Energy Efficient Homes Program
Evaluation, Measurement, and Verification Report
2017

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 2017, The Cleveland Electric Illuminating Company (CEI), Ohio Edison (OE), and The Toledo Edison Company (TE) (collectively "Companies") implemented the demand side management (DSM) Energy Efficient Homes 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 Energy Efficient Homes 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 (OH TRM)[1], State of Pennsylvania Energy Efficiency Technical Reference Manual (PA TRM)[2]. and ADM's previous experience performing EM&V activities for the Companies DSM programs.

This report describes the methodologies, procedures, and data tracking systems utilized to conduct program evaluation activities, including data gathering, sampling and analysis methods. Participation by subprogram and utility are detailed in Table 1-1.

Table 1-1: Program Participation by Measure and Utility

Subprogram	CEI	OE	TE	Participants
Audits	2,921	4,276	1,234	8,431
EE Kits	58,622	77,921	20,227	156,770
School Education	15,980	21,382	8,823	46,185
Behavioral	72,942	119,729	29,768	222,439
Total	150,465	223,308	60,052	433,825

Ex post electric savings were calculated through detailed analysis of program tracking data and participant survey data. ADM Associates, Inc. (ADM) conducted analyses of these data using technical reference manuals. ADM compared these results to the deemed savings values reported in the TRM. Per Ohio RC §4928.662, the methodology that generated higher energy savings was selected for each appliance category.

Annual *ex post* verified electric savings were 99,294,189 kWh (a realization rate of 103 percent). *Ex post* verified peak demand reduction was 12,868.95 kW (a realization rate of 110 percent).

[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.
[2] Pennsylvania Public Utility Commission, Technical Reference Manual 2016.

Detailed tables listing energy savings and demand reductions by subprogram can be found in Appendix A. *Ex post* gross energy savings (kWh) and peak demand reduction (kW) for the program in the three service territories are compared to ex ante estimates in Table 1-2.

Table 1-2: Overall Evaluation Results[3]

Subprogram	EDC	*Ex Ante* Savings		*Ex Post* Savings		RR	
		kWh	kW	kWh	kW	kWh	kW
Audits	CEI	774,065	175.26	1,062,426	175.26	137%	100%
Audits	OE	607,192	85.52	1,555,267	256.56	256%	300%
Audits	TE	197,440	24.68	448,830	74.04	227%	300%
Audits	**Total**	**1,578,697**	**285.46**	**3,066,523**	**506.86**	**194%**	**177%**
EE Kits	CEI	21,733,900	2,328.43	24,479,376	2,791.81	113%	120%
EE Kits	OE	29,942,910	3,238.15	33,288,445	3,829.05	111%	118%
EE Kits	TE	7,746,828	837.06	8,622,726	991.06	111%	118%
EE Kits	**Total**	**59,423,638**	**6,403.64**	**66,390,546**	**7,611.92**	**112%**	**119%**
School Education	CEI	5,606,180	586.34	4,307,091	456.91	77%	78%
School Education	OE	7,501,335	784.55	5,763,093	611.36	77%	78%
School Education	TE	3,095,327	323.73	2,378,064	252.27	77%	78%
School Education	**Total**	**16,202,843**	**1,694.62**	**12,448,248**	**1,320.54**	**77%**	**78%**
Behavioral	CEI	6,223,971	1,323.19	5,436,284	1,004.70	87%	76%
Behavioral	OE	11,372,700	1,743.95	10,695,632	2,181.19	94%	125%
Behavioral	TE	1,395,067	227.36	1,256,956	243.75	90%	107%
Behavioral	**Total**	**18,991,737**	**3,294.50**	**17,388,872**	**3,429.63**	**92%**	**104%**
Program Total		**96,196,915**	**11,678.22**	**99,294,189**	**12,868.95**	**103%**	**110%**

A comprehensive process evaluation was performed during the 2017 program year and the key findings can be found in the following subsections.

[3] All savings in this report are calculated at the retail level and do not include line losses.

