topics, and that during the 2014 program year communication occurred regularly through bi-weekly conference calls. Additionally, AM Conservation noted that they had bi-weekly IT calls with the Companies in order to ensure efficient and timely transfer of program tracking data.

Overall, the findings from the program staff interviews suggest that the Student Kit Program has continued to perform very effectively in the Companies service territories, and that there are no significant issues with program design, coordination, operation, or delivery. The program implementation contractor appears well-suited to managing program operations, and has extensive experience in administering similar programs in

other areas. These findings are consistent with those obtained through the participant survey effort, where customers found the program to be valuable, straightforward, and able to meet customer needs.

6.3 New Homes

This section provides a summary of findings organized by topics of interest from the New Homes process evaluation.

Tetra Tech, working in conjunction with ADM, conducted in-depth interviews with staff from the Companies, PSD, raters, and builders (both active and inactive in program participation). Interviews were conducted between February 6, 2015 and February 27, 2015. Tetra Tech spoke with the Companies program lead, two PSD staff, five builders, and five raters. In total, Tetra Tech conducted 13 in-depth interviews for this qualitative assessment. The objective of these interviews was to gather feedback to determine how the program is operating and to collect suggestions for program improvements.

The in-depth interviews with program staff, implementation staff, raters, and builders addressed the following researchable issues:

- The effectiveness of the program's marketing
- How well the program staff and the implementation staff worked together
- What changes can be made to the program's design/delivery to improve effectiveness
- What do builders and raters feel are the greatest challenges or obstacles to program participation
- Overall satisfaction with the program

Companies Program Staff Administration, Oversight and Communication

The program oversight has remained the same through the program years. The Companies contracted with PSD to administer the Efficient New Homes program.

Raters work with PSD to submit the paperwork in order for builders to receive the program incentives. Raters who have participated in the program said they generally find the online submission through COMPASS easy to complete.

Raters are also required to submit their ratings to their provider. Quarterly, PSD sends the rating submissions of each rater to their respective provider as required by the program.

As was reported in previous years, raters reported a very positive working relationship with PSD. All the raters we spoke to stated they are receiving the support they need in a timely manner.

Effectiveness of Program Marketing

Marketing efforts are performed by PSD staff and participating raters. Once a builder or rater has signed up for the program, PSD sends a packet containing documentation, explanation of benefits of the program, and examples of available marketing brochures to pass on to sales staff, technical partners, and homebuyers. The kit contains a letter directed to either a builder or a rater explaining the contents of the packet, which includes:

- A technical overview for the builders and raters
- Pen and carpenter pencil
- Brochure outlining benefits for builders
- Brochure outlining benefits for homebuyers
- A sample Homebuyer Certificate.

Builders and raters who participated in the program were listed on the Companies' program website for potential homebuyers and builders to seek approved program partners. Builders and raters have access to training seminars, webinars, conferences, and networking events, along with opportunities to be featured in program outreach efforts.

Current and Future Challenges

As a gauge to whether a tiered rebate approach in Ohio would be effective, builders and raters were asked their input. Unanimously, they felt that adding an additional rebate option would increase program participation. This especially holds true for those who are building energy efficient homes with a low HERS score but are not getting ENERGY STAR certified.

Program Satisfaction

Program satisfaction remains high among participating builders and raters. Both raters and builders appreciate the marketing opportunity it provides for selling their services and homes. Builders are satisfied because they are able to build better quality homes, market the energy efficiency of the home, and receive the incentives.

All builders who were asked about satisfaction gave a rating of 4 or 5 when asked to rate their overall satisfaction with the program (1=very dissatisfied, 5=extremely satisfied).

Using the same scale, 3 of 5 raters we spoke to rated their overall satisfaction with the program a 4 or 5.

6.4 Behavioral

This section reports findings from the ADM process evaluation of the Behavioral Program. Findings are based on survey responses from samples of customers who participated in the Behavioral program during 2014. The findings also draw on survey responses from nonparticipants. There were over 60 responses for both the participant and non-participant groups. This chapter presents findings from the participant surveys that address several research questions.

- How did customers learn of the availability of the HERs?
- What actions did report recipients take to save energy? How did these actions differ from the energy saving actions of online audit users or a control group?

Characteristics of Dwellings for 2014 Behavioral Modification Program Participants

As background for the process evaluation, tabulations were prepared to compare the characteristics of the dwellings of participants in the 2014 Behavioral program to those of non-participants. These comparisons are provided in Table 6-34.

Table 6-34: Type of Dwelling Occupied by 2014 Behavioral Program Participants

<i>Type of Dwelling</i>	<i>Participants</i>	<i>Non-Participants</i>
Single-family home, detached construction	88.7%	86.8%
Single-family home, factory manufactured/modular	3.1%	0.0%
Mobile home/Trailer	2.1%	3.3%
Row house	1.0%	0.0%
Two or Three family attached residence/Duplex	1.0%	0.0%
Apartment with 4+ families	0.0%	3.3%
Condominium	0.0%	3.3%
Rural house	0.0%	0.0%
Other	4.1%	3.3%
Totals	100%	100%
Sample sizes	n = 97	n=60

Table 6-35: Distribution of Owner/Renter for 2014 OA Program Participants

<i>Owned or Rented?</i>	<i>Participants</i>	<i>Non-Participant</i>
Owned	92.8%	93.3%
Rented	7.2%	6.7%
Did not know	0.0%	0.0%
Did not answer	0.0%	0.0%
Totals	100%	100%
Sample sizes	n = 97	n =60

Table 6-36: Year Built for Dwellings Occupied by 2014 OA Program Participants

<i>Year Dwelling Was Built</i>	<i>Participants</i>	<i>Non-Participants</i>
Before 1960	24.7%	25.0%
1960-1969	11.3%	6.7 %
1970-1979	21.6%	21.6 %
1980-1989	16.5%	8.3%
1990-1999	9.3%	11.7%
2000-2005	10.3%	6.7%
2006 or Later	3.1%	8.3%
Did not know	3.1%	11.7%
Totals	100%	100%
Sample sizes	n = 97	n =60

*Table 6-37: Size of Dwelling Occupied by 2014 Behavioral Program Participants
(As Measured by Square Feet of Above-Ground Living Space)*

Year Dwelling Was Built	Participants	Non-Participants
Less than 1,000 square feet	5.2%	1.7%
1,000-2,000 square feet	32.0%	40.0%
2,000-3,000 square feet	28.9%	25.0 %
3,000-4,000 square feet	11.3%	5.0 %
4,000-5,000 square feet	5.2%	1.7%
More than 5,000 square feet	4.1%	6.6%
Don't know	13.4%	20.0%
Totals	100%	100%
Sample sizes	n = 97	n =60

Customers' Experience in Receiving Home Energy Reports through 2014 Behavioral Program

Approximately 90% of program participants surveyed indicated that they recalled receiving the HERs.

Table 6-38 details how customers rated the helpfulness of the information they were sent.

Table 6-38: How helpful were the HERs

<i>Would you say the information contained in the HERs was helpful?</i>	<i>Percentage of Customers</i>
Very helpful	14.4%
Somewhat helpful	47.4%
Neither helpful nor unhelpful	11.3%
Somewhat Unhelpful	11.3%
Very Unhelpful	10.3%
Don't Know / Don't recall	5.2%
Totals	100%
Sample size	n = 41

Table 6-39 shows the percentages of participants in the 2014 Behavioral program who reported making energy saving changes after receiving the report. Customers were more likely to report making structural changes than taking behavioral actions.

*Table 6-39: Percentages of Participants in 2014 Behavioral Program
Taking Different Types of Energy Saving Actions*

Type of Energy Saving Action	Percentage of Customers
Structural (Equipment)	30.9%
Behavioral	33.0%
Both Structural & Behavioral	12.4%
No Changes Made	48.5%
Did not know / did not recall	30.9%
Sample Sizes	n= 97

Table 6-40 shows how participants rated their satisfaction with the information provided to them in HERs.

*Table 6-45: How Participants Rated
Their Satisfaction with HERs*

Level of Satisfaction	Telephone Audit
Very satisfied	28.9%
Somewhat satisfied	37.1%
Neither satisfied nor dissatisfied	22.7%
Somewhat dissatisfied	2.1%
Very dissatisfied	6.2%
Did not know	3.1%
Sample Sizes	n=97

Actions Taken by Behavioral Participants as Compared to Non-Participants.

A survey of non-participants provided information on actions they took to save energy during hot or cold weather. Table 6-41 and 6-42 shows how Behavioral participants compared to non-participants on taking actions to save energy.

Table 6-41: Percentages of Customers Who Reported Taking Particular Actions to Save Energy in Response to Hot Weather

<i>Do you do things differently now to save energy in hot weather?</i>	<i>Participants</i>	<i>Non-Participant</i>
Yes	57.1%	32.2%
No	32.1%	62.7%
Did not know	10.7%	5.1%
Totals	100%	100%
Sample sizes	n = 28	n =59

Table 6-42: Percentages of Customers Who Reported Taking Particular Actions to Save Energy in Response to Cold Weather

<i>Do you do things differently now to save energy in cold weather?</i>	<i>Participants</i>	<i>Non-Participant</i>
Yes	82.1%	43.3%
No	14.3%	56.7%
Did not know	3.6%	0.0%
Totals	100%	100%
Sample sizes	n = 28	n =60

7. Conclusions and Recommendations

This chapter reports the conclusions and recommendations resulting from the impact and process evaluation of the 2014 Program.

7.1 Audits

7.1.1 Residential Energy Audit

The overall evaluation results for estimated gross kWh energy savings and kW peak demand reductions for the REA subprogram in 2014 in the Companies' service territories are summarized in Table 7-1.

Table 7-1: Ex Ante and Ex Post Gross kWh and kW by Operating Company

Operating Company	Ex Ante kWh	Ex Ante kW	Ex Post kWh	Ex Post kW
CEI	138,406	30	142,524	30
OE	174,178	34	170,436	38
TE	53,455	13	52,123	13
Total	366,038	77	365,083	80

The gross kWh savings totals shown in Table 7-1 give a realization rate for kWh savings of about 100%, as determined by the ratio of verified gross kWh savings to expected gross kWh savings. The realization rate for kW reductions was approximately 104%.

Of the total kWh savings, 74% resulted from direct install measures and 26% from rebate measures. Direct install measures accounted for 40% of kW demand reductions and rebate measures for 60%.

Taken together, the various types of CFLs directly installed through the program accounted for 71% of the total kWh savings, ENERGY STAR windows for 21%, and all other measures for the remaining 8%.

Process Findings

Several key changes were introduced in PY2014. In order to improve the quality of the services delivered to program participants, all participating contractors were required to be BPI certified, whereas previously only contractors who conducted home energy audits

were required to be BPI certified.⁵⁹ The number of participating contractors dropped sharply from 157 in PY2013 to only 14 in PY2014. Many of the installation contractors who participated in 2013 were not BPI certified and thus were not eligible to participate in the program in 2014.

In contrast to previous program years in which rebates took the form of a specific dollar amount per measure, PY2014 rebates were based on and contingent upon kWh savings. Overall effective rebate levels decreased—particularly for ENERGY STAR windows, which had historically been the most popular additional home improvement measure installed by customers. In PY2013, nearly one-half (46%) of the 157 contractors enrolled in the program were window installation contractors; only two window installation contractors were enrolled in PY2014.

A new rebate form and submittal process was introduced in PY2014. The new process appears to be an improvement over the old one. None of participating contractors reported any customer complaints.

Recommendations

- REA include minimum kWh savings requirement in any future program iterations. The requirement that customers achieve 350 kWh in order to receive the \$250 rebate towards the cost of the audit appears to have been effective in guaranteeing a minimum amount of energy savings per audited home.
- Investigate ways to increase program marketing. Contractors act as the program's sales force, and the contractor base decreased by 91% between PY2013 and PY2014. In addition to continuing to implement marketing activities proven effective (such as bill inserts), the Companies may want investigate additional ways to market the program.
- Reevaluate the bonus incentive structure. Customers installed a greater number of additional home improvement measures in previous program years, when rebates took the form of a specific dollar amount per measure. It may be that customers have more difficulty understanding the value of rebates in the form of dollars per kWh saved.

⁵⁹ Contractors who have enrolled in the REA program include 1) contractors who only perform energy audits (audit contractors), 2) contractors who only install rebate eligible measures (installation contractors), and 3) contractors who perform audits and install rebate eligible measures.

7.1.2 Online Audits

Energy Impacts

A total of 12,828 customers participated in the OA program in Ohio in 2014. Of these participants, about three-fourths used the online audit method and about a fourth used the telephone audit method.

Electricity and Demand Savings

For all home energy audits combined in 2014, *ex ante* expected annual kWh savings were 4,130,273 kWh. The *ex post* verified annual electricity savings for all home energy audits combined in 2014 were 2,120,374 kWh. The ratio of *ex post* to *ex ante* total electricity savings yields an overall realization rate of about 51 percent for kWh savings for the 2014 OA program.

For all home energy audits combined in 2014, *ex ante* expected critical peak demand kW reduction was 820 kW. The *ex post* verified critical peak kW reduction for all home energy audits combined in 2014 was 410.3 kW. The ratio of *ex post* to *ex ante* total demand reductions yields an overall realization rate of about 50 percent kW reductions for the 2014 OA program.

Table 7-2 shows program-level results for kWh savings and kW reductions for the 2014 OA program for each of the Ohio Companies.

Audit Methods Contributions to Electricity Savings

Of the total electricity savings, 1,133,580 kWh (54 percent) were from online audits and 986,794 (46 percent) were from telephone audits.

Of the total demand reduction, 275.5 kW (67 Percent) were from online audits and 134.8 kW (33Percent) were from telephone audits.

*Table 7-2: Program-Level Savings (kWh) and
kW Reductions by Utility and Audit Method*

CEI			
	Telephone	Online	All Audits
Total kWh Saved	473,726	717,547	1,191,273
Total kW Reduced	67.1	189.7	256.8
OE			
	Telephone	Online	All Audits
Total kWh Saved	481,676	416,033	897,709
Total kW Reduced	61.2	85.8	147
TE			
	Telephone	Online	All Audits
Total kWh Saved	31,392	-	31,392
Total kW Reduced	6.5	-	6.5
Totals for All Three Companies			
	Telephone	Online	All Audits
Total kWh Saved	986,794	1,133,580	2,120,374
Total kW Reduced	134.8	275.5	410.3

Contributions to Electricity Savings

Ex post verified kWh savings and kW reductions were achieved in 2014 for those participants who engaged in either type of audit in CEI and OE territories, as well as those who engaged in a telephone audit in the TE territory. No electricity savings or demand reductions were achieved by participants who engaged in an online audit in the TE territory.

In addition, the 2014 ex-ante savings figures were also calculated assuming a similar ratio of utility company participants as the 2013 cohort. Any change in this ratio from year to year would cause variability in realized savings. Accordingly, it is expected that there will be some variation from year to year as the impacts are contingent upon the characteristics of the particular program year's participant population. The energy audit is a pathway to the structural and behavioral changes that ultimately result in energy savings; this is unlike many other typical energy efficiency programs. For example, one would expect the results of a Refrigerator Recycling program to be consistent from year to year as the savings have little to do with the specific characteristics of the participants recycling the refrigerators. ADM believes the variance from 2013 to 2014 can also be explained by the fact that 2014 participants were far less likely to engage in the behavioral changes that result in energy efficiency savings than 2013 participants. While 2014 participants were more likely to engage in structural changes than 2013 participants, the overall

percentages of participants making any changes that result in energy efficiency changes is down from 2013, as seen in Table 7-3.

Table 7-3: Energy Saving Actions

Type of Energy Saving Action	2013		2014	
	Telephone Audit	Online Audit	Telephone Audit	Online Audit
Structural (Equipment)	4.7%	18.6%	11.6%	32.5%
Behavioral	37.2%	69.3%	18.6%	48.7%

Persistence of Electricity Savings

Persistence in savings was identified for two audit groups: customers who participated in the telephone audits in 2011 and customers who participated in the online audit in 2013. For the online audit groups in the 2011 and 2012 cohorts, energy use increased in 2014 from the pre-audit year of the respective cohorts. For both audit groups in the 2010 cohort, the online audit group in the 2012 cohort, and the telephone audit group in the 2013 cohort, energy use decreased in 2014 from the pre-audit year of the respective cohorts. However, the decrease in energy use for these customers was less than for the non-participant group.

Process Findings

Differences between an Online Audit and a Telephone Audit

Customers may receive a home energy audit by telephone as part of the process of resolving a high bill complaint; however, home energy audits by telephones are not initiated by the customer. In contrast, online energy audits are initiated by customers, generally to understand how they can be more efficient in using electricity in their home.

Customers who receive a home energy audit by telephone may receive literature on how to save energy in the home, but they do not receive a customized, written home energy report like the online audit participants do.

A total of 8,791 customers received an online audit through the 2014 OA program, and a total of 4,037 customers received a telephone audit through the 2014 OA program.

Energy Saving Actions of Online vs. Telephone Audit Participants

The online audit participants were more likely to take energy saving actions as a result of the home energy audit experience compared to telephone audit participants. Over three fourths (about 81 percent) of the online audit participants reported taking structural or

behavioral energy saving actions as a result of the home energy audit. By comparison just under a third (about 30 percent) of the telephone audit participants reported taking such actions. ADM believes that while online audit participants self-report more energy saving actions than phone audit participants, phone audit participants achieve a higher per participant savings because their attitudes towards energy efficiency aren't as strong as their online audit participant counterparts (phone audits are initiated through high-bill complaints while online audit participants seek out the Home Energy Analyzer through their own volition). Thus, many of the highest value energy efficiency structural and behavioral changes may have already been made by online audit participants prior to the audit.

Recommendations

The Companies should consider increasing the frequency and content of bill inserts that advertise and promote online home energy audits using the Online Audit software.

7.2 Energy Conservation Kits

7.2.1 Energy Impacts

The 2014 evaluation results for estimated gross kWh energy savings and kW peak demand reductions for the Energy Conservation Kits subprogram in the Companies' service territories are summarized in Table 7-4.

Table 7-4: Energy Conservation Kits Energy Impacts

Operating Company	Ex Ante kWh	Ex Ante kW	Ex Post kWh	Ex Post kW
CEI	19,691,682	2,007	18,532,445	2,062
OE	21,241,452	2,188	19,961,492	2,223
TE	10,441,251	1,090	11,053,340	1,227
Total	51,374,385	5,285	49,547,277	5,512

The gross kWh savings totals shown in Table 7-4 yield a program realization rate for kWh savings of 96%, as determined by the ratio of verified gross kWh savings to expected gross kWh savings. The realization rate for kW reductions was 104%. Of the total kWh savings and kW demand reduction, roughly 95% resulted from Power Direct Kits measures and 5% for Schools Kits measures.

7.2.2 Process Findings

Power Direct Kits

The following presents a selection of key conclusions from the current program year:

- **Continued Program Performance Success:** The program continued to exceed its goals, nearly meeting the 3-year program goal after only two years of operation. The participant survey effort and feedback from program staff indicate that the program has been able to meet increased levels of demand without any significant issues, and that the overall operation and performance of the program has exceeded expectations without any major challenges. As with the prior program year, the program appears to have sufficient staffing resources, budget, and participation potential to meet program objectives.
- **Sufficient Program Awareness:** The participant survey results and commentary from program staff suggest that word-of-mouth promotion of the program has continued to serve as a substantial driver of program awareness and enrollment.
- **Continued High Participant Satisfaction:** Participants reported very high satisfaction levels for the 2014 program year, both with regard to the performance of individual measures and with the time taken to receive the conservation kits.
- **Consistent Measure Preference:** As with the 2013 program year, participants in 2014 expressed preferences for CFLs, LED night lights, and smart strips over the other measures provided in the conservation kits. Participants found these three measures to be the most useful, and provided high satisfaction ratings for each of these measures. There do not appear to have been any significant changes with regard to participant measure preference for the 2014 program year.