2 Introduction and Purpose of Study

Under contract with the FirstEnergy's Ohio Utilities, The Cleveland Electric Illuminating Company (CEI), Ohio Edison Company (OE), and The Toledo Edison Company (TE) (collectively "Companies"), ADM Associates, Inc. (ADM) has performed evaluation, measurement, and verification (EM&V) activities to confirm the energy savings (kWh) and demand reduction (kW) achieved through the energy efficiency programs that the Company is implementing in Ohio in 2017. 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 program, as further described in subsequent sections, through the Energy Efficient Homes Program during 2017. Additionally, this report presents the results of the process evaluation of the program completed by ADM and Tetra Tech focusing on participant and program staff perspectives regarding the program's implementation.

Percent of Savings from Income Qualified Customers

Questions were added to the evaluation survey to assess low income participation in this program. The survey was administered so that the customer disclosed their annual income range from a series of categories. Customers also reported the number of occupants in the household. This information was used to support the determination of whether the household is above or below 150% of Federal Poverty Level (FPL). Respondents were classified as low-income-qualified if the stated incomes were below 150% of FPL (Table 2-1).

Table 2-1: 2018 Federal Poverty levels and 150% of the FPL

Persons in Household	2017 Federal Poverty Level	150% Federal Poverty Level
1	$12,060	$18,090
2	$16,240	$24,360
3	$20,420	$30,630
4	$24,600	$36,900
5	$28,780	$43,170
6	$32,960	$49,440
7	$37,140	$55,710
8	$41,320	$61,980

The RDD survey results were sorted by the number of people reported in each household and the household income ranges that fall below the 150% Federal Poverty Level shown in Table 2-1. For each of these groupings of occupants and incomes, ADM further broke

down the data by reported participants in each EDC by measure type. Once these counts of low income participants are calculated for each group. Table 2-1, they are summed up to get the number of low income participants in each EDC by measure type. Because the survey represents a statically valid sample for the program population we can use the percentages calculated from the numbers of low income participants relative to the number of participants in the entire survey, to assess the savings for low income participants in the program.

To calculate the savings for the low income portion of the program participants, the *ex post* energy and demand savings are multiplied by the percentage of low income participants by EDC.

3 Impact Evaluation Objectives

The primary deemed savings and/or engineering algorithm source for determining program impacts for the Energy Efficiency Homes Program was the OH TRM. The Pennsylvania TRM[4] (PA TRM) was used as a secondary calculation source for all measures not listed in the OH TRM. ADM Utilized the analysis of consumption data to estimate energy savings and demand impacts for the Audits & Education and Behavioral subprograms.

Per Ohio RC §4928.662, for all measure types listed in the OH TRM; all installation rates, deemed savings, and hours of use were calculated per the OH TRM ("Deemed"). In addition, ADM calculated gross savings for measures in the program with "as found" baseline conditions, hours of use, and installation rates. The values reported for both *ex ante* and *ex post* energy savings (kWh) and peak demand reduction (kW) represent the higher calculated value obtained from both methodologies.

The impact evaluation component of this report estimates annual gross energy savings (kWh) and peak demand reduction (kW) as framed by the following five research questions:

- How many customers participated in the program?
- How many and which measure types were installed through the program?
- What percentage of each measure type can be verified as installed?
- What are the kWh savings achieved by the program?
- What was the kW reduction achieved by the program?

The methodology used to address each of these questions is provided in detail in each subprogram chapter.

[4] PA 2016 Technical Reference Manual. http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx

4 Process Evaluation Objectives

The process evaluation is designed to research, and document, the program delivery mechanisms and collective experiences of program participants, partners and staff. ADM uses such information to assess if implementation strategies and/or program design could improve to better serve residential customers. Table 4-1 provides a summary of the research questions and corresponding data collection activities.