Schools Kits

The following presents a selection of key conclusions from the current program year:

- **Continued Program Performance Success:** The School Kit Program's successful performance increased during the 2014 program year, and overall participation rates increased substantially with the addition of more than 160 new schools to the program. As expected during 2014, the program was able to increase participation levels and did not encounter any significant operational issues during the program year. The program did not encounter any issues with staffing, budgetary, or promotional resources during the year, and the Schools Kit Program was able to meet its objectives for 2014.
- **Consistent Program Design:** Based on a review of program tracking data and program staff interviews, there were no major changes to program design, operation, or delivery for the 2014 year. The program continued to target students in kindergarten through 5th grade, and recruited new schools based on a list provided by the Companies to AM Conservation. The program continued to provide the same program materials to teachers and schools in advance of the NTC performance.

- **Sufficient Program Awareness:** Although the throughput rate of students who viewed the NTC presentation to students whose families requested a conservation kit continued to be approximately 20-25%, this level of awareness and enrollment was sufficient to meet program goals. Although increased program awareness by parents of students who view the presentation may increase enrollment rates, making efforts to modify program marketing or delivery does not appear necessary. Additionally, the Schools Kits Program did not encounter any significant difficulties in recruiting new schools to participate, and program awareness for the Companies' customers likely increased substantially during the 2014 program year as new schools were added.
- **Continued High Participant Satisfaction:** As with the 2013 program year, participants reported very high satisfaction levels for the 2014 program year for all surveyed program and measure elements. Instances of dissatisfaction were very minimal and appeared to be related to individual participant preferences rather than representative of a core program issue. Customers continued to perceive the program as valuable, straightforward, and able to meet customer needs.
- **Consistent Measure Preference:** As with the 2013 program year, the participant survey results indicate that customers prefer CFLs and LED night lights to the faucet aerators, and find these items to be more useful.

7.2.3 Recommendations

Overall, the program ran smoothly during the 2014 implementation year. The Companies and implementation contractor staff are confident with the distribution methods for the Energy Conservation Kits and participant satisfaction.

Power Direct Kits

The evaluation team currently has the following recommendations for program improvement consideration.

- **Consider Measure Modifications:** The set of measures provided in the Power Direct Kits has generated customer satisfaction and energy savings. However, the Companies and Power Direct should continually consider the benefits of modifying the contents of energy conservation kits in order to generate additional savings or appeal to a wider population of customers.
- **Assess Recommendation for Uninstalled Measures:** As some measures continue to have low in-service rates e.g. furnace whistles, the Companies and Power Direct should consider including with the kit, recommendations for uninstalled measures. A potential recommendation could be suggesting that uninstalled measures be shared with family, friends, or neighbors.

Schools Kits

The evaluation team currently has the following recommendations for program improvement consideration.

- **Consider Measure Modifications:** The current set of measures provided in the Schools Kits has generated customer satisfaction and energy savings. However, as it may be useful to explore alternative measures in order to appeal to the remaining non-participant population or to increase in-service rates of distributed measures. .
- **Assess Recommendation for Uninstalled Measures:** As the aerators continue to have low in-service rates, the Companies and AM Conservation should consider including with the kit, recommendations for uninstalled measures. A potential recommendation could be suggesting that uninstalled measures be shared with family, friends, or neighbors.

7.3 New Homes

Energy Impacts

A total of 921 homes in the service territories of the three Companies received rebates through the Residential New Homes program in 2014. The number of participating builders in each service territory is shown in Table 7-5.

Table 7-5: Builder Participation by Utility

<i>Operating Company</i>	<i>Number of Participants</i>
CEI	8
OE	22
TE	2
All Companies	32

Verified electric impacts were 2,339,659 kWh saved annually, which represents a realization rate of 104%. Average on-peak demand reduction was verified to be 591 kW. Annual gross energy savings (kWh) and on-peak demand reductions (kW) for the program in the three Companies are reported in Table 7-6.

Table 7-6: New Homes Energy Impacts

Operating Company	Ex Ante Expected Gross Savings		Ex Post Verified Gross Savings	
	kWh	kW	kWh	kW
CEI	495,726	169	527,277	160
OE	1,638,211	441	1,686,076	397
TE	123,294	38	126,307	34
All Companies	2,257,231	648	2,339,659	591

Since its inception, the Companies' Residential New Homes Program has seen a fair amount of success. Identifying ways to educate stakeholders will be key to the continuing success of the program. Increasing builder participation from those not currently building to ENERGY STAR® Version 3.0 standards would also improve the success of the program. Increasing the number of builders involved in the program could increase the presence of ENERGY STAR® homes in the market and make homebuyers more aware of their benefits.

Continued support by the raters will continue to be a key component to the continued success of the program. Builders are influenced by rater's suggestions and buy-in into the program. Maintaining a close working relationship between PSD and the raters will provide the support the raters need to continue to promote the program.

The program requirements are clear for builders and raters and trainings have been on target, which have been successful in helping move the program forward.

Process Findings

- **Raters continue to report an excellent working relationship with PSD.** PSD staff is viewed as responsive, knowledgeable, experienced, and helpful. This has been consistently reported over the past evaluation years. PSD conducts webinars which have been well received. PSD has also been readily available if there are questions on the program, the rebate submission process, or the QA/QC process.
- **Raters report that the COMPASS software provided by PSD is easy to use.** Most of the raters we spoke with said the submission process is easy. However, raters who enter paperwork for multiple projects indicated that it would be easier if some of the fields could be auto-filled.
- **A tiered incentive structure may appeal to builders and raters.** Some builders do not build homes that are ENERGY STAR, even though the homes are very efficient. If the Companies were to offer a rebate for homes that are non-

ENERGY STAR but are very efficient and have a low HERS score, some raters thought it would drive additional builders to the program.

- **Builders are typically informed about the program through raters.** The program involvement for builders was quite low; they did not know a lot about the program and relied on their rater to inform them of changes and complete all paperwork for them. Raters almost always knew the ins and outs of the program and felt that builders need to understand program requirements if the intent is to increase builder participation in the program.
- **Satisfaction with program elements is high among builders and raters.** All builders who were asked about satisfaction gave a rating of four or five when asked to rate their overall satisfaction with the program (1=very dissatisfied, 5=extremely satisfied). Using the same scale, three of five raters we spoke to rated their overall satisfaction with the program a four or five.

Recommendations

- **Increase program outreach with builder organizations.** Most local builders are part of builder organizations, which could be a key marketing mechanism for program outreach to gain participation. Builders felt that in-person presentations about the program would be the most useful (rather than webinars or mailings).
- **Educate the builders and homeowners about the long-term cost savings of an efficient home.** Building a more efficient home may cost more up-front. One builder indicated that it was typically about eight percent more for the home cost to go from a standard home to an ENERGY STAR certified home. Educating builders on the benefits will also make homeowners more aware of the long-term cost savings associated with the home.
- **Consider offering a tiered rebate structure, rather than requiring ENERGY STAR certification.** To continue to encourage the building of more efficient homes, the program could consider providing tiered rebates. These rebates would have offset some of the costs in the process of certifying a home which can be cumbersome and time intensive. If homes had a low HERS score and were still very energy efficient, it would appeal to additional builders to participate in the program.

7.4 Behavioral

A total of 21,475 customers participated in the Behavioral Modification program in Ohio during 2014. Of these participants, 48% were in the OE service territory, while a little over third were from CEI and 18% were from TE.

7.4.1 Energy Impacts

For all participants in across all service territories during 2014, *ex ante* expected annual kWh savings were 16,535,565 kWh. The *ex post* verified annual electricity savings for all participants in 2014 were 5,798,800 kWh. The realization rate for electric savings was 75.44 percent. The realization rate equals the ratio of ex post 2014 continued annual savings from ADM to ex ante 2014 continued annual electricity savings from Opower for the 2014 Behavioral program.

For all participants combined across all service territories during 2014, *ex ante* expected critical peak demand kW reduction was 2,611 kW. The *ex post* verified critical peak kW reduction for all home energy audits in 2014 continued was 662 kW.

Table 7-7 shows program-level results for kWh savings and kW reductions for the 2014 Behavioral program for each of the Companies.

Table 7-7: Program Level Results for 2014 Behavioral Modification Program

	Ex Ante Savings						Ex Post Savings	
	kWh			kW			kWh	kW
Savings by Utility Company								
	2014 Continued	2014 Persistence	Sum of Participants+ Persistence	2014 Continued	2014 Persistence	Sum of Participants + Persistence	2014 Continued	2014 Continued
CEI	2,908,322	2,,632,356	5,540,678	472	541	1,013	2,057,955	235
OE	3,708,593	5,562,962	9,271,555	403	815	1,218	2,853,723	326
TE	1,069,417	653,916	1,732,332	218	162	380	887,122	101
Total	7,686,331	8,849,234	16,535,565	1,093	1518	2,611	5,798,800	662

7.4.2 Process Findings

Over 60% of participants indicated that the information contained in HERs was either very or somewhat helpful, and most often cited the comparison to neighbors consumption was most helpful. While over 63% of survey respondents reported that they made either a structural or behavioral change as a result of the HERs, more respondents made structural changes to their homes as opposed to behavioral changes. While most structural changes were made to appliances, some of the behavioral changes reported are listed below:

- Keeping blinds closed during the day in the summer time.
- Adjustments to thermostats.
- Hanging clothes outside to dry during warmer weather.

- Opening windows instead of running the air conditioner.
- Turning off lights when not in use.

Overall satisfaction is high, over 65% of survey respondents reported that they were either “Very” or “Somewhat” satisfied with the HERs.

7.4.3 Recommendations (7.4.3)

In light of the above evaluation findings, ADM makes the following recommendations:

- Both the impact and process evaluations indicated that few customers who received HERs also participated in other utility-sponsored energy conservation programs. The Companies may consider marketing other programs on the HERs. Particularly, cross-marketing programs like Appliance Turn-In and Energy Efficient Products may result in increased program participation since the process evaluation implied that Behavioral Modification program participants have a propensity to make structural changes.

8. Appendix A: Required Savings Tables

Tables showing measure-level participation counts and savings for the Program were provided in various locations throughout this report. This appendix provides additional tables summarizing savings results. Lifetime savings were calculated as shown in

Equation 20: Calculation of Lifetime Savings

$$\text{Lifetime Savings} = \text{Measure Life} \times \text{Annualized Savings}$$

8.1 Audits

8.1.1 Residential Energy Audit

Table 8-1: Ex Post Annual kWh Savings by Measure and Operating Company

Measure	Operating Company			
	CEI	OE	TE	Total
Direct Install Measures				
12/22/33 Watt 3-way CFL	3,416	4,447	1,805	9,667
13 Watt CFL (60 watt)	36,598	38,311	16,338	91,246
14W Globe CFL	4,634	7,587	328	12,550
20 Watt CFL (75 watt)	22,029	32,400	9,316	63,745
25 Watt CFL (100 watt)	28,562	39,474	11,498	79,534
7W Candelabra CFL	513	1,169	62	1,743
9W Candelabra CFL	158	-	-	158
LED Nightlight	158	105	-	263
Energy Savings Surge Protector	1,808	1,526	-	3,334
Kitchen Aerator	154	62	-	216
Bath Aerator	53	794	-	847
Low Flow Showerhead	1,728	2,688	-	4,415
EHW Pipe Insulation	577	1,909	444	2,930
Furnace Whistle	149	303	-	453
Total	100,537	130,775	39,789	271,102
Rebate Measures				
Attic Insulation	2,784	4,311	613	7,708
Wall Insulation	349	5,584	1,861	7,794
ENERGY STAR Windows	38,853	29,767	9,860	78,479
Total	41,986	39,661	12,334	93,981

Grand Total kWh Savings	142,524	170,436	52,123	365,083
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Table 8-2: Ex Post Annual kW Reduction by Measure and Operating Company

Measure	Operating Company			
	CEI	OE	TE	Total
<u>Direct Install Measures</u>				
12/22/33 Watt 3-way CFL	0.409	0.532	0.216	1.156
13 Watt CFL (60 watt)	4.377	4.582	1.954	10.914
14W Globe CFL	0.554	0.907	0.039	1.501
20 Watt CFL (75 watt)	2.635	3.875	1.114	7.624
25 Watt CFL (100 watt)	3.416	4.721	1.375	9.513
7W Candelabra CFL	0.061	0.140	0.007	0.208
9W Candelabra CFL	0.019	0.000	0.000	0.019
LED Nightlight	0.000	0.000	0.000	0.000
Energy Savings Surge Protector	0.202	0.170	0.000	0.372
Kitchen Aerator	0.020	0.008	0.000	0.028
Bath Aerator	0.007	0.102	0.000	0.108
Low Flow Showerhead	0.221	0.344	0.000	0.565
EHW Pipe Insulation	0.066	0.218	0.051	0.334
Furnace Whistle	0.000	0.000	0.000	0.000
Total	11.987	15.600	4.757	32.343
<u>Rebate Measures</u>				
Attic Insulation	0.363	3.222	0.708	4.293
Wall Insulation	0.410	6.528	2.148	9.086
ENERGY STAR Windows	17.331	12.186	5.069	34.586
Total	18.104	21.936	7.925	47.965
Grand Total kW Reduction	30.091	37.536	12.681	80.308

Table 8-3: Lifetime kWh Savings by Measure and Operating Company

Measure	Operating Company				
	EUL	CEI	OE	TE	Total
<u>Direct Install Measures</u>					
12/22/33 Watt 3-way CFL	6.8	23,227	30,239	9,023	62,489
13 Watt CFL (60 watt)	6.8	248,863	260,517	81,688	591,068
14W Globe CFL	6.8	31,514	51,593	1,640	84,748
20 Watt CFL (75 watt)	6.8	149,800	220,318	46,578	416,696
25 Watt CFL (100 watt)	6.8	194,222	268,425	57,490	520,138
7W Candelabra CFL	6.8	3,486	7,948	308	11,742
9W Candelabra CFL	6.8	1,076	-	-	1,076
LED Nightlight	8.0	1,261	841	-	2,102
Energy Savings Surge Protector	4.0	7,232	6,102	-	13,334
Kitchen Aerator	5.0	772	309	-	1,081
Bath Aerator	5.0	265	3,971	-	4,236
Low Flow Showerhead	5.0	8,639	13,438	-	22,077
EHW Pipe Insulation	15.0	8,656	28,631	2,219	39,507
Furnace Whistle	7.5	1,121	2,275	-	3,396
Total Numbers of Direct Install Measures	6.5	680,135	894,609	198,946	1,773,690
<u>Rebate Measures</u>					
Attic Insulation	25.0	69,606	107,766	15,324	192,696
Wall Insulation	25.0	8,724	139,593	46,532	194,849
ENERGY STAR Windows	25.0	971,322	744,167	246,495	1,961,984
Total Numbers of Rebate Measures	25.0	1,049,651	991,526	308,352	2,349,529
Grand Total for Lifetime kWh Savings	11.3	1,729,786	1,886,134	507,298	4,123,219

8.1.2 Online Audit

Table 8-4: Online Audit Program Level Ex Post kWh Savings and kW Reduction

	Measure Life	Annual Savings		Lifetime Savings
		kWh	kW	kWh
Savings by Utility Company				
CEI	3	1,191,273	256.8	3,573,819
OE	3	897,709	147	2,693,127
TE	3	31,392	6.5	94,176
Savings by Type of Audit				
Online Audits	3	1,133,580	275.5	5,327,188
Telephone Audits	3	986,794	134.8	4,577,700
Savings for All Audits				
All Audits	3	2,120,374	410.3	9,904,888

8.2 Energy Conservation Kits

Table 8-5: Ex Post Annual kWh Savings by Measure and Operating Company

Measure	Operating Company			
	CEI	OE	TE	Total
<u>Non-Electric Kit Measures</u>				
13W CFL	5,447,049	5,228,960	3,245,604	13,921,613
20W CFL	1,867,560	1,792,786	1,140,347	4,800,693
23W/26W CFL	2,178,820	2,091,584	1,140,347	5,410,751
3 Way CFL	2,023,190	1,942,185	964,909	4,930,284
9W/11W Globe CFL	778,150	746,994	438,595	1,963,739
7 Plug Smart Strip	2,334,450	2,240,983	1,315,785	5,891,218
LED Nightlight	311,260	298,798	175,438	785,496
Furnace Whistle	622,520	597,595	350,876	1,570,991
Total for Standard Kit Measures	15,562,997	14,939,885	8,771,903	39,274,784
<u>Electric Kit Measures</u>				
13W CFL	734,952	939,941	480,542	2,155,435
20W CFL	283,360	369,509	226,187	879,056
23W/26W CFL	345,741	461,312	289,422	1,096,475
3 Way CFL	259,422	331,726	115,715	706,862
9W/11W Globe CFL	97,108	123,178	48,635	268,921
7 Plug Smart Strip	321,345	413,302	222,641	957,287
LED Nightlight	50,648	64,862	29,749	145,258
Furnace Whistle	82,357	105,184	60,438	247,979
Faucet Aerator*	396,621	509,281	265,378	1,171,280
Showerhead*	75,670	97,687	44,147	217,504
Total for All Electric Measures	2,647,224	3,415,981	1,782,852	7,846,058
<u>Schools Kit Measures</u>				
13W CFL	201,270	1,002,920	311,431	1,515,621
18W CFL	92,894	462,886	143,737	699,517
LED Nightlight	16,391	81,675	25,362	123,428
Faucet Aerator	11,669	58,145	18,056	87,870
Total for Schools Kits Measures	322,224	1,605,626	498,585	2,426,435
Grand Total	18,532,445	19,961,492	11,053,340	49,547,277

*Energy savings only occur for these measures in homes with an electric water heater.

Table 8-6: Ex Post Annual kW Reduction by Measure and Operating Company

Measure	Operating Company			
	CEI	OE	TE	Total
<u>Non-Electric Kit Measures</u>				
13W CFL	677	650	380	1,708
20W CFL	243	234	137	614
23W/26W CFL	244	234	138	615
3 Way CFL	208	200	117	525
9W/11W Globe CFL	87	83	49	219
7 Plug Smart Strip	278	267	156	701
LED Nightlight	0	0	0	0
Furnace Whistle	0	0	0	0
Total for Standard Kit Measures	1,737	1,668	977	4,381
<u>Electric Kit Measures</u>				
13W CFL	89	113	58	259
20W CFL	34	44	27	106
23W/26W CFL	41	55	35	130
3 Way CFL	31	40	14	84
9W/11W Globe CFL	13	16	6	35
7 Plug Smart Strip	37	48	25	111
LED Nightlight	0	0	0	0
Furnace Whistle	0	0	0	0
Faucet Aerator	9	11	6	26
Showerhead	35	45	24	104
Total for All Electric Measures	289	373	194	856
<u>Schools Kit Measures</u>				
13W CFL	24	120	37	181
18W CFL	11	55	17	84
LED Nightlight	0	0	0	0
Faucet Aerator	1	7	2	11
Total for Schools Kits Measures	37	183	57	276
Grand Total	2,062	2,223	1,227	5,512

Table 8-7: Lifetime kWh Savings by Measure and Operating Company

Measure	Operating Company				
	EUL	CEI	OE	TE	Total
<u>Non-Electric Kit Measures</u>					
13W CFL	6.80	37,039,932	35,556,926	22,070,107	94,666,973
20W CFL	6.80	12,699,405	12,190,946	7,754,362	32,644,720
23W/26W CFL	6.80	14,815,973	14,222,770	7,754,362	36,793,112
3 Way CFL	6.80	13,757,689	13,206,858	6,561,383	33,525,937
9W/11W Globe CFL	6.80	5,291,419	5,079,561	2,982,447	13,353,434
7 Plug Smart Strip	4.00	9,337,798	8,963,931	5,263,142	23,564,875
LED Nightlight	8.00	2,490,079	2,390,382	1,403,504	6,283,974
Furnace Whistle	7.50	4,668,899	4,481,965	2,631,571	11,782,443
Total for Standard Kit Measures	6.43	100,101,195	96,093,340	56,420,879	252,615,467
<u>Electric Kit Measures</u>					
13W CFL	6.80	4,997,674	6,391,599	3,267,687	14,656,967
20W CFL	6.80	1,926,848	2,512,662	1,538,069	5,977,585
23W/26W CFL	6.80	2,351,040	3,136,921	1,968,072	7,456,039
3 Way CFL	6.80	1,764,068	2,255,736	786,860	4,806,670
9W/11W Globe CFL	6.80	660,334	837,613	330,717	1,828,671
7 Plug Smart Strip	4.00	1,285,381	1,653,207	890,562	3,829,153
LED Nightlight	8.00	405,186	518,892	237,988	1,162,075
Furnace Whistle	7.50	617,676	788,882	453,286	1,859,850
Faucet Aerator	5.00	1,983,107	2,546,403	1,326,888	5,856,403
Showerhead	5.00	378,350	488,434	220,734	1,087,524
Total for All Electric Measures	6.18	16,369,662	21,130,349	11,020,863	48,520,937
<u>Schools Kit Measures</u>					
13W CFL	6.80	1,368,638	6,819,855	2,117,728	10,306,227
18W CFL	6.80	631,679	3,147,625	977,413	4,756,724
LED Nightlight	8.00	131,127	653,398	202,896	987,428
Faucet Aerator	5.00	58,344	290,727	90,278	439,354
Total for Schools Kits Measures	6.80	2,189,788	10,911,605	3,388,313	16,489,733
Grand Total	6.41	118,660,645	128,135,293	70,830,055	317,626,137

8.3 New Homes

Lifetime savings are presented for the New Homes subprogram by operating company in *Table 8-8*.

Table 8-8: New Homes Lifetime Savings by Operating Company

<i>Operating Company</i>	<i>Number of Participants</i>	<i>Annual ex Post kWh Savings</i>	<i>Annual ex Post kW Savings</i>	<i>Lifetime kWh</i>
CEI	187	527,277	160	7,909,152
OE	675	1,686,076	397	25,291,140
TE	59	126,307	34	1,894,598
Total	921	2,339,659	591	35,094,891

8.4 Behavioral

The Lifetime savings for the Behavioral Modification program in 2014 is the second program year. Savings for persistence group is also shown in Table 8-10.

Table 8-9: 2014 Behavior Modification Program Level kWh Savings

	Ex Ante Savings						Ex Post Savings ⁶⁰	
	kWh			kW			kWh	kW
Savings by Utility Company								
	2014 Participants (Received Report in 2014)	2014 Persistence (Received report in 2013)	Sum of Participants+ Persistence	2014 Participants	2014 Persistence	Sum of Participants+ Persistence	2014 Participants	2014 Participants
CEI	2,908,322	2,,632,356	5,540,678	472	541	1,013	2,057,955	235
OE	3,708,593	5,562,962	9,271,555	403	815	1,218	2,853,723	326
TE	1,069,417	653,916	1,732,332	218	162	380	887,122	101
Total	7,686,331	8,849,234	16,535,565	1,093	1518	2,611	5,798,800	662

⁶⁰ Ex Post savings are based on 2014 participant savings only, thus yielding a realization rate for kWh and kW of 75% and 61% respectively.

Table 8-10: Participation Levels for Persistence Group Behavioral Program KWh Savings

	<i>Persistent Group kWh Savings (Per Participant)</i>	<i>Persistence Participants</i>	<i>Persistence Program kWh Annual Savings</i>	<i>kW Savings</i>
CEI	0.38642	15,666	2,209,584	252.24
OE	0.537602	25,812	5,064,953	578.19
TE	0.30609	5,280	589,897	67.34
Totals		46,758	7,864,434	897.77

9. Appendix B: Audit Survey Instruments

9.1 Residential Energy Audit Participant Survey

Q1. Hello, my name is [INTERVIEWER NAME]. ADM Associates is an independent research firm conducting this survey on behalf of [EDC]. We are surveying households that participated in [EDC]'s 2014 Residential Energy Audit Program. May I please speak to the person who would know the most about [EDC] your home energy audit?

1. Yes
2. No [THANK AND TERMINATE INTERVIEW]

Q2. According to our records, you received a home energy audit through this program and may also have had various energy efficiency measures installed in your home based on the recommendations of the home energy auditor. Measures may have included the direct installation of compact fluorescent lamps (CFLs), low flow showerheads, faucet aerators, or hot water pipe wrap insulation. You may also have received a rebate for an Energy Star ceiling fan or items installed in your home by a home improvement contractor, including attic or wall insulation, duct sealing, or Energy Star windows.

We received your phone number from [EDC] because you are listed as the person on the account receiving a residential energy audit or the person who applied for a product rebate through this program. We are surveying program participants to verify information and assess customer satisfaction about the individual products and services in order to assess program benefits for customers and future program offerings. If you complete this survey, we will send you a \$10 gift card to Target Stores. May I complete this survey with you?

1. Yes
2. No [THANK AND TERMINATE INTERVIEW]

Online Introduction:

ADM Associates, Inc. is an independent research firm conducting this survey on behalf of [EDC]. We are surveying households that participated in [EDC]'s 2014 Residential Energy Audit Program.

According to our records, you received a home energy audit through this program and may also have had various energy efficiency measures installed in your home depending on the recommendations of the home energy auditor. These measures may have

included the direct installation of compact fluorescent lamps (CFLs), low flow showerheads, faucet aerators, or hot water pipe wrap insulation. You may also have received a rebate for an Energy Star ceiling fan or items installed in your home by a home improvement contractor, including attic or wall insulation, HVAC system duct sealing, or Energy Star windows.

We received your email address from [EDC] because you are listed as the person on the account receiving a residential energy audit or the person who applied filed for a product rebate through this program. We are surveying program participants to verify information about the products and services received and to assess customer satisfaction with the individual chose products and services in order to access assess program benefits for customers and future program offerings. If you complete this survey, we will send you a \$10 gift card to Target Stores.

Q3. Do you recall participating in the 2014 Residential Energy Audit Program?

1. Yes
2. No [THANK AND TERMINATE INTERVIEW]
98. Don't Know [THANK AND TERMINATE INTERVIEW]

Q4. How did you hear about the Residential Energy Audit Program? (Do not read; Prompt if necessary)

1. Contractor
2. Retail Store
3. Bill Insert
4. Direct Mail from electric company
5. Energy Save Ohio website
6. Print Ad
7. TV
8. Word-of-Mouth
97. Other (Specify)

1. Our records show that you had Energy Star CFLs directly installed in your home by a home energy auditor. Is this correct?

1. Yes
2. No
98. Don't know

2. Our records show that you had Low Flow Showerheads directly installed in your home by a home energy auditor. Is this correct?
 1. Yes
 2. No
 98. Don't know
3. Our records show that you had Kitchen and/or Bath Faucet Aerators directly installed in your home by a home energy auditor. Is this correct?
 1. Yes
 2. No
 98. Don't know
4. Our records show that you had Pipe Wrap Insulation directly installed in your home by a home energy auditor. Is this correct?
 1. Yes
 2. No
 98. Don't know

[DISPLAY CFLS IF Q= 1]

CFLS

I would like to ask you some questions about the CFLs that may have been installed in your home. CFL bulbs are the bulbs that are "corkscrew" in shape or in a double U-shape.

5. According to our records, you had [NUMBER OF CFLs] CFLs installed in your home by a home energy auditor. Is that correct?
 1. Yes
 2. No
 98. Don't know

[DISPLAY QIF Q = 2]

6. What is the correct number of CFLs that were installed by the auditor?
 1. Correct number of CFLs installed:
 98. Don't know

[DISPLAY Q IF Q. = 1]

7. Were you given additional CFLs to install later?
 1. Yes

- 2. No
- 98. Don't know

[

8. How many CFLs were you given?

9. Did you install any of the additional CFLs yourself?

- 1. Yes
- 2. No
- 98. Don't Know

Now I would like to ask you some questions about the CFLs that were installed. When answering the following questions, I would like you to think of the CFLs that were installed by the home auditor and any additional CFLs that were left by the auditor that you may have installed.

10. Which of the following rooms did new CFLs get installed in by either the auditor, or yourself. The bulbs must have been provided by the program. (Select all that apply)
(Do not read; prompt if necessary)

- 1. Bedrooms
- 2. Bathrooms
- 3. Living Room
- 4. Kitchen
- 5. Entry Way
- 6. Dining Room
- 7. Garage
- 8. Basement
- 9. Den
- 10. Stairway
- 11. Office
- 12. Hallway
- 97. Other Room/Location
- 98. Don't Know

11. Did the CFLs in your [ROOM SELECTED FROM Q10] replace traditional incandescent light bulbs, replace another CFL, or were they installed in a new fixture? (Select all that apply)

- 1. Incandescent
- 2. CFLs
- 3. Installed in new fixture

98. Don't Know

[DISPLAY QIF Q = 1]

12. How many watts were the incandescent bulbs replaced in this room?

1. 60 watts or higher
2. Less than 60 watts
98. Don't Know

[DISPLAY QIF Q= 3]

13. How many of the new CFLs were installed in a new light fixture?

1. Number of CFLs installed in new light fixture:
98. Don't Know

14. Before the CFLs were installed by the home energy auditor, did you have any CFLs installed in your home?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q= 1]

15. How many CFLs were installed in your home before the home energy audit?

16. Would you purchase CFLs in the future?

1. Yes
2. No
98. Don't Know

17. How satisfied or dissatisfied are you with the new CFLs? Would you say you are:
(Read list)

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied or dissatisfied
4. Satisfied
5. Very satisfied
98. Don't know

[DISPLAY Q IF Q= 1 or 2]

18. Why are you dissatisfied with your new CFLs?

[DISPLAY FAUCET AERATORS IF Q = 1]

FAUCET AERATORS

19. Our records show that the home energy auditor installed [QUANTITY FROM DB] faucet aerators in your bathroom. Is that correct?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q= 2]

20. What is the correct number of bath faucet aerators that were installed?

1. Number of bath aerators installed:
98. Don't know

21. Did you remove any of the bath faucet aerators?

1. Yes
2. No
98. Don't know

[DISPLAY QIF Q = 1]

22. How many bath faucet aerators did you remove?

1. Number of aerators removed:
98. Don't know

23. How satisfied or dissatisfied are you with the new bath faucet aerators? Would you say you are: (Read list)

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied or dissatisfied
4. Satisfied
5. Very satisfied
98. Don't know

[DISPLAY QIF Q= 1 or 2]

24. Why are you dissatisfied with your bath faucet aerators?

25. Our records show that the home energy auditor installed [QUANTITY FROM DB] faucet aerators in your kitchen. Is that correct?

1. Yes
2. No
98. Don't know

[DISPLAY QIF Q = 2]

26. What is the correct number of kitchen faucet aerators that were installed?

1. Number of aerators installed
98. Don't know

27. Did you remove any of the kitchen faucet aerators?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q. = 1]

28. How many kitchen faucet aerators did you remove?

29. How satisfied or dissatisfied are you with the kitchen faucet aerators? Would you say you are: (Read list)

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied or dissatisfied
4. Satisfied
5. Very satisfied
98. Don't know

[DISPLAY Q IF Q= 1 or 2]

30. Why are you dissatisfied with your kitchen faucet aerators?

[DISPLAY LOW FLOW SHOWERHEADS IF Q= 1]

LOW FLOW SHOWERHEADS

31. Our records show that the home energy auditor installed [NUMBER OF SHOWERHEADS] low flow showerheads. Is that correct?

1. Yes
2. No
98. Don't know

= 2]

32. What is the correct number of low flow showerheads that were installed?

33. Did you remove any of the low flow showerheads?

1. Yes
2. No
98. Don't know

[DISPLAY QIF Q = 1]

34. How many of the low flow showerheads did you remove?

35. How satisfied or dissatisfied are you with the low flow showerheads? Would you say you are: (Read list)

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied or dissatisfied
4. Satisfied
5. Very satisfied
98. Don't know

[DISPLAY Q IF Q = 1]

36. Why are you dissatisfied with your low flow showerheads?

[DISPLAY PIPE WRAP INSULLATIONS IF Q = 1]

PIPE WRAP INSULLATIONS

37. Our records show that the home energy auditor installed pipe wrap insulation for your hot water heater. Is that correct?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q= 1]

38. Was an insulating tank blanket installed in addition to the pipe wrap installation?

1. Yes, the auditor installed an insulating tank blanket.
2. No, there was a preexisting tank blanket.
3. No, heater is thankless.
4. No, there was no existing insulating tank blanket and the auditor didn't install one

98. Don't Know

39. Was an insulating tank blanket installed in addition to the pipe wrap installation?

1. Yes, the auditor installed an insulating tank blanket.
2. No, there was a preexisting tank blanket.
3. No, heater is tankless.
4. No, there was no existing insulating tank blanket and the auditor didn't install one

98. Don't Know

40. How satisfied or dissatisfied are you with the pipe wrap insulation? Would you say you are: (Read list)

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied or dissatisfied
4. Satisfied
5. Very satisfied
98. Don't know

[DISPLAY Q IF Q= 1 or 2]

41. Why are you dissatisfied with the pipe wrap for your hot water heater?

42. Did the auditor make recommendations for additional energy saving home improvements such as installing insulation, new windows, or duct sealing?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q = 1]

43. How satisfied or dissatisfied are you with the recommendations made by the auditor? (Read list)

1. Very dissatisfied
2. Dissatisfied
3. Neither satisfied or dissatisfied
4. Satisfied
5. Very satisfied
98. Don't know

44. Our records show that you received a rebate from [EDC] for an attic installation by a participating contractor. Is that correct?

- 1. Yes
- 2. No
- 98. Don't know

45. Our records show that you received a rebate from [EDC] for wall insulation by a participating contractor. Is that correct?

- 1. Yes
- 2. No
- 98. Don't know

46. Our records show that you received a rebate from [EDC] for an Energy Star qualified Window installation by a participating contractor. Is that correct?

- 1. Yes
- 2. No
- 98. Don't know

47. Our records show that you received a rebate from [EDC] for a duct sealing installation by a participating contractor. Is that correct?

- 1. Yes
- 2. No
- 98. Don't know

48. Our records show that you received a rebate from [EDC] for an Energy Star qualified Ceiling Fan installation by a participating contractor. Is that correct?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY ATTIC INSULATION IF Q= 1]

ATTIC INSULATION

49. Why did you decide to install the attic insulation? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate incentive amount provided	1	2	98
Being able to cover the out-of-pocket costs	1	2	98
Being able to finance the costs of the retrofit	1	2	98

Realizing a good payback period for the investment	1	2	98
The retrofit recommendation seemed credible	1	2	98
The expected impact of attic insulation on reducing my electric bill	1	2	98
The expected impact of attic insulation on home comfort	1	2	98

50. Were there any other reasons for your decision to install the attic insulation?

1. Yes
2. No
98. Don't know

[DISPLAY QIF Q = 1]

51. What other factors were important to your decision to not install the attic insulation?

52. What would you say was the most important factor in your decision to install the attic insulation? (Don't read; prompt if necessary)

1. The rebate incentive amount provided
2. Being able to cover the out-of-pocket costs
3. Being able to finance the costs of the retrofit
4. Realizing a good payback period for the investment
5. The retrofit recommendation seemed credible
6. The expected impact of attic insulation on reducing my electric bill
7. The expected impact of attic insulation on home comfort
97. Other (Specify)
98. Don't know

53. Please indicate if you are very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied with the following aspects of the attic insulation. (Read a-d)

VD D N S VS DK

- | | | | | | | |
|---|---|---|---|---|---|----|
| a. Rebate application process | 1 | 2 | 3 | 4 | 5 | 98 |
| b. Rebate dollar amount you received | 1 | 2 | 3 | 4 | 5 | 98 |
| c. Insulation performance for saving energy | 1 | 2 | 3 | 4 | 5 | 98 |
| d. Insulation performance for increased comfort | 1 | 2 | 3 | 4 | 5 | 98 |

[DISPLAY Q IF Qa-Qd = 1 or 2]

54. Why are you dissatisfied with the attic insulation?

55. What was your approximate total out-of-pocket cost for installing the additional attic insulation?

[DISPLAY WALL INSULATION IF Q= 1]

WALL INSULATION

56. Why did you decide to install the wall insulation? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate incentive amount provided	1	2	98
Being able to cover the out-of-pocket costs	1	2	98
Being able to finance the costs of the retrofit	1	2	98
Realizing a good payback period for the investment	1	2	98
The retrofit recommendation seemed credible	1	2	98
The expected impact of wall insulation on reducing my electric bill	1	2	98
The expected impact of wall insulation on increasing comfort level	1	2	98
The expected impact of wall insulation on reducing outside noise.	1	2	98

57. Were there any other reasons your decision to install the wall insulation?

1. Yes
2. No
98. Don't know

[DISPLAY QIF Q= 1]

58. What other factors were important to your decision to not install the wall insulation?

59. What would you say was the most important factor to your decision to install the wall insulation?

1. The rebate incentive amount provided

2. Being able to cover the out-of-pocket costs
3. Being able to finance the costs of the retrofit
4. Realizing a good payback period for the investment
5. The retrofit recommendation seemed credible
6. The expected impact of wall insulation on reducing my electric bill
7. The expected impact of wall insulation on increasing comfort level
8. The expected impact of wall insulation on reducing outside noise.
97. Other (Specify)
98. Don't know

60. Please indicate if you are very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied with the following aspects of the wall insulation.

VD D N S VS DK

- | | | | | | | |
|--|---|---|---|---|---|----|
| a. Rebate application process | 1 | 2 | 3 | 4 | 5 | 98 |
| b. Rebate dollar amount you received | 1 | 2 | 3 | 4 | 5 | 98 |
| c. Insulation performance for saving energy | 1 | 2 | 3 | 4 | 5 | 98 |
| d. Insulation performance for increasing comfort | 1 | 2 | 3 | 4 | 5 | 98 |

[DISPLAY QIF Q = 1 or 2]

61. Why are you dissatisfied with the wall insulation?

62. What was your approximate total out-of-pocket cost for installing the additional wall insulation?

[DISPLAY ENERGY STAR QUALIFIED WINDOWS IF Q

ENERGY STAR QUALITY WINDOWS

63. Why did you decide to install the Energy Star qualified windows? Was your decision related to:

	<u>Yes</u>	<u>N</u> <u>O</u>	<u>DK</u>
The rebate incentive amount provided	1	2	98
Being able to cover the out-of-pocket costs	1	2	98
Being able to finance the costs of the retrofit	1	2	98
Realizing a good payback period for the investment	1	2	98
The retrofit recommendation seemed credible	1	2	98

The expected impact of energy efficient windows on reducing my electric bill	1	2	98
Increased comfort gained from installing windows	1	2	98
The appearance of the windows	1	2	98

64. Were there any other reasons for your decision to install the windows?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q = 1]

65. What other factors were important to your decision to not install the windows?

66. What would you say was the most important factor to your decision to install the Energy Star qualified windows?

1. The rebate incentive amount provided
2. Being able to cover the out-of-pocket costs
3. Being able to finance the costs of the retrofit
4. Realizing a good payback period for the investment
5. The retrofit recommendation seemed credible
6. The expected impact of energy efficient windows on reducing my electric bill
7. Increased comfort gained from installing windows
8. Aesthetic value provided by windows
97. Other (Specify)
98. Don't know

67. Please indicate if you are very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied with the following aspects of the Energy Star windows installation.