Table 4-1: Energy Efficient Homes Program Research Questions

Researchable Questions	Activity to Support the Question
Were there any significant program design changes? If so, what influenced the change(s) how did the change(s) impact the program?	■ Program staff interviews
Is the program being administered effectively in terms of program oversight, communication, staffing, training and/or reporting?	■ Program staff interviews
Is the program being implemented effectively in terms of the participation processes, application tools and marketing and outreach?	■ Program staff interviews ■ Participant survey
Were the program participants satisfied with their experiences?	■ Participant survey
What changes can be made to the program's design or delivery to improve its effectiveness in future program years?	■ Program staff interview ■ Participant survey

To address these researchable issues, ADM reviewed program documentation, administered program surveys and completed in-depth interviews with program staff and implementation partners. ADM began the process evaluation August of 2017 with the development of data collection instruments and a review of program documentation. Data collection and analysis occurred September 2017 through February 2018.

Program Documentation Review: Program materials are an important data source for the process evaluation. ADM began by requesting all available documentation for program staff. This list included any operating or process manuals, implementation contracts, resident and agency outreach and education materials, agency newsletters and the current price sheet.

Program Staff In-Depth Interviews: ADM researchers conducted in-depth interviews with key program staff that work with each subprogram. The objective of these interviews is to better understand program design objectives and delivery mechanisms, elicit feedback and suggestions for program improvements.

Participant Survey: ADM administered online surveys and contracted with VuPoint Research to administer phone surveys to customers that participated in the various Energy Efficient Homes sub-programs, and control group surveys where appropriate. Table 4-2 below provides a summary of 2017 survey activity and number of completes.

Table 4-2: Energy Efficient Homes Surveys – Number of Completes

Subprogram	Number of completes
Audits & Education	
Online Participant Survey	192
Online Control Group Survey	185
Telephone Participant Survey	30
Telephone Control Group Survey	62
School Education	
Parent/Participant Survey	210
Energy Efficiency Kits	
Participant Survey	210
Behavioral	
Participant Survey	215
Control Group Survey	81

5 Audits & Education

The purpose of this chapter is to present, in detail, the evaluation of the Audits & Education subprogram of the EE Homes program.

A total of 8,431 customers participated in the Audits & Education subprogram in 2017 as shown in Table 5-1. Of these customers, 86% conducted an online audit and 14% participated in telephone audits.

Table 5-1: Participation by Audit Type and EDC

EDC	Online	Telephone	Totals
CEI	2,547	374	2,921
OE	3,650	626	4,276
TE	1,084	150	1,234
Total Program	**7,281**	**1,150**	**8,431**

5.1 Description of the Audits & Education Subprogram

The Audits & Education subprogram, 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. 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 CSR 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 the 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.

5.2 Impact Evaluation Methodology

The impact evaluation addressed the following research questions.

- To what extent has the 2017 Audits & Education subprogram 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?

5.2.1 Data Cleaning and Quality Control

ADM checked, cleaned and incorporated the following data into the datasets used in the linear panel regression model:

- Monthly billing data provided by the Companies, for all treatment group participants

for the period January 1, 2017, through December 31, 2017.

- Customer data which included:
  - Premise ID
  - Premise address
  - Account ID
  - Monthly kWh consumption
  - Monthly billing end date
  - Monthly billing duration
- Audits & Education subprogram delivery data, which included the date each treatment group member received their first energy audit service.

ADM performed the following steps to prepare the data:

- Verified 2017 participants using the program delivery data.
- Merged the participant dataset with the raw billing data provided by the Companies.
- Cleaned the billing data of duplicate bills and information placed in the wrong columns.
- Removed nearly zero monthly consumption values.
- Assigned a single kWh value for each month for each Premise ID.
  - Monthly billing data is reported in inconsistent time periods, ADM uses the energy usages and time periods to assign a daily kWh value that was then averaged into a monthly kWh value.
- Filtered out statistical outliers by keeping premises where the average daily consumption values were larger than 3 kWh and less than twice of the standard deviation of the average daily consumption plus the mean of average daily consumption per month.
- Removed cross-participants from the dataset.