VD D N S VS DK

- | | | | | | | |
|--|---|---|---|---|---|----|
| a. Rebate application process | 1 | 2 | 3 | 4 | 5 | 98 |
| b. Rebate dollar amount you received | 1 | 2 | 3 | 4 | 5 | 98 |
| c. Window performance for saving energy | 1 | 2 | 3 | 4 | 5 | 98 |
| d. Window performance for increasing comfort | 1 | 2 | 3 | 4 | 5 | 98 |

[DISPLAY Q= 1 or 2]

68. Why are you dissatisfied with the Energy Star windows installation?

69. What was your approximate total out-of-pocket cost for installing the Energy Star qualified windows?

[DISPLAY DUCT SEALING IF Q= 1]

DUCT SEALING

70. Why did you decide to seal the ducts in your home? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate incentive amount provided	1	2	98
Being able to cover the out-of-pocket costs	1	2	98
Being able to finance the costs of the retrofit	1	2	98
Realizing a good payback period for the investment	1	2	98
The retrofit recommendation seemed credible	1	2	98
The expected impact of sealed ducts on reducing my electric bill	1	2	98

71. Were there any other factors that were important to your decision to seal the ducts in your home?

1. Yes
2. No
98. Don't know

[DISPLAY Q IF Q = 1]

72. What other factors were important to your decision to seal the ducts in your home?

73. What would you say was the most important factor to your decision to seal the ducts in your home?

1. The rebate incentive amount provided
2. Being able to cover the out-of-pocket costs
3. Being able to finance the costs of the retrofit
4. Realizing a good payback period for the investment
5. The retrofit recommendation seemed credible

6. The expected impact of sealed ducts on reducing my electric bill
97. Other (Specify)
98. Don't know

74. Please indicate if you are very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied with the following aspects of the duct sealing job that was performed:

VD D N S

VS DK

- | | | | | | | |
|--|---|---|---|---|---|----|
| a. Rebate application process | 1 | 2 | 3 | 4 | 5 | 98 |
| b. Rebate dollar amount you received | 1 | 2 | 3 | 4 | 5 | 98 |
| c. Duct performance for saving energy | 1 | 2 | 3 | 4 | 5 | 98 |
| d. Duct performance for increasing comfort | 1 | 2 | 3 | 4 | 5 | 98 |

75. Why are you dissatisfied with the duct sealing job?

76. What was your approximate total out-of-pocket cost for the duct sealing job?

ENERGY STAR QUALITY CEILING FANS

77. Why did you decide to install the Energy Star ceiling fans? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate incentive amount provided	1	2	98
Being able to cover the out-of-pocket costs	1	2	98
Being able to finance the costs of the retrofit	1	2	98
Realizing a good payback period for the investment	1	2	98
The retrofit recommendation seemed credible	1	2	98
The expected impact of ceiling fans on reducing my electric bill	1	2	98
The expected impact of ceilings fans on comfort level	1	2	98
Aesthetic value provided by fan			

78. Were there any other reasons for your decision to install the ceiling fans?

1. Yes
2. No
98. Don't know

79. What other factors were important to your decision to install the ceiling fans?

80. What would you say was the most important factor to your decision to install the ceiling fans?

1. The rebate incentive amount provided
2. Being able to cover the out-of-pocket costs
3. Being able to finance the costs of the retrofit
4. Realizing a good payback period for the investment
5. The retrofit recommendation seemed credible
6. The expected impact of ceiling fans on reducing my electric bill
7. The expected impact of ceiling fans on comfort level
8. Aesthetic value provided by fan
97. Other (Specify)
98. Don't know

81. Please indicate if you are very dissatisfied, dissatisfied, neither dissatisfied nor satisfied, satisfied, or very satisfied with the following aspects of the ceiling fan installation.

VD D N S VS DK

- | | | | | | | |
|--|---|---|---|---|---|----|
| a. Rebate application process | 1 | 2 | 3 | 4 | 5 | 98 |
| b. Rebate dollar amount you received | 1 | 2 | 3 | 4 | 5 | 98 |
| c. Ceiling fans performance for saving energy | 1 | 2 | 3 | 4 | 5 | 98 |
| d. Ceiling fans performance for increasing comfort | 1 | 2 | 3 | 4 | 5 | 98 |

[

82. Why are you dissatisfied with the installation of the ceiling fans?

83. What was your approximate total out-of-pocket cost for the Energy Star qualified ceiling fan purchase?

RETROFIT RECOMMENDATIONS

84. Did the home energy auditor make recommendations for one or more of the following home improvements that you declined to pursue?

	<u>Yes</u>	<u>No</u>	<u>DK</u>
a. Attic Insulation	1	2	98
b. Wall insulation	1	2	98
c. Energy Star Qualified Windows	1	2	98
d. Duct Sealing	1	2	98

e. Energy Star Qualified Ceiling fan	1	2	98
--------------------------------------	---	---	----

85. Did the auditor recommend any retrofits other than those we just covered?

- 1. Yes
- 2. No
- 98. Don't know

86. What were the additional recommended retrofits?

87. Did you complete any of the additional retrofits?

- 1. Yes
- 2. No
- 98. Don't know

[

88. Which additional retrofits did you complete?

[

ATTIC INSULATION

89. Why did you not install the recommended attic insulation? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate offered was not enough of an incentive	1	2	98
Was not able to cover the out-of-pocket costs	1	2	98
Financing was not offered to fund the retrofit	1	2	98
Payback period for the investment was not attractive	1	2	98
Retrofit recommendation did not seem very credible	1	2	98
More attic insulation would not reduce my electric bill	1	2	98

90. Were there any other reasons for your decision to not install the recommended attic insulation?

- 1. Yes
- 2. No
- 98. Don't know

91. What other factors were important to your decision to not install the recommended attic insulation?

92. What would you say was the most important factor to your decision to not install the recommended attic insulation?

1. The rebate offered was not enough of an incentive
2. Was not able to cover the out-of-pocket costs
3. Financing was not offered to fund the retrofit
4. Payback period for the investment was not attractive
5. Retrofit recommendation did not seem very credible
6. More attic insulation would not reduce my electric bill
97. Other (Specify)
98. Don't know

[Why did you not install the recommended wall insulation? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate offered was not enough of an incentive	1	2	98
Was not able to cover the out-of-pocket costs	1	2	98
Financing was not offered to fund the retrofit	1	2	98
Payback period for the investment was not attractive	1	2	98
Retrofit recommendation did not seem very credible	1	2	98
More wall insulation would not reduce my electric bill	1	2	98

93. Were there any other reasons for your decision to not install the recommended wall insulation?

1. Yes
2. No
98. Don't know

94. What other factors were important to your decision to not pursue the recommendation to seal the ducts in your home?

95. What would you say was the most important factor to your decision to not install the recommended wall insulation?

1. The rebate offered was not enough of an incentive
2. Was not able to cover the out-of-pocket costs
3. Financing was not offered to fund the retrofit
4. Payback period for the investment was not attractive
5. Retrofit recommendation did not seem very credible
6. More wall insulation would not reduce my electric bill
97. Other (Specify)
98. Don't know

[

ENERGY STAR QUALIFIED WINDOWS

96. Why did you not install the Energy Star qualified windows? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate offered was not enough of an incentive	1	2	98
Was not able to cover the out-of-pocket costs	1	2	98
Financing was not offered to fund the retrofit	1	2	98
Payback period for the investment was not attractive	1	2	98
Retrofit recommendation did not seem very credible	1	2	98
Energy Star qualified would not reduce my electric bill	1	2	98

97. Were there any other reasons for your decision to not install the recommended Energy Star qualified windows?

1. Yes
2. No
98. Don't know

98. What other factors were important to your decision to not install the windows?

99. What would you say was the most important factor to your decision to not install the recommended wall insulation? (Do not read list; prompt if necessary)

1. The rebate offered was not enough of an incentive
2. Was not able to cover the out-of-pocket costs
3. Financing was not offered to fund the retrofit

4. Payback period for the investment was not attractive
5. Retrofit recommendation did not seem very credible
6. Energy Star qualified windows would not reduce my electric bill
97. Other (Specify)
98. Don't know

DUCT SEALING

100. Why did you not pursue the recommendation to seal the ducts in your home? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate offered was not enough of an incentive	1	2	98
Was not able to cover the out-of-pocket costs	1	2	98
Financing was not offered to fund the retrofit	1	2	98
Payback period for the investment was not attractive	1	2	98
Retrofit recommendation did not seem very credible	1	2	98
Energy Star qualified would not reduce my electric bill	1	2	98

101. Were there any other reasons for your decision to not pursue the recommendation to seal the ducts in your home?
1. Yes
 2. No
 98. Don't know
102. What other factors were important to your decision to not pursue the recommendation to seal the ducts in your home?
103. What would you say was the most important factor in your decision to not pursue the recommendation to seal the ducts in your home?
1. The rebate offered was not enough of an incentive
 2. Was not able to cover the out-of-pocket costs
 3. Financing was not offered to fund the retrofit
 4. Payback period for the investment was not attractive
 5. Retrofit recommendation did not seem very credible
 6. Duct sealing would not reduce my electric bill
 97. Other (Specify)

98. Don't know

ENERGY STAR QUALIFIED CEILING FAN

104. Why did you not install the recommended Energy Star ceiling fans? Was your decision related to:

	<u>Yes</u>	<u>No</u>	<u>DK</u>
The rebate offered was not enough of an incentive	1	2	98
Was not able to cover the out-of-pocket costs	1	2	98
Financing was not offered to fund the retrofit	1	2	98
Payback period for the investment was not attractive	1	2	98
Retrofit recommendation did not seem very credible	1	2	98
Ceiling fans would not reduce my electric bill	1	2	98

105. Were there any other reasons for your decision to not pursue the recommendation to install the ceiling fans?

1. Yes

2. No

98. Don't know

106. What other factors were important to your decision to not install the ceiling fans? (Do not read list; prompt if necessary)

107. What would you say was the most important factor to your decision to not install the ceiling fans?

1. The rebate offered was not enough of an incentive

2. Was not able to cover the out-of-pocket costs

3. Financing was not offered to fund the retrofit

4. Payback period for the investment was not attractive

5. Retrofit recommendation did not seem very credible

6. Ceiling fans would not reduce my electric bill

97. Other (Specify)

98. Don't know

[

HOME DEMOGRAPHICS

108. Which of the following best describes your residence? (Read list)
1. Single-family home, detached construction
 2. Single-family home, factory manufactured/modular
 3. Mobile home
 4. Row house
 5. Two or Three family attached residence
 6. Apartment with 4+ families
 7. Condominium
 97. Other (Specify)
 98. Don't Know
109. Do you own or rent this residence?
1. Own
 2. Rent
 98. Don't Know
110. Approximately when was your residence built? (Read list)
1. Before 1960
 2. 1960-1969
 3. 1970-1979
 4. 1980-1989
 5. 1990-1999
 6. 2000-2005
 7. 2006 or Later
 98. Don't know
111. About how much above-ground living space do you have in your residence? (Read list)
1. Less than 1,000 square feet
 2. 1000-2000 square feet
 3. 2000-3000 square feet
 4. 3000-4000 square feet
 5. 4000-5000 square feet
 6. Greater than 5000 square feet
 98. Don't know
112. About how much below-ground living space do you have in your residence? (Read list)

1. Less than 1,000 square feet
 2. 1000-2000 square feet
 3. 2000-3000 square feet
 4. 3000-4000 square feet
 5. 4000-5000 square feet
 6. Greater than 5000 square feet
 98. Don't know
113. Would you be interested in participating in a at home verification visit for a 20 dollar (Add Detail for the gift card) Shell gas online gift card?
1. Yes
 2. No

Thank you for your time.

If you have any questions about this survey, please call ADM Associates
775-624-7999

9.2 Online Audit Survey Cohort 5

1. Our records indicate that you used the Home Energy Analyzer. Can you tell me why you decided to do an online home energy audit? What were your concerns?
 1. Investigate
 2. Financial (High Bills)
 3. Conserve Energy
 97. Other (Specify)
 98. Don't know

2. Can you tell me what you did online with the Home Energy Analyzer? Did you...
 1. Review changes in your bill/usage over time
 2. Answer questions about your home appliances
 3. Answer questions about weatherizing your home
 4. Get detailed energy saving ideas for your home
 5. Do something else
 98. Don't know

[

3. Can you specify "something else"?
4. What kind of detailed energy saving ideas did you receive? Did they involve:
 1. No-cost /low cost ways to save energy immediately?
 2. Ways to save requiring investment but will pay off?
 3. Ways to save that would not be cost-justified?
 97. Other (Specify)

[

5. Can you specify the "other ways to save"?
6. How helpful was the information provided by the Home Energy Analyzer? Would you say it was:
 1. Very Helpful
 2. Somewhat Helpful
 3. Neither Helpful nor Unhelpful
 4. Somewhat Unhelpful
 5. Not at all Helpful

98. Don't know

[

7. What aspects were not helpful? Why?

8. What aspect of the Home Energy Analyzer was most helpful to you? Why?

9. What energy saving actions were you able to take, if any, as a result of using the Home Energy Analyzer?

1. Structural changes (e.g. replace an appliance with one that is more energy efficient)
2. Behavioral changes (turn off the lights when leaving a room, adjust the thermostat before leaving the house)
3. Both structural and behavioral changes taken
4. No changes made yet

98. Don't know

10. I made structural changes to my...

1. Appliance
 2. HVAC
 3. Lighting
 4. Water heating measures
97. Other (Specify)

[

11. I made behavioral changes to my...

1. Appliance
 2. HVAC
 3. Lighting
 4. Water heating measures
97. Other (Specify)

3]

12. Do you do things differently now to save energy in hot weather?

1. Yes
 2. No
98. Don't know

[

13. What do you do differently now?

[

14. Do you do things differently now to save energy in cold weather?

1. Yes
2. No
98. Don't know

15. What do you do differently now?

16. Have you noticed any savings on your electric bill since you made these changes?

1. Yes, my electric bill has decreased
2. No, there does not seem to be a change in my electric bill
3. Not sure or too soon to tell
98. Don't know

17. How satisfied are you with the savings you noticed on your electric bill since making these changes? Would you say you are:

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know

18. Overall, how satisfied are you with the Home Energy Audit Program? Would you say you are:

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know

19. Why do you give it that rating?

20. Do you have any suggestions for improving the Home Energy Analyzer?

21. Which of the following best describes your home?

1. Single-family home, detached construction
2. Single-family home, factory manufactured/modular
3. Mobile home
4. Row house
5. Two or Three family attached residence
6. Apartment with 4+ families
7. Condominium
97. Other (Specify)
98. Don't know

22. Do you own or rent this residence?

1. Own
2. Rent
98. Don't know

23. Approximately when was your home built?

1. Before 1960
2. 1960-1969
3. 1970-1979
4. 1980-1989
5. 1990-1999
6. 2000-2005
7. 2006 or Later
98. Don't know

24. Would you estimate the above-ground living space is about:

1. Less than 1,000 square feet
2. 1,000-2,000 square feet
3. 2,000-3,000 square feet
4. 3,000-4,000 square feet
5. 4,000-5,000 square feet
6. Greater than 5,000 square feet
98. Don't know

25. Do you have any below-ground living space like a converted basement?

1. Yes

- 2. No
- 98. Don't know

26. Would you estimate the below-ground living space is about:

- 1. Less than 1,000 square feet
- 2. 1,000-2,000 square feet
- 3. 2,000-3,000 square feet
- 4. 3,000-4,000 square feet
- 5. 4,000-5,000 square feet
- 6. Greater than 5,000 square feet
- 98. Don't know

9.3 Phone Audit Survey Cohort 5

1. Can you tell me why you called the Customer Service Center? What were your concerns?
 1. High Bill Complaint
 97. Other (Specify)
 98. Don't Know
2. What did the Customer Service Center Representative discuss with you?
 1. Review changes in your bill/usage over time
 2. Answer questions about your home appliances?
 3. Find out about your top 3 home energy uses?
 4. Get offered literature about saving energy at home?
 5. Discuss something else?
 98. Don't know
3. Can you specify "something else"?
4. How helpful was the information provided over the phone?
 1. Very Helpful
 2. Somewhat Helpful
 3. Neither Helpful nor Unhelpful
 4. Somewhat Unhelpful
 5. Not at all Helpful
 98. Don't know
5. What aspects of the phone conversation with Customer Service were not helpful? Why? (ex: did the conversation provide you new or actionable info?)
6. Did the Customer Service Representative send you any of the following?
 1. Brochure(s) on Energy Savings Tips
 2. Pack of 6 Energy-Saving CFL Light Bulbs
 3. PC Link to Home Energy Analyzer software
 4. Nothing was sent
 97. Other (Specify)
7. How helpful were the Energy Saving Tips? Would you say...
 1. Very Helpful
 2. Somewhat Helpful
 3. Neither Helpful nor Unhelpful
 4. Somewhat Unhelpful
 5. Not at all Helpful
 98. Don't Know

8. How many of the CFL light bulbs have you installed?
1. Number of CFLs installed:
98. Don't Know
9. Have you viewed the Energy Analyzer from the link that was sent to you? If so, have you used it?
1. Yes, I viewed but have not used it:
 2. Yes, I have viewed it and I have used it
 3. No, I have not viewed it
98. Don't Know
10. What energy saving actions were you able to take, if any, as a result of your telephone call to the Customer Service Center? Did you start doing things differently to save energy or did you have new high efficiency energy saving equipment installed in your home?
1. Structural changes (e.g. replace an appliance with one that is more energy efficient)
 2. Behavioral changes (e.g. turn off lights when leaving a room, adjust thermostat before leaving the house)
 3. Both structural and behavioral changes made
 4. No energy saving changes made
98. Don't know
11. What structural (equipment) changes were made?
1. Appliance
 2. HVAC
 3. Lighting
 4. Water heating measures
97. Other (Specify)
12. What behavioral changes were made?
1. Appliance
 2. HVAC
 3. Lighting
 4. Water heating measures
97. Other (Specify)
13. Do you do things differently now to save energy in hot weather?
1. Yes
 2. No
98. Don't know
14. What do you do differently now?
15. Do you do things differently now to save energy in cold weather?

1. Yes
2. No
98. Don't know

16. What do you do differently now?

17. Have you noticed any savings on your electric bill since you made these changes?

1. Yes, my electric bill has decreased
2. No, there does not seem to be a change in my electric bill
3. Not sure or too soon to tell
98. Don't know

18. How satisfied are you with the savings you noticed on your electric bill since making these changes? Would you say you are:

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know

19. Overall, how satisfied are you with the Analysis performed by the Customer Service Center? Would you say you are:

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know

20. Why do you give it that rating?

21. Do you have any suggestions to improve the Analysis process?

1. Yes
2. No
98. Don't know

22. What are your suggestions for improving the Analysis process?

23. Which of the following best describes your home?

1. Single-family home, detached construction
2. Single-family home, factory manufactured/modular

3. Mobile home
 4. Row house
 5. Two or Three family attached residence
 6. Apartment with 4+ families
 7. Condominium
 97. Other (Specify)
 98. Don't know
24. Would you please specify "other"?
25. Do you own or rent this residence?
1. Own
 2. Rent
 98. Don't know
26. Approximately when was your home built?
1. Before 1960
 2. 1960-1969
 3. 1970-1979
 4. 1980-1989
 5. 1990-1999
 6. 2000-2005
 7. 2006 or Later
 98. Don't know
 99. Refused
27. Would you estimate the above-ground living space is about:
1. Less than 1,000 square feet
 2. 1,000-2,000 square feet
 3. 2,000-3,000 square feet
 4. 3,000-4,000 square feet
 5. 4,000-5,000 square feet
 6. Greater than 5,000 square feet
 98. Don't know
28. Do you have any below-ground living space like a converted basement?
1. Yes
 2. No
 98. Don't know
29. Would you estimate the below-ground living space is about:
1. Less than 1,000 square feet
 2. 1,000-2,000 square feet
 3. 2,000-3,000 square feet

4. 3,000-4,000 square feet
5. 4,000-5,000 square feet
6. Greater than 5,000 square feet
98. Don't know

Thank you!

9.4 Online Audit Survey Cohorts 1-4

1. Our records indicate that you used the Home Energy Analyzer. Can you tell me why you decided to do an online home energy audit? What were your concerns?
 1. Investigate
 2. Financial (High Bills)
 3. Conserve Energy
 97. Other (Specify)
 98. Don't know
2. Can you tell me what you did online with the Home Energy Analyzer? Did you...
 1. Review changes in your bill/usage over time
 2. Answer questions about your home appliances
 3. Answer questions about weatherizing your home
 4. Get detailed energy saving ideas for your home
 5. Do something else
 98. Don't know
- [
3. Can you specify "something else"?
4. If you did not complete the entire online audit, what made you stop at the location you did?
 1. Completed the entire survey
 2. Was satisfied with the results
 3. Ran out of time
 4. Further improvements out of budget
5. What kind of detailed energy saving ideas did you receive? Did they involve:
 1. No-cost /low cost ways to save energy immediately?
 2. Ways to save requiring investment but will pay off?
 3. Ways to save that would not be cost-justified?
 97. Other
6. Can you specify the "other ways to save"?
7. How helpful was the information provided by the Home Energy Analyzer?
 1. Very Helpful
 2. Somewhat Helpful
 3. Neither Helpful nor Unhelpful
 4. Somewhat Unhelpful
 5. Not at all Helpful
 98. Don't know
8. What aspects were not helpful? Why?

9. What aspect of the Home Energy Analyzer was most helpful to you? Why?
10. What energy saving actions were you able to take, if any, as a result of using the Home Energy Analyzer?
1. Structural changes (e.g. replace an appliance with one that is more energy efficient)
 2. Behavioral changes (turn off the lights when leaving a room, adjust the thermostat before leaving the house)
 3. Both structural and behavioral changes taken
 4. No changes made yet
 98. Don't know
11. I made structural changes to my...
1. Appliance
 2. HVAC
 3. Lighting
 4. Water heating measures
 97. Other (Specify)
12. I made behavioral changes to my...
1. Appliance
 2. HVAC
 3. Lighting
 4. Water heating measures
 97. Other (Specify)
13. Is the equipment/materials that you purchased still installed?
1. Yes, it's still installed
 2. No, I removed it/took it out
 98. Don't know
14. How satisfied are you with your new equipment/materials?
1. Very satisfied
 2. Somewhat satisfied
 3. Neither satisfied nor dissatisfied
 4. Somewhat dissatisfied
 5. Very dissatisfied
 98. Don't know
15. Do you do things differently now to save energy in hot weather?
1. Yes
 2. No
 98. Don't know
16. What do you do differently now?
17. Do you do things differently now to save energy in cold weather?
1. Yes

- 2. No
- 98. Don't know
- 18. What do you do differently now?

- 19. Are you continuing to do the behavioral changes you identified?
 - 1. Yes, behavior still practiced
 - 2. No, I stopped doing that
 - 98. Don't know

- 20. Have you noticed any savings on your electric bill since you made these changes?
 - 1. Yes, my electric bill has decreased
 - 2. No, there does not seem to be a change in my electric bill
 - 3. Not sure or too soon to tell
 - 98. Don't know
- 21. How satisfied are you with the savings you noticed on your electric bill since making these changes?
 - 1. Very satisfied
 - 2. Somewhat satisfied
 - 3. Neither satisfied nor dissatisfied
 - 4. Somewhat dissatisfied
 - 5. Very dissatisfied
 - 98. Don't know

- 22. Overall, how satisfied are you with the Home Energy Audit Program? Would you say you are:
 - 1. Very satisfied
 - 2. Somewhat satisfied
 - 3. Neither satisfied nor dissatisfied
 - 4. Somewhat dissatisfied
 - 5. Very dissatisfied
 - 98. Don't know
- 23. Why do you give it that rating?
- 24. Do you have any suggestions to improve the Home Energy Analyzer?
 - 1. Yes
 - 2. No
 - 98. Don't know
- 25. What are your suggestions for improving the Home Energy Analyzer?
- 26. Which of the following best describes your home?
 - 1. Single-family home, detached construction
 - 2. Single-family home, factory manufactured/modular
 - 3. Mobile home
 - 4. Row house

- 5. Two or Three family attached residence
- 6. Apartment with 4+ families
- 7. Condominium
- 97. Other (Specify)
- 98. Don't know

27. Do you own or rent this residence?

- 1. Own
- 2. Rent
- 98. Don't know

28. Approximately when was your home built?

- 1. Before 1960
- 2. 1960-1969
- 3. 1970-1979
- 4. 1980-1989
- 5. 1990-1999
- 6. 2000-2005
- 7. 2006 or Later
- 98. Don't know

29. Would you estimate the above-ground living space is about:

- 1. Less than 1,000 square feet
- 2. 1,000-2,000 square feet
- 3. 2,000-3,000 square feet
- 4. 3,000-4,000 square feet
- 5. 4,000-5,000 square feet
- 6. Greater than 5,000 square feet
- 98. Don't know

30. Do you have any below-ground living space like a converted basement?

- 1. Yes
- 2. No
- 98. Don't know

31. Would you estimate the below-ground living space is about:

- 1. Less than 1,000 square feet
- 2. 1,000-2,000 square feet
- 3. 2,000-3,000 square feet
- 4. 3,000-4,000 square feet
- 5. 4,000-5,000 square feet
- 6. Greater than 5,000 square feet
- 98. Don't know

9.5 Phone Audit Survey Cohorts 1-4

1. Our records indicate that you called the Customer Service Center. Can you tell me why you called the Customer Service Center? What were your concerns?
 2. High Bill Complaint
 3. Other (Specify)
 4. Don't Know
2. What other reasons did you call the customer service center?
 1. Investigate
 2. Financial (high bills)
 3. Conserve Energy
 4. Meter
 5. Power Outage
 97. Other (Specify)
3. What did the Customer Service Center Representative discuss with you?
 6. Review changes in your bill/usage over time
 7. Answer questions about your home appliances?
 8. Find out about your top 3 home energy uses?
 9. Get offered literature about saving energy at home?
 10. Discuss something else?
 98. Don't know
4. Can you specify "something else"?
5. How helpful was the information provided over the phone? Would you say it was...
 6. Very Helpful
 7. Somewhat Helpful
 8. Neither Helpful nor Unhelpful
 9. Somewhat Unhelpful
 10. Not at all Helpful
 98. Don't know
6. What aspects of the phone conversation with Customer Service were not helpful? Why? (ex: Did the conversation provide you new or actionable info?)
7. Did the Customer Service Representative send you any of the following?
 5. Brochure(s) on Energy Savings Tips
 6. Pack of 6 Energy-Saving CFL Light Bulbs
 7. PC Link to Home Energy Analyzer software
 8. Nothing was sent
 97. Other (Specify)

8. How helpful were the Energy Saving Tips? Would you say...
- 6. Very Helpful
 - 7. Somewhat Helpful
 - 8. Neither Helpful nor Unhelpful
 - 9. Somewhat Unhelpful
 - 10. Not at all Helpful
 - 98. Don't Know
9. How many of the CFL light bulbs have you installed?
- 1. Number of CFLs installed:
 - 98. Don't Know
10. Have you viewed the Online Energy Analyzer from the link that was sent to you?
If so, have you used it?
- 4. Yes, I viewed but have not used it:
 - 5. Yes, I have viewed it and I have used it
 - 6. No, I have not viewed it
 - 98. Don't Know
11. What energy saving actions were you able to take, if any, as a result of your telephone call to the Customer Service Center? Did you start doing things differently to save energy or did you have new high efficiency energy saving equipment installed in your home?
- 5. Structural changes (e.g. replace an appliance with one that is more energy efficient)
 - 6. Behavioral changes (e.g. turn off lights when leaving a room, adjust thermostat before leaving the house)
 - 7. Both structural and behavioral changes made
 - 8. No energy saving changes made
 - 98. Don't know
12. I made behavioral changes to my...
- 5. Appliance
 - 6. HVAC
 - 7. Lighting
 - 8. Water heating measures
 - 97. Other (Specify)
13. I made structural changes to my...
- 5. Appliance
 - 6. HVAC
 - 7. Lighting
 - 8. Water heating measures
 - 97. Other (Specify)

14. How is that working out? Is the equipment/materials that you purchased still installed?

- 1. Yes, it's still installed
- 2. No, I removed it/took it out
- 98. Don't know

15. How satisfied are you with your new equipment/materials?

- 1. Very satisfied
- 2. Somewhat satisfied
- 3. Neither satisfied nor dissatisfied
- 4. Somewhat dissatisfied
- 5. Very dissatisfied
- 98. Don't know

16. Do you do things differently now to save energy in hot weather?

- 3. Yes
- 4. No
- 98. Don't know

17. What do you do differently now?

18. Do you do things differently now to save energy in cold weather?

- 3. Yes
- 4. No
- 98. Don't know

19. What do you do differently now?

20. Are you continuing to do the behavioral changes you identified?

- 1. Yes, behavior still practiced
- 2. No, I stopped doing that
- 98. Don't know

21. Have you noticed any savings on your electric bill since you made these changes?

- 4. Yes, my electric bill has decreased
- 5. No, there does not seem to be a change in my electric bill
- 6. Not sure or too soon to tell
- 98. Don't know

22. How satisfied are you with the savings you noticed on your electric bill since making these changes?

- 6. Very satisfied
 - 7. Somewhat satisfied
 - 8. Neither satisfied nor dissatisfied
 - 9. Somewhat dissatisfied
 - 10. Very dissatisfied
 - 98. Don't know
23. Overall, how satisfied are you with the Analysis performed by the Customer Service Center?
- 6. Very satisfied
 - 7. Somewhat satisfied
 - 8. Neither satisfied nor dissatisfied
 - 9. Somewhat dissatisfied
 - 10. Very dissatisfied
 - 98. Don't know
24. Why do you give it that rating?
25. Do you have any suggestions to improve the Analysis process?
- 3. Yes
 - 4. No
 - 98. Don't know
26. What are your suggestions for improving the Analysis process?
27. Which of the following best describes your home?
- 8. Single-family home, detached construction
 - 9. Single-family home, factory manufactured/modular
 - 10. Mobile home
 - 11. Row house
 - 12. Two or Three family attached residence
 - 13. Apartment with 4+ families
 - 14. Condominium
 - 97. Other (Specify)
 - 98. Don't know
- [DISPLAY Q28 IF Q27 = 1]
28. Would you please specify "other"?
29. Do you own or rent this residence?
- 3. Own
 - 4. Rent
 - 98. Don't know

30. Approximately when was your home built?

- 8. Before 1960
- 9. 1960-1969
- 10. 1970-1979
- 11. 1980-1989
- 12. 1990-1999
- 13. 2000-2005
- 14. 2006 or Later
- 98. Don't know
- 99. Refused

31. Would you estimate the above-ground living space is about:

- 7. Less than 1,000 square feet
- 8. 1,000-2,000 square feet
- 9. 2,000-3,000 square feet
- 10. 3,000-4,000 square feet
- 11. 4,000-5,000 square feet
- 12. Greater than 5,000 square feet
- 98. Don't know

32. Do you have any below-ground living space like a converted basement?

- 3. Yes
- 4. No
- 98. Don't know

33. Would you estimate the below-ground living space is about:

- 7. Less than 1,000 square feet
- 8. 1,000-2,000 square feet
- 9. 2,000-3,000 square feet
- 10. 3,000-4,000 square feet
- 11. 4,000-5,000 square feet
- 12. Greater than 5,000 square feet
- 98. Don't know

9.6 Home Energy Audit Control Survey

1. Did you participate in any of the following (NAME OF EDC) residential energy saving programs in 2014 that could help save you money? These include:

	<u>Yes</u>	<u>No</u>	<u>DK</u>	<u>Refused</u>
a. CFL Retail Program	1	2	98	99
b. Residential Energy Audit Program	1	2	98	99
c. Easy Cool Rewards Program	1	2	98	99
d. Energy Efficient Products Program	1	2	98	99
e. Appliance Turn-In Program	1	2	98	99
f. Community Connections Program	1	2	98	99
g. Behavioral Modification Program	1	2	98	99

2. Have you taken any of the following energy saving steps this year? Have you:

	<u>Yes</u>	<u>No</u>	<u>DK</u>	<u>Refused</u>
1. Purchased any CFLs	1	2	98	99
2. Added insulation to your home	1	2	98	99
3. Tuned up your central AC system	1	2	98	99
4. Installed a high efficiency central AC system	1	2	98	99
5. Installed a new high efficiency heat pump	1	2	98	99
6. Installed Energy Star windows	1	2	98	99
7. Installed a programmable thermostat	1	2	98	99
8. Had a residential energy audit performed	1	2	98	99
9. Purchased Energy Star home appliances ⁶¹	1	2	98	99

3. Have you taken any other energy saving steps this year?

1. Yes
2. No
98. Don't know
99. Refused

4. Please describe what other energy saving steps you did this year.
(Record verbatim response)

5. Are you doing anything in particular this year to save energy in hot weather?

1. Yes

⁶¹ Includes Energy Star rated clothes washers, refrigerators, room AC units, dehumidifiers as well as energy saving surge protectors and torchiere floor lamps.

- 2. No
- 98. Don't know
- 99. Refused

[

- 6. What do you do? (Record verbatim response)
- 7. Are you doing anything in particular this year to save energy in cold weather?
 - 1. Yes
 - 2. No
 - 98. Don't know
 - 99. Refused
- 8. What do you do? (Record verbatim response)
- 9. Have you noticed any savings on your electric bill since you made these changes?
 - 1. Yes, my electric bill has decreased
 - 2. No, there does not seem to be a change in my electric bill
 - 3. Not sure or too soon to tell
 - 98. Don't know
 - 99. Refused
- 10. How satisfied are you with the savings you noticed on your electric bill since making these changes? Would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied?
 - 1. Very satisfied
 - 2. Somewhat satisfied
 - 3. Neither satisfied nor dissatisfied
 - 4. Somewhat dissatisfied
 - 5. Very dissatisfied
 - 98. Don't know
 - 99. Refused

I'd like to finish up by asking you some questions about your home.

- 11. Which of the following best describes your home? (Read list option 1-7)
 - 1. Single-family home, detached construction
 - 2. Single-family home, factory manufactured/modular
 - 3. Mobile home
 - 4. Row house
 - 5. Two or Three family attached residence
 - 6. Apartment with 4+ families

- 7. Condominium
 - 97. Other (Specify)
 - 98. Don't Know
 - 99. Refused
12. Do you own or rent this residence?
- 1. Own
 - 2. Rent
 - 98. Don't Know
 - 99. Refused
13. Approximately when was your home built? (Do not read list)
- 1. Before 1960
 - 2. 1960-1969
 - 3. 1970-1979
 - 4. 1980-1989
 - 5. 1990-1999
 - 6. 2000-2005
 - 7. 2006 or Later
 - 98. Don't know
 - 99. Refused
14. Would you estimate the above-ground living space is about:
- 1. Less than 1,000 square feet
 - 2. 1000-2000 square feet
 - 3. 2000-3000 square feet
 - 4. 3000-4000 square feet
 - 5. 4000-5000 square feet
 - 6. Greater than 5000 square feet
 - 98. Don't know
 - 99. Refused
15. Do you have any below-ground living space such as a converted basement?
- 1. Yes
 - 2. No
 - 98. Don't know
 - 99. Refused
16. Would you estimate the below-ground living space is about:
- 1. Less than 1,000 square feet
 - 2. 1000-2000 square feet
 - 3. 2000-3000 square feet
 - 4. 3000-4000 square feet
 - 5. 4000-5000 square feet

- 6. Greater than 5000 square feet
- 98. Don't know
- 99. Refused

That's all the questions I have. Thank you for your time. Good bye.

10. Appendix C: Energy Conservation Kits Reference Materials and Survey Instruments

10.1 Application, Marketing, and Kit Literature



FirstEnergy Energy Conservation Kit Program

FirstEnergy has contracted with Power Direct Energy to administer this program. Power Direct Energy maintains this site and its content. To request a kit over the phone, call 1-888-257-2838. For assistance with signing up for a kit online, please contact a Power Direct Energy program representative at 1-888-225-8996, Monday-Friday between the hours of 9am-7pm EST.

Ohio residential customers of The Illuminating Company, Ohio Edison and Toledo Edison are now eligible to receive an energy conservation kit. You will not be charged separately for this kit. The kit includes nine compact fluorescent light bulbs (CFLs), a smart strip/surge protector, a furnace filter whistle, and two LED night lights. **** Click here to learn more about the cost of this kit.**

To complete your enrollment in the Energy Conservation Kit program and receive your kit, please complete the fields below. If you received a postcard, you can use the invitation code listed above your name to enroll. If you do not have an invitation code, you will need to provide your 12 digit account number, which can be found on the upper right hand corner of your electric bill.

Invitation Code: *	<input type="text"/>	or Account #: *	<input type="text"/>	(do not include any dashes or spaces)
Contact Name: *	<input type="text"/>	<input type="text"/>		
	First	Last		
Email Address:	<input type="text"/>			
Confirm Email:	<input type="text"/>			
Phone Number: *	<input type="text"/>	-	<input type="text"/>	- <input type="text"/>
	###		###	####
ZIP Code: *	<input type="text"/>			
Water Heating Fuel: *	<input type="text" value="--Select--"/>	Non-electric water heating fuel includes natural gas, oil, propane, wood and other.	Heating Fuel: *	<input type="text" value="--Select--"/> Non-electric heating fuel includes natural gas, oil, propane, wood and other.
Referral Source: *	<input type="text" value="--None--"/>			

Shipping Information

The kit may be shipped to your mailing address (where your bill is sent), service address (the location where you receive your electricity) or an alternative address. Please select where you would like the kit to be shipped. Note that the kit can only be shipped to addresses in the state of Ohio.