5.2.2 Linear Panel Regression Model

The linear panel regression model specified in the equation below was used to determine daily average energy (kWh) savings treatment group members in the Audits & Education subprogram.

$$AEC_{i,t} = \beta_1 Treat_{i,t} + E_{i,t}$$

Equation 5-1: Linear Panel Regression Model

Where:

Average Electricity Consumption ($AEC_{i,t}$): 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).

Treat: a dummy variable that is 0 if the customer is a member of the control group and a 1 if the customer is a member of the treatment group.

β_1: the kWh savings per premise per day if it is significant.

E_t: the error term.

5.2.3 Selection of the Control Group

There are traditionally two ways to select a control group for a linear regression analysis of behavioral types of programs, using a defined control group or treatment sites before they received the treatment. ADM investigated both methods for the 2017 analysis of the Audits & Education subprogram and was able to get a better representative control group using the later method. The following rules were used to create the average monthly usage curve 2017 Audits & Education subprogram control group:

For all treatment sites,

- If a month of the billing record is after the first month treatment occurred in that premise, then it is a treatment record;
- If the month of the billing record is earlier than the first month treatment occurred in that premise, then it is a control record.

This method resulted in thousands of treatment and control billing records per month for six to eight months of the 2017 calendar year. To test that this control group had both enough sites included and is representative of the treatment population ADM performed F-tests of variances. The test showed that at a 95% confidence interval the five months (June – October) of billing data did not have dissimilar variances. Visual verification of the treatment and control groups was also used in the decision to use this control group in the linear panel regression model.

5.2.4 Energy Savings and Peak Demand Reduction Analysis

ADM combined all the Audits & Education treatment participants and using the associated (pre-treatment) control group calculated the average daily savings for the period between June 1, 2017 through October 31, 2017. The program participation levels in 2017 did not allow for enough data to run statistically valid models for individual breakouts by EDC. ADM used the participant counts for each EDC and parts of the program to calculate the savings attributable to the subsets.

To calculate the energy savings for the other 7 months of the year not included in the model, ADM's Online Audit energy savings curve was used to allocate savings based on the relative monthly savings percentages relative to the 5 months used in the model. The result was an annual energy savings value. The same curve was used to calculate the coincidence factor of the peak demand period based on the OH TRM definition. The energy and demand savings for the Audits & Education subprogram was then broken out into the individual subsets for the report.

5.3 Detailed Impact Evaluation Findings

This section details the impact evaluation results for the 2017 Audits & Education subprogram. The liner regression model for the Audits & Education subprogram had a p-value = 0.00087 and showed an average daily savings 0.997 kWh. The energy savings for each subgroup of the Audits & Education subprogram are presented in Table 5-2 and Table 5-3.

Table 5-2: Ex Post kWh Savings per Participant[5]

CEI	**Totals**
kWh saved per participant	363.72
Number of participants	2,921
Total kWh saved	1,062,426
OE	**Totals**
kWh saved per participant	363.72
Number of participants	4,276
Total kWh saved	1,555,267
TE	**Totals**
kWh saved per participant	363.72
Number of participants	1,234
Total kWh saved	448,830
Combined Totals across Utilities	**Totals**
Number of participants	8,431
Total kWh saved	3,066,523

[5] *Ex post* savings were calculated for both audit types across all three EDCs because there were not enough participants by audit type to report statistically significant results.

Table 5-3: Ex Post kW Savings by Audit Type

CEI	Totals
kW reduction per participant	0.06
Number of participants	2,921
Total kW reduction	175.26
OE	**Totals**
kW reduction per participant	0.06
Number of participants	4,276
Total kW reduction	256.56
TE	**Totals**
kW reduction per participant	0.06
Number of participants	1,234
Total kW reduction	74.04
Combined Totals across Utilities	**Totals**
Number of participants	8,431
Total kW reduction	505.86

As shown in Table 5-4 verified *ex post* electric savings were 3,066,523 kWh for all home energy audits combined. Of the total kWh savings, 86% were from online audits and 14% were from telephone audits. Table 5-4 also shows that verified critical peak demand reduction was 505.86 kW.