- ☒ Mailing Address
☐ Service Address
☐ Other

**One Energy Conservation Kit per residential account.

Direct Mail Kits Participation Survey

1. According to our records, you received an Energy Conservation Kit supplied by FirstEnergy's Ohio Utilities. Is that correct?
 1. Yes
 2. No [THANK AND TERMINATE INTERVIEW]
2. Does your home have an electric water heater or a gas water heater?
 1. Electric water heater
 2. Non-electric water heater
3. How did you first hear about FirstEnergy's Ohio Utilities' Energy Conservation Kit Program? (Select all that apply)
 1. Referred by friend/family
 2. FirstEnergy's Ohio Utilities' website
 3. FirstEnergy's Ohio Utilities' telephone representative
 4. Through a program at my child's school
 5. Other (Specify)
4. How did you request the kit?
 1. Online
 2. Telephone
 98. Don't know

[DISPLAY Q5 IF Q4 = 1]

5. Was it easy to find the sign up screen to request the kit?
 1. Yes
 2. No
 98. Don't know

[DISPLAY Q6 IF Q4 = 1]

6. Did the website answer all of your questions about the kit?
 1. Yes
 2. No
 98. Don't know

[DISPLAY Q7 IF Q6 = 2]

7. What questions were not answered by the website?

[DISPLAY Q8 IF Q4 = 2]

8. Was the representative you spoke to on the telephone polite and courteous?
 1. Yes
 2. No
 98. Don't know

[DISPLAY Q9 IF Q4 = 2]

9. Did the representative answer all of your questions about the program?

1. Yes
2. No
98. Don't know

[DISPLAY Q10 IF Q9 = 2]

10. What question or questions was the representative unable to answer?
11. Approximately how many weeks did it take to receive the kit after you requested it?
12. How satisfied or dissatisfied were you with the time it took to receive the kit?
 1. Very satisfied
 2. Satisfied
 3. Neither Satisfied nor dissatisfied
 4. Dissatisfied
 5. Very dissatisfied
 98. Don't know
13. Who is the primary decision-maker in your household when it comes to home energy issues?
 1. Me
 2. My spouse/domestic partner/significant other
 3. Someone else (Specify)
14. Did you receive 13W (60W Equivalent) CFLs in your Energy Conservation Kit?
Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF CFL BULB]
 1. Yes
 2. No
15. Did you receive a 20W (75W Equivalent) CFL in your Energy Conservation Kit?
Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF CFL BULB]
 1. Yes
 2. No
16. Did you receive 23W or 26W CFL in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF CFL BULB]
 1. Yes
 2. No
17. Did you receive 16/25/32W 3-Way CFL in your Energy Conservation Kit?
Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF CFL BULB]
 1. Yes
 2. No

18. Did you receive a 40W globe CFL in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF CFL BULB]
1. Yes
 2. No
19. Did you receive a LED Night Lights in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF NIGHT LIGHT]
1. Yes
 2. No
20. Did you receive a furnace whistle in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF FURNACE WHISTLE]
1. Yes
 2. No
21. Did you receive a 7 Plug Smart Strip in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF 7 PLUG SMART STRIP]
1. Yes
 2. No
22. Did you receive faucet aerators in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF FAUCET AERATOR]
1. Yes
 2. No
23. Did you receive a showerhead in your Energy Conservation Kit in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture. [IMAGE OF SHOWERHEAD]
1. Yes
 2. No
24. Were any of the kit items broken or not working when you received them?
1. Yes
 2. No
 98. Don't know
- [DISPLAY Q25 IF Q24 = 1]
25. Did you contact any one about the items that were broken or not working?
1. Yes
 2. No
 98. Don't know

[DISPLAY Q26 IF Q25 = 1]

26. Who did you contact?

[DISPLAY Q27 IF Q24 = 1]

27. Was the item replaced?

1. Yes

2. No

98. Don't know

28. At the time when you requested the kit, did you know that each of the follow would be included in the kit?

	Yes	No	Don't know
CFLs	()	()	()
Smart Strip	()	()	()
Faucet aerators	()	()	()
LED night lights	()	()	()
Energy efficient showerhead	()	()	()

29. When you received the Energy Conservation Kit containing CFL light bulbs and other energy efficient products, did you install any of these products?

1. Yes

2. No

[DISPLAY Q30 IF Q29 = 2]

30. Why didn't you install any of the items in the Energy Conservation Kit?

1. I didn't like any of the products

2. I haven't had time yet

3. I gave the entire kit to someone else

97. Other reason (Specify)

[DISPLAY Q31 IF Q29 = 1]

31. Did you install the SMART POWER STRIP provided in the Energy Conservation Kit?

1. Yes

2. No

[DISPLAY Q32 IF Q31 = 1]

32. What appliances did you connect to the Smart Power Strip? (DROP DOWN LIST OF 31 HOUSEHOLD APPLIANCE CHOICES)

Outlet #1 – Master circuit

- Outlet #2 – Controlled outlet
- Outlet #3 – Controlled outlet
- Outlet #4 – Controlled outlet
- Outlet #5 – Controlled outlet
- Outlet #6 – Always on
- Outlet #7 – Always on

[DISPLAY Q33 IF Q31 = 2]

33. Why didn't you install any of the Smart Power Strip?

- 1. Already have power strips installed
- 2. Did not understand how to install it
- 3. Don't like the look of it
- 4. I have no appropriate use for it
- 97. Other (Specify)

[DISPLAY Q34 IF Q14-Q18=1]

34. Did you install ANY of the CFL Light Bulbs provided in the Energy Conservation Kit?

- 1. Yes
- 2. No

[DISPLAY Q35 IF Q34=1]

35. Did you install ALL of the CFL light bulbs included in the Energy Conservation Kit?

- 1. Yes
- 2. No

[DISPLAY Q36 IF Q34 = 2]

36. Why didn't you install any of the CFLs?

- 1. Waiting until light bulbs burn out
- 2. Don't like the color of CFLs
- 3. CFLs make a strange sound
- 4. CFLs don't fit in my lamp
- 97. Other (Specify)

[DISPLAY Q37 IF Q34 = 2]

37. What did you do with the CFL bulbs that you did not install in or around your home?

- 1. I installed all of the bulbs in the kit
- 2. I gave them away to friends or family
- 3. I am storing them for future use
- 4. I installed all of the CFL Bulbs...the other(s) were missing
- 5. I installed all of the working CFL Bulbs...the other(s) were broken
- 6. I installed all of the working CFL Bulbs...the other(s) were defective
- 7. I disposed of them at a household hazardous waste collection site.
- 97. Other (Specify)

[DISPLAY Q37 if Q14=1]

38. How many of the 13 Watt (60 Watt Equivalent) Spiral CFL Bulbs did you install (up to a maximum of 5 bulbs)?

[DISPLAY Q38 if Q14=1]

39. For the 13W bulbs that you installed, where did you install these bulbs? Please enter the number of bulbs you installed in each location.

1. Living room
2. Bathroom
3. Kitchen
4. Outdoors
5. Family Room
6. Bedroom
7. Garage
8. Hallway
9. Office
10. Laundry Room
11. Dining Room
98. Don't know

[DISPLAY Q39 IF Q15 = 1]

40. If you installed the 20W CFL, where did you install the bulb?

1. Living room
2. Bathroom
3. Kitchen
4. Outdoors
5. Family Room
6. Bedroom
7. Garage
8. Hallway
9. Office
10. Laundry Room
11. Dining Room
98. Don't know

[DISPLAY Q40 IF Q16 = 1]

41. If you installed the 23W or 26W (100 Watt Equivalent) CFL, where did you install the bulb?

1. Living room
2. Bathroom
3. Kitchen
4. Outdoors
5. Family Room
6. Bedroom
7. Garage
8. Hallway

- 9. Office
- 10. Laundry Room
- 11. Dining Room
- 98. Don't know

[DISPLAY Q42 IF Q17 = 1]

42. If you installed the 16/25/32W 3-Way CFL, where did you install this bulb?

- 1. Living room
- 2. Bathroom
- 3. Kitchen
- 4. Outdoors
- 5. Family Room
- 6. Bedroom
- 7. Garage
- 8. Hallway
- 9. Office
- 10. Laundry Room
- 11. Dining Room
- 98. Don't know

[DISPLAY Q43 IF Q18 = 1]

43. If you installed the Globe CFL, where did you install this bulb?

- 1. Living room
- 2. Bathroom
- 3. Kitchen
- 4. Outdoors
- 5. Family Room
- 6. Bedroom
- 7. Garage
- 8. Hallway
- 9. Office
- 10. Laundry Room
- 11. Dining Room
- 98. Don't know

[DISPLAY Q44 IF Q22 = 1]

44. How many of the FAUCET AERATORS provided in the Energy Conservation Kit did you install?

- 1. Zero
- 2. One
- 3. Two

[DISPLAY Q45 IF Q44 = 2 or 3]

45. Where in the home was the first Faucet Aerator installed?

	Kitchen	Laundry Room	Bathroom	Garage	Other
Faucet Aerator #1	()	()	()	()	()

[DISPLAY Q46 IF Q44 = 3]

46. Where in the home was the second Faucet Aerator installed?

	Kitchen	Laundry Room	Bathroom	Garage	Other
Faucet Aerator #2	()	()	()	()	()

[DISPLAY Q47 IF Q44 = 1]

47. Why didn't you install the other or all of the Faucet Aerator(s)?

1. Already have faucet aerators installed
2. Did not understand how to install
3. Doesn't fit my faucet (wrong size)
4. Doesn't fit my faucet (my kit didn't include a gender adapter)
5. My city water supply pressure is too low
6. My well water supply pressure is too low
7. I've tried them in the past and they clog up too quickly.
97. Other (Specify):

[DISPLAY Q48 IF Q19 = 1]

48. How many of the NIGHT LIGHTS provided in the Energy Conservation Kit did you install?

1. None
2. One
3. Two
4. Three

[DISPLAY Q49 IF Q48 = 1]

49. If you did not install the Night Light, what did you do with it?

1. Still in box
2. Thrown away
3. Given to someone else
99. Other (Specify)

[DISPLAY Q50 and Q51 IF Q48 = 2, 3, or 4]

50. Please describe where the FIRST (or only) Night Light was installed.

1. Where there was no night light before (new night light)
2. Where a standard night light was previously installed

51. What did you do with the FIRST (or only) old night light?

1. I threw it away
2. I moved it to a new location
3. I gave it away
4. I put it in storage for later use

[DISPLAY Q52 and Q53 IF Q48 = 3]

52. Please describe where the SECOND Night Light was installed.

1. Where there was no night light before (new night light)
2. Where a standard night light was previously installed

53. What did you do with the SECOND old night light?

1. I threw it away
2. I moved it to a new location
3. I put it in storage for later use
4. I gave it away

[DISPLAY Q54 and Q55 IF Q48=4]

54. Please describe where the THIRD Night light was installed.

1. Where there was no night light before (new night light)
2. Where a standard night light was previously installed

55. What did you do with the third old night light?

1. I threw it away
2. I moved it to a new location
3. I put it in storage for later use
4. I gave it away

[DISPLAY Q56 IF Q23 = 1]

56. Did you install the SHOWERHEAD included in the Energy Conservation Kit?

1. Yes
2. No

[DISPLAY Q57 IF Q23 = 2]

57. Why didn't you install the Showerhead?

1. I tried it but I didn't like it
2. I prefer the showerhead(s) I already have
3. I didn't know how to install it
4. I haven't had time yet
5. I gave it away
97. Other (Specify)

[DISPLAY Q58 IF Q55 = 1]

58. Where did you install the Showerhead?

1. Master bathroom
2. Any other bathroom

[DISPLAY Q59 IF Q20 = 1]

59. Did you install the FURNACE WHISTLE provided in the Energy Conservation Kit?

1. Yes
2. No

[DISPLAY Q60 IF Q59 = 1]

60. Has the furnace whistle indicated that you needed to change your filter by whistling?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q61 IF Q60 = 1]

61. Have you replaced the furnace filter since installing the whistle?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q62 IF Q61 = 1]

62. Did you reinstall the whistle when you replaced the furnace filter?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q63 IF Q59 = 1]

63. Do you think the whistle is useful for letting you know when to change the furnace filter?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q64 IF Q63 = 2]

64. Why not?

[DISPLAY Q65 and 66 IF Q59 = 2]

65. Why didn't you install the furnace whistle?

- 1. I didn't like the product's function
- 2. I didn't know what it was for
- 3. I didn't understand how to install it
- 4. It was broken/ didn't work
- 97. Other (Specify)

66. What did you do with the uninstalled Furnace Whistle?

- 1. Still in box
- 2. Threw it away
- 3. Gave it to someone else
- 97. Other (Specify)

67. What single item from the Energy Conservation Kit was MOST useful to you?

- 1. CFL Bulbs
- 2. Faucet Aerators
- 3. Smart Power Strips

4. Night Lights
5. Showerhead
6. Furnace Whistle

[DISPLAY Q68 IF Q34 = 1]

68. What wattage CFL bulb was most useful to you?

1. 13 Watt
2. 20 Watt
3. 26 Watt
4. 16/25/32 Watt 3-Way CFL
5. 40 Watt Globe CFL
6. I would have preferred a different wattage (please specify):

69. What other items do you think would be most useful to send in future Energy Conservation Kits?

[DISPLAY Q70 IF Q31 = 1]

70. How satisfied or dissatisfied are you with the performance and quality of the smart power strip?

1. Very Satisfied
2. Satisfied
3. Neither satisfied nor dissatisfied
4. Dissatisfied
5. Very dissatisfied
98. Don't know

[DISPLAY Q71 IF Q70 = 4 or 5]

71. Why are you dissatisfied?

[DISPLAY Q72 IF Q34= 1]

72. How satisfied or dissatisfied are you with the performance and quality of the CFL light bulbs?

1. Very Satisfied
2. Satisfied
3. Neither satisfied nor dissatisfied
4. Dissatisfied
5. Very dissatisfied
98. Don't know

[DISPLAY Q73 IF Q72= 4 or 5]

73. Why are you dissatisfied?

[DISPLAY Q74 IF Q44= 2 or 3]

74. How satisfied or dissatisfied are you with the performance and quality of the faucet aerators?

1. Very Satisfied
2. Satisfied

- 3. Neither satisfied nor dissatisfied
- 4. Dissatisfied
- 5. Very dissatisfied
- 98. Don't know

[DISPLAY Q75 IF Q74 = 4 or 5]

75. Why are you dissatisfied?

[DISPLAY Q76 IF Q48 = 2, 3. Or 4]

76. How satisfied or dissatisfied are you with the performance and quality of the night lights?

1. Very Satisfied
2. Satisfied
3. Neither satisfied nor dissatisfied
4. Dissatisfied
5. Very dissatisfied
98. Don't know

[DISPLAY Q77 IF Q76 = 4 or 5]

77. Why are you dissatisfied?

[DISPLAY Q78 IF Q56 = 1]

78. How satisfied are you with the performance of the showerhead?

1. Very Satisfied
2. Satisfied
3. Neither satisfied nor dissatisfied
4. Dissatisfied
5. Very dissatisfied
98. Don't know

[DISPLAY Q79 IF Q78 = 4 or 5]

79. Why are you dissatisfied?

[DISPLAY Q80 IF Q59 = 1]

80. How satisfied or dissatisfied are you with the performance and quality of the furnace whistle?

1. Very Satisfied
2. Satisfied
3. Neither satisfied nor dissatisfied
4. Dissatisfied
5. Very dissatisfied
98. Don't know

[DISPLAY Q81 IF Q80 = 4 or 5]

81. Why are you dissatisfied?

82. Before you received the kit, did you have the following items from the kit installed in your home?

	Yes	No	Don't know
CFLs	()	()	()
Faucet aerators	()	()	()
LED night lights	()	()	()
Energy Smart Strip	()	()	()
Low flow shower head	()	()	()
Furnace whistle	()	()	()

83. Before receiving the energy saving kit, how would you rate your familiarity with the ways to save energy in your home?

1. Very familiar
2. Somewhat familiar
3. A little familiar
4. Not at all familiar
98. Don't know

84. As a result of receiving the energy saving kit, how would you now rate your familiarity with ways to save energy in your home?

1. Very familiar
2. Somewhat familiar
3. A little familiar
4. Not at all familiar
98. Don't know

85. Have you participated in any of FirstEnergy Ohio's Energy Conservation Programs?

	Yes	No	Don't know
Home Energy Analyzer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HVAC Incentives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appliance Turn-IN (refrigerator and freezer recycling)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy Efficiency Products (rebates for energy efficient appliances)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Easy Cool Rewards (A/C cycling on and off at peak usage times)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy Audit (discounted energy audit of your home)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy Efficient New Homes (incentives for remodeling your home)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lighting discounts (discounts and rebates for lighting projects)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

86. What factors motivated you to request an Energy Conservation Kit from FirstEnergy's Ohio Utilities? (Select all that apply)

1. I was looking for ways to save energy in my home

2. Recommendation from a friend
3. The Energy Conservation Kit looked useful and valuable
4. Just for fun
5. It was free
6. Environmental reasons
7. I needed light bulbs
8. I needed an efficient showerhead
9. I needed faucet aerators
10. Health of family
97. Other (Specify)

87. How many people live in your household?

- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8
- 9. 9
- 10. 10

[DISPLAY Q88 IF Q87 = 1]

88. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()

[DISPLAY Q89 IF Q87 = 2]

89. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()

[DISPLAY Q90 IF Q87 = 3]

90. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()

[DISPLAY Q91 IF Q87 = 4]

91. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()

[DISPLAY Q92 IF Q87 = 5]

92. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()

Person 5 () () () () () () ()

[DISPLAY Q93 IF Q87 = 6]

93. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[DISPLAY Q94 IF Q87 = 7]

94. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[DISPLAY Q95 IF Q87 = 8]

95. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[DISPLAY Q96 IF Q87 = 9]

96. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[DISPLAY Q97 IF Q87 = 10]

97. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Person 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

98. Please make any corrections needed in the following fields

First name:

Last name:

Mailing address:

City:

State:

Zip code:

99. The name of your Electric Distribution Company:

1. Cleveland Electric Illuminating Company
2. Ohio Edison
3. Toledo Edison
4. Other:

10.2 Schools Kits Participation Survey

1. According to our records, you received an Energy Conservation Kit supplied by FirstEnergy's Ohio Utilities that was requested through your child's school. Is that correct?
 1. Yes
 2. No [THANK AND TERMINATE INTERVIEW]
 2. Does your home have an electric water heater or a gas water heater?
 1. Electric water heater
 2. Non-electric water heater
 3. Who is the primary decision-maker in your household when it comes to home energy issues?
 1. Me
 2. My spouse/domestic partner/significant other
 3. Someone else (please specify):
 4. How did you request the kit?
 1. Online
 2. Telephone
 3. Don't know
 5. How satisfied or dissatisfied are you with the process used to request and receive the kit?
 1. Very satisfied
 2. Satisfied
 3. Neither satisfied nor dissatisfied
 4. Dissatisfied
 5. Very dissatisfied
 6. Don't know
- [DISPLAY Q6 ONLY IF Q5 = 4 OR 5]
6. Why were you dissatisfied with the process used to request and receive the kit?
 7. Approximately how many weeks did it take to receive the kit after you requested it?
 8. How satisfied or dissatisfied are you with the time it took to receive the kit?
 1. Very satisfied
 2. Satisfied
 3. Neither satisfied nor dissatisfied
 4. Dissatisfied
 5. Very dissatisfied
 6. Don't know

9. Did you receive 13W (60W Equivalent) CFLs in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture? [IMAGE OF CFL BULB]
1. Yes
 2. No
10. Did you receive an 18W (75W Equivalent) CFL in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture? [IMAGE OF CFL BULB]
1. Yes
 2. No
11. Did you receive an LED Night Light in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture? [IMAGE OF NIGHT LIGHT]
1. Yes
 2. No
12. Did you receive faucet aerators in your Energy Conservation Kit? Example shown below. The actual item may have a slightly different appearance or it may be from a different manufacture? [IMAGE OF FAUCET AERATOR]
1. Yes
 2. No
13. At the time when you requested the kit, did you know that each of the follow would be included in the kit?

	Yes	No	Don't know
CFLS	()	()	()
Faucet aerators	()	()	()
LED night lights	()	()	()

14. Were any of the kit items broken or not working when you received them?
1. Yes
 2. No
 98. Don't know

[DISPLAY Q15 ONLY IF Q14= 1]

15. Did you contact any one about the items that were broken or not working?
1. Yes
 2. No
 98. Don't know

[DISPLAY Q16 ONLY IF Q15= 1]

16. Who did you contact?

[DISPLAY Q17 ONLY IF Q15= 1]

17. Was the item replaced?

1. Yes
2. No

[DISPLAY Q18 IF ONLY Q9-Q12]

18. When you received the Energy Conservation Kit containing CFL light bulbs and other energy efficient products, did you install any of these products?

1. Yes
2. No

[DISPLAY Q19 IF Q18 = 2]

19. Why didn't you install any of the items in the Energy Conservation Kit?

1. I didn't like any of the products
2. I haven't had time yet
3. I gave the entire kit to someone else
4. Other reason (please specify):

20. Did you install ANY of the CFL light bulbs provided in the Energy Conservation Kit?

1. Yes
2. No

[DISPLAY Q21 ONLY IF Q20=1]

21. Did you install ALL of the CFL light bulbs included in the Energy Conservation Kit?

1. Yes
2. No

[DISPLAY Q22 ONLY IF Q20=2]

22. Why didn't you install any of the CFLs?

1. Waiting until currently installed light bulbs burn out
2. Don't like the color of the CFLs
3. CFLs make a strange sound
4. The CFLs don't fit in the fixtures where I should have installed them
5. Other (Specify)

[DISPLAY Q23 ONLY IF Q21=2]

23. What did you do with the bulbs that you did not install in or around your home?

1. I am storing them for future use
2. I gave them away to friends or family
3. I installed all of the CFL Bulbs...the other(s) were missing
4. I installed all of the working CFL Bulbs...the other(s) were defective
5. I disposed of them at a household hazardous waste collection site.
99. Other (please specify):

[DISPLAY Q24 and 25 IF Q9 = 1]

24. How many of the 13 Watt (60 Watt Equivalent) Spiral CFL Bulbs did you install (up to a maximum of 3 bulbs)?

25. For the 13W bulbs that you installed, where did you install these bulbs? (Leave blank if they do not know where the bulbs were installed)

1. Living room
2. Bathroom
3. Kitchen
4. Outdoors
5. Family Room
6. Bedroom
7. Garage
8. Hallway
9. Office
10. Laundry Room
11. Dining Room
12. Don't know

[DISPLAY Q26 IF Q10 = 1]

26. Which room did you install the 18W CFL in?

1. Living room
2. Bathroom
3. Kitchen
4. Outdoors
5. Family Room
6. Bedroom
7. Garage
8. Hallway
9. Office
10. Laundry Room
11. Dining Room
12. Don't know
13. I didn't install the 18W CFL
14. Other: (Specify)

[DISPLAY Q28 IF Q12=1]

28. How many of the FAUCET AERATORS provided in the Energy Conservation Kit did you install?

1. Zero
2. One
3. Two

[DISPLAY Q29 IF Q28 = 2 or 3]

29. Where in the home was the first Faucet Aerator installed?

	Kitchen	Laundry Room	Bathroom	Garage	Other
Faucet Aerator #1	()	()	()	()	()

[DISPLAY Q30 IF Q28 = 3]

30. Where in the home was the second Faucet Aerator installed?

	Kitchen	Laundry Room	Bathroom	Garage	Other
Faucet Aerator #2	()	()	()	()	()

[DISPLAY Q31 IF Q28 = 1]

31. Why didn't you install the other or all of the Faucet Aerator(s)?

1. Already have faucet aerators installed
2. Did not understand how to install
3. Doesn't fit my faucet (wrong size)
4. Doesn't fit my faucet (my kit didn't include a gender adapter)
5. My city water supply pressure is too low
6. My well water supply pressure is too low
7. I've tried them in the past and they clog up too quickly.
99. Other reason (please specify):

[DISPLAY Q32 ONLY IF Q11=1]

32. Did you install the NIGHT LIGHT provided in the Energy Conservation Kit?

1. Yes
2. No

[DISPLAY Q33 IF Q32 = 2]

33. If you did not install the Night Light, what did you do with it?

1. Still in box
2. Thrown away
3. Given to someone else
99. Other (please specify):

34. Please describe where the Night Light was installed.
1. Where there was no night light before (new night light)
 2. Where a standard night light was previously installed
35. What did you do with the old night light?
1. I threw it away
 2. I moved it to a new location
 3. I put it in storage for later use
36. What single item from the Energy Conservation Kit was MOST useful to you?
1. CFL Bulbs
 2. Faucet Aerators
 3. Night Lights
37. What wattage CFL bulb was most useful to you?
1. 13 Watt
 2. 18 Watt
 3. I would have preferred a different wattage (please specify):
38. What other items do you think would be most useful to send in future Energy Conservation Kits?
- [DISPLAY Q39 ONLY IF Q20=1]
39. How satisfied or dissatisfied are you with the performance and quality of the CFL light bulbs?
1. Very Satisfied
 2. Satisfied
 3. Neither satisfied nor dissatisfied
 4. Dissatisfied
 5. Very dissatisfied
 98. Don't know
- [DISPLAY Q40 IF Q39 = 4 or 5]
40. Why are you dissatisfied?
- [DISPLAY Q41 ONLY IF Q28= 2 or 3]
41. How satisfied or dissatisfied are you with the performance and quality of the faucet aerators?
1. Very Satisfied
 2. Satisfied
 3. Neither satisfied nor dissatisfied
 4. Dissatisfied
 5. Very dissatisfied
 98. Don't know

[DISPLAY Q42 IF Q41 = 4 or 5]

42. Why are you dissatisfied?

[DISPLAY Q43 ONLY IF Q32=1]

43. How satisfied or dissatisfied are you with the performance and quality of the LED night light?

1. Very Satisfied
2. Satisfied
3. Neither satisfied nor dissatisfied
4. Dissatisfied
5. Very dissatisfied
98. Don't know

[DISPLAY Q44 IF Q43 = 4 or 5]

44. Why are you dissatisfied?

45. Before you received the kit, did you have the following items from the kit installed in your home?

	Yes	No	Don't know
CFL(s)	()	()	()
Faucet aerator(s)	()	()	()
LED night light(s)	()	()	()

46. Before receiving the energy saving kit, how would you rate your familiarity with the ways to save energy in your home?

1. Very familiar
2. Somewhat familiar
3. A little familiar
4. Not at all familiar
98. Don't know

47. As a result of receiving the energy saving kit, how would you now rate your familiarity with ways to save energy in your home?

1. Very familiar
2. Somewhat familiar
3. A little familiar
4. Not at all familiar
98. Don't know

48. Have you participated in any of FirstEnergy Ohio's Energy Conservation Programs?

	Yes	No	Don't know
Home Energy Analyzer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HVAC Incentives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appliance Turn-IN (refrigerator and freezer recycling)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy Efficiency Products (rebates for energy efficient appliances)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Easy Cool Rewards 9A/C cycling on and off at peak usage times)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy Audit (discounted energy audit of your home)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy Efficient New Homes (incentives for remodeling your home)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lighting discounts (discounts and rebates for lighting projects)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49. What factor(s) motivated you to request an Energy Conservation Kit from FirstEnergy's Ohio Utilities? (Select all that apply)

1. I was looking for ways to save energy in my home

2. Recommendation from a friend
3. The Energy Conservation Kit looked useful and valuable
4. Just for fun
5. It was free
6. Environmental reasons
7. I needed light bulbs
8. I needed an efficient showerhead
9. I needed faucet aerators
10. Health of family
11. Other (please specify):

50. How many people live in your household?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10

[DISPLAY Q51 IF Q50 = 1]

51. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()

[DISPLAY Q52 IF Q50 = 2]

52. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()

[DISPLAY Q53 IF Q50 = 3]

53. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()

[DISPLAY Q54 IF Q50 = 4]

54. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()

[DISPLAY Q55 IF Q50 = 5]

55. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()
Person 5	()	()	()	()	()	()	()

[DISPLAY Q56 IF Q50 = 6]

56. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()
Person 5	()	()	()	()	()	()	()
Person 6	()	()	()	()	()	()	()

[DISPLAY Q57 IF Q50 = 7]

57. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()
Person 5	()	()	()	()	()	()	()
Person 6	()	()	()	()	()	()	()
Person 7	()	()	()	()	()	()	()

[DISPLAY Q58 IF Q50 = 8]

58. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()
Person 5	()	()	()	()	()	()	()
Person 6	()	()	()	()	()	()	()
Person 7	()	()	()	()	()	()	()
Person 8	()	()	()	()	()	()	()

[DISPLAY Q59 IF Q50 = 9]

59. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()
Person 5	()	()	()	()	()	()	()
Person 6	()	()	()	()	()	()	()
Person 7	()	()	()	()	()	()	()
Person 8	()	()	()	()	()	()	()
Person 9	()	()	()	()	()	()	()

[DISPLAY Q60 IF Q50 = 10]

60. What are the ages of the members of your household?

	Under 10	10-20	20-30	30-40	40-50	50-65	65 or older
Person 1	()	()	()	()	()	()	()
Person 2	()	()	()	()	()	()	()
Person 3	()	()	()	()	()	()	()
Person 4	()	()	()	()	()	()	()
Person 5	()	()	()	()	()	()	()
Person 6	()	()	()	()	()	()	()
Person 7	()	()	()	()	()	()	()
Person 8	()	()	()	()	()	()	()
Person 9	()	()	()	()	()	()	()
Person 10	()	()	()	()	()	()	()

61. The name of your Electric Distribution Company:

1. The Illuminating Company
2. Ohio Edison
3. Toledo Edison
4. Other: (Specify)

62. Please make any corrections needed in the following fields

First name:

Last name:

Mailing address:

City:

State:

Zip code:

11. Appendix D: New Homes Interview Guides and Survey Instruments

11.1 New Homes Builder Interview Guide

This interview guide is for builders who work with FirstEnergy's New Homes program.

First, the guide summarizes the key researchable issues that the interviews will explore. This is followed by the specific questions that will be asked of the builders.

Because senior staff will be conducting interviews, interviews will be semi-structured. Therefore, the following interview protocol is only a guide to ensure certain topics are covered, but evaluators will follow the flow of the interview and modify questions as needed to fit the interviewee's circumstance.

11.1.1 Overarching Key Researchable ISSUES

- What were the most common measures installed to meet program eligibility guidelines.
- How effective were the marketing efforts for the program? Which marketing methods were most effective?
- How well did FirstEnergy staff and the implementation team work together?
- What changes can be made to the program's design or delivery to improve its effectiveness in future program years?
- Which installed measures have the greatest homebuyer perceived value and the least homebuyer perceived value.
- What do builders feel are the greatest challenges or obstacles to program participation?

11.1.2 Introduction

My name is _____, with Tetra Tech. We are working with ADM Associates to evaluate the New Homes program sponsored by FirstEnergy.

The study will provide recommendations on how FirstEnergy can improve the program for builders and their customers. I would like to ask you some questions about your experience with the program. Your feedback on the program is extremely valuable as

FirstEnergy wants to improve your experience and satisfaction with the program. This interview should take approximately 30 minutes of your time. May we take some time now to do the interview? (If no, when would be a convenient time?)

(IF NECESSARY) I want to assure you that all of your responses and information about your company will be kept confidential and will not be reported individually by your name or businesses' name.

11.1.3 Introduction and Business Scope

I'd like to start with some general information about you and your company.

1. Approximately how many total homes did you complete in 2014? [NOTE: Be sure to ask each of the bullet questions below.]
 - How many of these were qualified to receive a rebate from FirstEnergy's New Homes Program?
 - How many did you receive rebates for through the program?
2. Approximately how many total homes do you expect to complete in 2014?
 - Of your 2014 homes, how many (what percentage of total builds) will likely qualify for rebates from FirstEnergy's New Homes program?
 - If 0, ask: Why aren't you planning to build any program-qualifying homes this year?
 - What would have to change within the program for you to build a larger proportion of program homes this year? (Probe to ask about changes under the program's control.)

[NOTE: If 0 homes, adjust subsequent questions to obtain feedback on past participation experience.]

3. Who is your target market for FirstEnergy's New Homes program? (Probe on income level, family size, first time vs. move-up buyers, geographic location, etc.)
4. Do you mostly build spec homes, or do buyers have input into the final designs?
If the builder indicates they build custom homes, what are the most requested energy efficient measure for custom builds?
5. Do you build homes in the other utility service territories as well?
 - IF YES: In what territories?

- IF YES: Do you currently participate in their new homes/new construction program, or plan to? IF NO: Why not?

11.1.4 Program Requirements

Now I'd like to ask you about the program requirements.

6. Are any program requirements unclear to you?
 - If YES: Which ones?
7. If you had to estimate the additional cost to you to go from a standard code home to an Energy Star 3.0 version home, what would that be?
8. How do you recover the costs in conjunction with the program rebates?
9. Are appraisal values of your Energy Star homes an issue for you?
10. Do you have any recommended changes to the program requirements? (If needed: These changes could pertain to the equipment requirements, training needs, HERS ratings, or rebate amounts, for instance.)
11. What are your biggest challenges to building program qualifying homes?
12. How satisfied are you with the program's technical support?
 - PROBE: What kind of support does FirstEnergy provide?
 - How important is this support for your participation in the program?
 - Do you go to anyone else for support?
13. Are you aware of other "green" or energy efficiency related programs for new homes in Ohio?
 - If YES: Do you also build homes to their requirements?
 - If YES: Which rebate programs are the most influential to you building above code?
 - If YES: How do you think homebuyers perceive homes built to FirstEnergy's requirements compared to other green homebuilding programs?

11.1.5 Marketing

Now I'd like to ask you about how you market your new homes.

14. Do you sell your homes through your own sales reps or through real estate agents?

If Sales Reps Used:

- Have any of your reps received specific training on your FirstEnergy program homes?
 - If NO: do you plan to give them training or detailed information about the FirstEnergy program homes you build?
- Are they effectively selling the advantages of your program homes? What additional information or training do they need?

If Realtors Used:

- Do you think realtors understand the advantages of FirstEnergy program homes?
 - Do you think realtors are adequately promoting the advantages these homes? What additional information or training do they need?
 - Could you provide me with the name of the realtor(s) you typically use to sell FirstEnergy program homes?
15. Which features of the program homes are most beneficial or valuable to the homebuyers? How about the least beneficial or valuable?
16. And which benefits do you promote when marketing these homes?
- If no marketing occurring: Why don't you market your program homes?
17. What do you think FirstEnergy should do to effectively market the benefits of their program homes?
18. Have you received the same, more, or less inquiries about energy efficient homes in the past year? Why do you think that is?
- Do homebuyers make referrals to your company?
19. Does the ENERGY STAR label provide a sales advantage in the current housing market?

20. What do you think are the biggest challenges when marketing energy efficient homes?
21. Have you received feedback from customers regarding the energy efficiency of their home?
22. What equipment do homebuyers mention most when discussing the energy efficiency of their home, (if custom built: either during the design phase or) post-purchase?
23. (If custom built) Are there particular things they are willing to pay more for in order to be more efficient?

11.1.6 Program Interactions

Now I have a few questions about your interactions with other program actors.

24. Who do you get most of your program information from (e.g., a HERS Rater, FirstEnergy staff or website, a State or National Energy organization, an HVAC contractor, program implementation etc.)? By program information, I mean updates on new home requirements, rebate levels, trainings being offered, etc.
 - If from a HERS Rater or HVAC contractor: Which company do you primarily work with?
 - IF DID NOT MENTION HERS RATER, ASK: Do you work with a HERS Rater?
 - IF YES, ASK: Who do you primarily work with?
25. What is the most critical support the program could provide to program builders and subcontractors in the near future? (Probe to see if technical/field support, consumer marketing, subcontractor training, other preferred) Why do you say that?
26. [IF MENTIONED THEY WORK WITH A HERS RATER]
Tell me about your collaboration/relationship with the HERS Rater(s) you work with.
 - What value do Raters offer?
 - What is going well?
 - What improvements could be made?
 - Do you have any issues Raters failing homes? What types of issues?

27. How efficiently is the home certification process performing? Could this be improved in any way? (Probe to see if any issues with field inspections or QA by Providers).
- Are there different stages of the certification process that work better than others? (Probe particular for ENERGY STAR homes, as there are different site visits that need to be made by the HERS Rater.)
28. How well is the rebates payment process working for you?
If answer is approximately poorly, ask how could it be improved?

11.1.7 Overall Program

I just have a few final questions about the program.

29. Given everything we've discuss, what do you consider to be the biggest advantages of the program to you from being a program builder?
30. What has been the biggest challenge for you in participating in FirstEnergy's New Homes program?
31. Prior to your decision to participate in FirstEnergy's New Homes program, did you perceive any barriers or disadvantages to program participation?
If YES, has FirstEnergy implemented any policy or program change that removed the barriers?
32. How can the Energy's New Homes program be improved to encourage builder participation?
33. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is extremely satisfied, how would you rate your satisfaction with FirstEnergy's New Homes program? Why do you say that?

11.1.8 Wrap-up

32. Those are all the questions I have for you. Do you have anything else you want to mention to me in regards to the program?

Thank you for your time. This completes our interview.

11.1 New Homes Program and Implementation Staff Interview Guide

11.1.1 Interview Objectives

- How effective have the marketing efforts been for the program? Which marketing methods have proven to be the most effective?
- How effectively have managers been able to monitor and administer the program?
- What were the issues and concerns about implementing the program in 2014? What issues remain unresolved?
- What were the lessons learned in implementing the program in 2014?
- How well has the team (i.e., FirstEnergy staff and implementation staff) worked together? Characterize internal program management and operations including communications, staffing, and marketing.
- What changes, with regard to program design or delivery, should the program implement in order to improve effectiveness? Understand program design process, program launch and program's key challenges. Understand the program's service offerings, the types of customers participating and not participating, and role of trade allies and implementation contractors.

11.1.2 Describe your role with the program in Ohio

1. What are your responsibilities and roles in this program?
2. When did you become involved in the program?
3. (If FirstEnergy Staff) Responsibilities and roles within FirstEnergy and, specifically, for energy efficiency
4. (If FirstEnergy Staff) Any previous experience with energy efficiency (implementing, overseeing energy efficiency programs, etc.)

11.1.3 Who do you interact with directly as part of this program (examples listed below)

5. Trade allies, builders, raters?
6. Program manager/implementation contractor?
7. Customers?

8. Public Utilities Commission and advocacy groups?
9. Statewide Evaluator?
10. Others?

11.1.4 Program Planning and Design

11. How were you involved in the program planning and design, if at all? How does the Ohio iteration of the program differ from the Pennsylvania program offering?
12. How were the program's goals set? How are these goals communicated both internally and externally? Are the goals set by territory?
13. How will program progress toward goals be monitored and reported to the utility? How is the program doing in meeting these goals in 2014? How about 2014?
14. What are the implications for the program of not meeting goals? What are the implications for oversubscribing?

11.1.5 Program Design

15. Could you please provide an update on the progress of the program? What barriers have you encountered since the program's launch? What are key successes from the program's launch?
16. Please provide an overview of the program, including standard equipment and incentive strategy.
17. What are the target markets for the program?
18. Do the incentive levels seem appropriate? If not, why do you think that? What, if any, changes in the incentive levels do you think may be needed?

11.1.6 Program Operations

19. What are the participation steps from the builder's perspective? From the customer's perspective
20. How long does it take before the incentive payment is received? What step in the process if any hinders process of incentive payment?
21. What parties are involved in administering and/or serving customers through the

- program? (Probe for trade allies, implementation contractors, etc.) What do they do?
22. Describe your communications and working relationship with raters/builders. (If not revealed above, distinguish between the different trade ally groups involved.) Follow up question: what can be improved on by FirstEnergy to improve communication with raters/builders?
23. What support is provided through the program to builders, raters, etc.? In what areas could this be improved?
24. Have you received compliments or criticisms from participants/builders? What are the typical topics brought up?
25. What type of quality control measures are in place for the program or are planned? What percentage of projects will receive QC? What types of problems are most common (if any QC has been performed yet)?
26. How can the program be modified to increase builder participation?
27. What do you see as future challenges to the program?

11.1.7 Program Operations and Management

28. Do you feel there are sufficient resources to effectively operate and manage the programs? If no, what additional resources are needed overall (by program)?
29. How is program information communicated internally (or planned to be communicated) within FirstEnergy? Do you feel the correct mechanisms are in place for internal program information dissemination? Probe about any improvements needed or plans in place.
30. How often are progress reports generated on program performance? Who is responsible for this?
31. What additional reporting is required (type and dates)?
32. (If FirstEnergy Staff) How effectively have program managers been able to monitor and administer the program? Are you confident in the information and data reported to you by the program administrator/implementer? Are additional QA/QC controls required to improve confidence (if applicable)? What additional information or data would be useful?

33. (If implementation staff) How effectively have program managers been able to monitor and administer the program? Are you confident in the information and data reported to you? Are additional QA/QC monitoring controls required to improve confidence (if applicable)? What additional information or data would be useful?
34. What aspects of the program operations and management are working well or are expected to work well? Which are not working well or may be a concern?
35. What do you see as challenges to the program's operations and management?
36. What implementation issues in 2014 remain unresolved and why?
37. What were the lessons learned in implementing the program in 2014?

11.1.8 Program Marketing and Outreach

38. What overall marketing activities are being or will be used to reach the different target markets? Who conducts these? Have you noticed changes in participation levels relative to the release of each marketing effort? Do you feel that a specific type of effort works better than others?
39. How effective do you feel each of these methods has been in identifying and enrolling potential participants? Why?
40. How will program information be communicated to builders, raters and other external stakeholders? Probe about any improvements needed.
41. What are major barriers to participation (both customers and builders)?
42. Why do you think some choose to participate or not participate?
43. Are there any specific types of customers/stakeholders that face more barriers than others?

11.1.9 Conclusion

44. Is there anything we haven't covered today that we should be aware of when evaluating the program?
45. If I have any additional questions, can I call you or email you my questions? (Confirm contact information)

11.2 New Homes Rater Interview Guide

This interview guide is for raters who work with FirstEnergy to provide services through the New Homes program.

First, the guide summarizes the key researchable issues that the interviews will explore. This is followed by the specific questions that will be asked of the raters.

Because senior staff will be conducting interviews, interviews will be semi-structured. Therefore, the following interview protocol is only a guide to ensure certain topics are covered, but evaluators will follow the flow of the interview and modify questions as needed to fit the interviewee's circumstance.

11.2.1 Overarching Key Researchable ISSUES

- What were the most common measures installed to meet program eligibility guidelines.
- How effective were the marketing efforts for the program? Which marketing methods were most effective?
- How well did FirstEnergy staff and the implementation team work together?
- What changes can be made to the program's design or delivery to improve its effectiveness in future program years?
- Which installed measures have the greatest homebuyer perceived value and the least homebuyer perceived value.
- What do builders feel are the greatest challenges or obstacles to program participation?

11.2.2 Introduction

My name is _____, with Tetra Tech. We are working with ADM Associates to evaluate the New Homes program sponsored by FirstEnergy.

I am calling to better understand how well FirstEnergy's New Homes program is operating and how it could potentially be improved. As part of our study we are speaking with program HERS raters like you, to learn about your experiences with the program.

I'm not selling anything; I'd just like to ask your experiences with this program. Let me assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone unless you grant permission.

If needed: Our findings will be reported to FirstEnergy in a confidential, “summary” format that combines responses from all interviewees. We will not identify you or your company.

This call will take about 30 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT.

11.2.3 Introduction and Business Scope

I'd like to start with some general information about you and the company you work for.

1. Approximately how many total new homes did your company work with in Ohio in 2014 as a rater?
 - And how many of these were FirstEnergy program homes?
 - And about how many different Ohio home builders did you work with in 2014?
2. Do you think your new homes business in Ohio will increase, decrease or remain about the same in 2014? Why?
3. Besides rating homes, what other services does your company offer to builders or their contractors, if any? (E.g., HVAC installation/commissioning, Duct sealing/testing, Lighting, Permitting, Inspections for other building programs, General construction consulting, Green/EE construction consulting)

11.2.4 Program Requirements

Now I'd like to ask you about the program requirements.

4. Are any program requirements unclear to you?
 - If YES: Which ones?
5. Do you have any recommended changes to any of the program's requirements? (If needed: These changes could pertain to the equipment requirements, HERS ratings, or rebate amounts, for instance.)
6. How is the process for rating FirstEnergy homes going?
 - What are your biggest challenges as a home rater?
 - Who helps you address any problems related to the specifications? How has this gone?
7. Do the builder's and their subcontractors understand program requirements?
 - What don't they understand?

- Do they need additional training?
 - If YES: Who should provide this? Why?
 - What are builders' most common challenges that may limit program participation?
8. How satisfied are you with the program's technical support?
- PROBE: What kind of support does FirstEnergy provide? (Confirm if this help is from FirstEnergy or someone else)
 - How important is this support for your participation in the program?
9. Are you aware of other "green" or energy efficiency related programs for new homes in Ohio?
- If YES: Do you also work with builders on these types of homes?
 - If YES: How do you think homebuyers perceive homes built to FirstEnergy's requirements compared to other green homebuilding programs?
 - What other rebate programs do builders take advantage of?

11.2.5 Marketing

Now I'd like to ask you about program marketing.

10. Do you actively promote the program to builders?
11. Have you recruited any new builders to the program?
12. How do builders typically learn about this program?
13. Do you work with builder or real estate sales staff to help them promote the energy efficiency of these program homes? Other groups?

IF YES:

- What do you do? (Probe to see if info on website, calling builders, presentations, etc.)
 - Which benefits of energy efficient homes do you promote?
 - Could you provide me with the name of the realtor you use?
14. Do you think builders/realtors understand the advantages of FirstEnergy program homes?

15. Do you think builders/realtors are adequately promoting the advantages of these homes?
16. Which program features seem to be most beneficial/valuable to the homebuyers? What about to builders? How about the least beneficial/valuable?
17. Are there certain energy efficient measures builders avoid due to the cost regardless of the program's rebates? Are there measures that are under installed by builders because the rebate amount is not sufficient to make these measures cost effective?
18. Have you received more or less inquiries about certifying energy efficient homes in the past year? Why do you think that is?
19. What do you think FirstEnergy should do to effectively market the benefits of their program homes?
20. Does the ENERGY STAR label provide a sales advantage in the current housing market?

11.2.6 Program Interactions

Now I have a few questions about your interactions with other program actors and program tools.

21. Who do you get most of your program information from (e.g., FirstEnergy staff or website, a State or National Energy organization, program implementation staff, etc.)? By program information, I mean updates on new home requirements, rebate levels, trainings being offered, etc.
 - Who do you mostly work with at FirstEnergy?
22. What is the most critical support the program could provide to Raters in the near future? (Probe to see if technical/field support, consumer marketing, subcontractor training, other preferred.) Why do you say that?
23. Tell me about your collaboration/relationship with your builders in certifying homes.
 - What is the process?
 - What is going well?
 - What improvements could be made?

- Are there any builders who have consistent issues with homes failing the certification process? What are these issues and how should these be addressed?
24. How efficiently is the home certification process performing? Could this be improved in any way? Are there different stages of the certification process that work better than others?
25. How do you work with the program providers who certify the homes and conduct quality assurance inspections?
- What is the process?
 - What is going well?
 - What improvements could be made?
27. How is the use of COMPASS to submit paperwork? Any recommended changes?
28. Have you had any issues with their QA/QC process?
- IF YES, how have they been addressed? Or how would you like to see them addressed?

11.2.7 Overall Program

I just have a few final questions about the program.

29. Given everything we've discussed, what has been the biggest challenge for you in being a Rater for FirstEnergy's New Homes program? For builders?
- (If needed) What about the incremental costs of building more energy efficient homes? Are these a challenge for your builders, even after FirstEnergy's rebates are considered?
 - Are appraisals of your builder's homes an issue?
30. What do you think are the biggest challenges for constructing and/or selling energy efficient homes going forward? Do you have any suggestions for overcoming these challenges?
31. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is extremely satisfied, how would you rate your satisfaction with FirstEnergy's New Homes program?

11.2.8 Feedback

32. What feedback have you received from customers, builders, and other raters (positive and negative)? Do they have any suggestions for improving the program? [Probe for measure specific feedback]

11.2.9 Wrap-up

33. Those are all the questions I have for you. Do you have anything else you want to mention to me in regards to the program?

Thank you for your time. This completes our interview.

12. Appendix E: Behavioral Survey Instruments

12.1.1 Behavioral Modification Cohort 2 Survey

1. Our records indicate that you received a Home Electricity Report. Is this true?
 1. True
 2. False
2. Would you tell me how you first learned about Home Electricity Reports?
 1. Bill Insert
 2. Direct email from a FirstEnergy utility
 3. Energy Save Ohio website
 4. FirstEnergy utility website
 5. Print/Newspaper Ad
 6. Radio
 7. Word-of-Mouth
 97. Other (Specify):
3. Would you share with us how you found out how to get a Home Electricity Report?
 1. Bill insert
 2. Direct email from FirstEnergy utility
 3. FirstEnergy website
 97. Other (Specify):
4. What first got your attention and made you decide to request a Home Electricity Report?
 1. Curiosity
 2. Energy conservation
 3. Financial motives (high bills)
 97. Other (Specify):
 98. Don't Know
5. What kind of detailed energy savings ideas did you receive in your Home Electricity Report?
 1. No-cost/low cost ways to save energy immediately
 2. Ways to save requiring investment that would pay off in the future
 3. Ways to save that would not be cost-justified
 97. Other (Specify)

[DISPLAY Q6 IF Q5 = 98]

6. What other detailed energy savings ideas did you receive?

7. Would you say the information contained in the Home Electricity Report was helpful?

1. Very helpful
2. Somewhat helpful
3. Neither helpful nor unhelpful
4. Somewhat unhelpful
5. Very unhelpful
98. Don't Know

[DISPLAY Q8 IF Q7 = 1 or 2]

8. Which aspect of the Home Electricity Report was the least helpful to you? Why?

[DISPLAY Q9 IF Q7 = 4 or 5]

9. What aspect of the Home Electricity Report was most helpful to you? Why?

10. Would you say the information contained in the Home Electricity Report was easy to understand?

1. Very easy
2. Somewhat easy
3. Neither easy nor difficult
4. Somewhat difficult
5. Very Difficult
98. Don't know

[DISPLAY Q11 IF Q10 = 1 or 2]

11. How could the Home Electricity Report be changed to make it easier to understand or implement?

12. What energy saving actions were you able to take in the past year, if any, in response to the personalized action steps, tips, or other information contained in the Home Electricity Report?

1. Changes to your home, lighting or appliances(e.g. replaced an appliance with one that is more energy efficient)
2. Changes to what you do(e.g. turn off lights when leaving a room, adjust the thermostat when leaving the house)
3. Both changes to your home, lighting or appliances and changes to what you do
4. No changes made yet
98. Don't know

[DISPLAY Q13 IF Q12 = 1 or 3]

13. I made changes to my...

1. Appliances
2. HVAC
3. Lighting
4. General
5. Water heating measures
97. Other (Specify)

[DISPLAY Q14 IF Q12 = 2 or 3]

14. I made changes to how I use my...

1. Appliances
2. HVAC
3. Lighting
4. General
5. Water heating measures
97. Other (Specify)

[DISPLAY Q15 IF Q12 = 2 or 3]

15. Do you do things differently now to save energy in hot weather?

1. Yes
2. No
98. Don't Know

[DISPLAY Q16 IF Q15 = 1]

16. What do you do differently now?

[DISPLAY Q17 IF Q12 = 2 or 3]

17. Do you do things differently now to save energy in cold weather?

1. Yes
2. No
98. Don't Know

[DISPLAY Q18 IF Q17 = 1]

18. What do you do differently now?

[DISPLAY Q19 IF Q15 or Q17 = 1]

19. Have you noticed any savings on your electric bill since you made these changes?

1. Yes, my electric bill has decreased
2. No, there does not seem to be a change in my electric bill
3. Not sure or too soon to tell
98. Don't Know

[DISPLAY Q20 IF Q19 = 1]

20. How satisfied are you with the savings you noticed on your electric bill since making these changes?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't Know

21. Overall, how satisfied are you with your Home Electricity Report?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't Know

[DISPLAY Q22 IF Q21 = 4 or 5]

22. Why did you give it that rating?

23. Do you have any suggestions to improve the Home Electricity Reports?

24. Have you participated in any other FirstEnergy residential energy conservation programs in this or past years?

1. HVAC tune-ups and rebates
2. Residential energy audits
3. Easy Cool Rewards Program (rebates for programmable thermostats)
4. CFL retail program
5. Residential Energy Audit program
6. Community Connections
7. Residential new construction program
8. Online energy audits
9. No other programs were participated in
98. Don't know

25. Which of the following best describes your home?

1. Single-family home, detached construction
2. Single-family home, factory manufactured/modular
3. Mobile home
4. Row house
5. Two or Three family attached residence
6. Apartment with 4+ families
7. Condominium
97. Other (Specify)

26. Do you own or rent this residence?

1. Own
2. Rent

27. Approximately when was your homebuilt?

1. Before 1960
2. 1960-1969
3. 1970-1979
4. 1980-1989
5. 1990-1999
6. 2000-2005
7. 2006 or Later
98. Don't know

28. Would you estimate the above-ground living space is about:

1. Less than 1,000 square feet
2. 1000-2000 square feet
3. 2000-3000 square feet
4. 3000-4000 square feet
5. 4000-5000 square feet
6. Greater than 5000 square feet
98. Don't Know

29. Would you estimate the below-ground living space is about:

1. Less than 1,000 square feet
2. 1000-2000 square feet
3. 2000-3000 square feet
4. 3000-4000 square feet
5. 4000-5000 square feet
6. Greater than 5000 square feet
98. Don't know

12.1.2 Behavioral Modification Program Non-Participant Survey

1. Did you participate in any of the following [NAME OF EDC] residential energy saving programs in 2014 that could help save you money? These include:

		<u>Yes</u>	<u>No</u>	<u>DK</u>	<u>Refused</u>
a. CFL Retail Program	1	2	98	99	
b. Residential Energy Audit Program		1	2	98	99
c. Easy Cool Rewards Program		1	2	98	99
d. Energy Efficient Products Program		1	2	98	99
e. Appliance Turn-In Program		1	2	98	99
f. Community Connections Program		1	2	98	99
g. Home Energy Audit Program		1	2	98	99

2. Have you taken any of the following energy saving steps this year? Have you:

		<u>Yes</u>	<u>No</u>	<u>DK</u>	<u>Refused</u>
a. Purchased any CFLs		1	2	98	99
b. Added insulation to your home	1	2	98	99	
c. Tuned up your central AC system		1	2	98	99
d. Installed a high efficiency central AC system	1 2	98	99		
e. Installed a new high efficiency heat pump		1	2	98	99
f. Installed Energy Star windows	1	2	98	99	
g. Installed a programmable thermostat		1	2	98	99
h. Had a residential energy audit performed		1	2	98	99
i. Purchased Energy Star home appliances ⁶²		1	2	98	99

3. Have you taken any other energy saving steps this year?

1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY Q4 IF Q3 = 1]

4. Please describe what other energy saving steps you did this year.

5. Are you doing anything in particular this year to save energy in hot weather?

1. Yes
2. No
98. Don't know
99. Refused

[DISPLAY Q6 IF Q5 = 1]

⁶² Includes Energy Star rated clothes washers, refrigerators, room AC units, dehumidifiers as well as energy saving surge protectors and torchiere floor lamps.

6. What do you do? (Record verbatim response)
7. Are you doing anything in particular this year to save energy in cold weather?
1. Yes
 2. No
 98. Don't know
 99. Refused

[DISPLAY Q8 IF Q7 = 1]

8. What do you do? (Record verbatim response)

[DISPLAY Q9 IF ANY ACTIONS HAVE BEEN TAKEN; OTHERWISE SKIP TO Q11]

9. Have you noticed any savings on your electric bill since you made these changes?
1. Yes, my electric bill has decreased
 2. No, there does not seem to be a change in my electric bill
 3. Not sure or too soon to tell
 98. Don't know
 99. Refused

[DISPLAY Q10 IF Q9 = 1]

10. How satisfied are you with the savings you noticed on your electric bill since making these changes? Would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied, or Very Dissatisfied?
1. Very satisfied
 2. Somewhat satisfied
 3. Neither satisfied nor dissatisfied
 4. Somewhat dissatisfied
 5. Very dissatisfied
 98. Don't know
 99. Refused

I'd like to finish up by asking you some questions about your home.

11. Which of the following best describes your home? (Read list: options 01-07)
1. Single-family home, detached construction
 2. Single-family home, factory manufactured/modular
 3. Mobile home
 4. Row house
 5. Two or Three family attached residence
 6. Apartment with 4+ families Condominium
 97. Other (Specify)
 98. Don't Know
 99. Refused

12. Do you own or rent this residence?

- 1. Own
- 2. Rent
- 98. Don't Know
- 99. Refused

13. Approximately when was your home built? (Do not read response options)

- 1. Before 1960
- 2. 1960-1969
- 3. 1970-1979
- 4. 1980-1989
- 5. 1990-1999
- 6. 2000-2005
- 7. 2006 or Later
- 98. Don't know
- 99. Refused

14. Would you estimate the above-ground living space is about:

- 1. Less than 1,000 square feet
- 2. 1000-2000 square feet
- 3. 2000-3000 square feet
- 4. 3000-4000 square feet
- 5. 4000-5000 square feet
- 6. Greater than 5000 square feet
- 98. Don't know
- 99. Refused

15. Do you have any below-ground living space such as a converted basement?

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[DISPLAY Q16 IF Q15 = 1]

16. Would you estimate the below-ground living space is about:

1. Less than 1,000 square feet
2. 1000-2000 square feet
3. 2000-3000 square feet
4. 3000-4000 square feet
5. 4000-5000 square feet
6. Greater than 5000 square feet
98. Don't know
99. Refused

That's all the questions I have. Thank you for your [time](#). [Good bye](#).