Table 5-4: Ex Post kWh & kW

EDC, Audit Type	*Ex Ante* Savings		*Ex Post* Savings		RR	
	kWh	kW	kWh	kW	kWh	kW
CEI Online	674,955	152.82	926,395	152.82	137%	100%
CEI Telephone	99,110	22.44	136,031	22.44	137%	100%
ALL CEI	**774,065**	**175.26**	**1,062,426**	**175.26**	**137%**	**100%**
OE Online	518,300	73.00	1,327,578	219.00	256%	300%
OE Telephone	88,892	12.52	227,689	37.56	256%	300%
ALL OE	**607,192**	**85.12**	**1,555,267**	**256.56**	**256%**	**300%**
TE Online	173,440	21.68	394,272	65.04	227%	300%
TE Telephone	24,000	3.00	54,558	9.00	227%	300%
ALL TE	**197,440**	**24.68**	**448,830**	**74.04**	**227%**	**300%**
Total	**1,578,697**	**285.46**	**3,066,523**	**505.86**	**194%**	**177%**

5.4 Detailed Process Evaluation Findings

This section presents the findings of the process evaluation of the Energy Efficiency Kits subprogram.

Program Operations Perspective

The following section provides a detailed overview of the Audits & Education subprogram design and operational landscape, constructed through in-depth discussions with program staff and a review of the various documents used for customer outreach and education. This section will summarize key elements of program design, program management, marketing and outreach, project implementation, and quality control and verification.

Program Management and Staffing

The Companies' residential program manager is responsible for program implementation, general oversight and is the primary point of contact between the Companies and Aclara. The residential program manager addresses issues with implementation as they arise, as well as any general program issues related to program tracking and reporting. The program manager also provides guidance to the customer call center when necessary.

The Companies customer call center is responsible for resolving issues that result from customers using the Home Energy Analyzer tool, as well as performing customer phone audits. Aclara is responsible for hosting the online Home Energy Analyzer tool and does not play a role in the outreach and/or support of the program itself.

The program management team, consisting of the residential program manager, hosts a bi-weekly meeting to discuss topics related to program activity, progress towards goals, guideline interpretation and project-specific issues. In addition to the bi-weekly meeting, program staff, the customer call center and IT meet monthly to make sure everything is running smoothly, and issues are resolved in a timely fashion. Staff also email and speak on the phone as needed and in-between the regularly scheduled meetings. Program staff indicated the relationship and level of communication between the Companies' program manager, Aclara, the customer call center, and IT is strong, and adequately supports the administration needs of the program.

Marketing and Outreach

In 2017, the Companies kept marketing to a minimum for the Audits & Education subprogram. Postcards were distributed to: 1) customers who requested Efficiency Kits through the Energy Efficiency Kits subprogram, as well as 2) customers who attended public events throughout the year. The postcard directs customers to the Energy Save Ohio website[6], where they can access the Home Energy Analyzer tool in addition to

[6] Energysaveohio.com.

information regarding other rebate opportunities offered by the Companies. Staff indicated that the Audits & Education subprogram is often used as a channel to market other energy efficiency programs to residential customers.

Program Implementation and Participation Process

As part of the process evaluation, the evaluation team reviewed program processes, the audit tool, and the program website. The evaluation team also spoke with program staff regarding their perspectives on the 2017 program year, what went well and what could be improved upon.

In 2017, customers participated in the Audit & Education subprogram in one of two ways: (1) using a personal computer to access the online audit tool[7] on the Companies' website or (2) by phone with the assistance of a Customer Call Center. According to staff, customers typically became aware of the Home Energy Analyzer tool through the Energy Save Ohio website.

To access the audit tool the customer clicks the Home Energy Analyzer link. After entering their account number, they are brought to the tools' homepage or the energy dashboard where they can view their account summary, bill highlights, electricity costs by end use, and historical usage data. Once inside the Home Energy Analyzer, the customer can access energy savings tips through the "Ways to Save" page or the "Improve my Home" page. Each of these provides every savings tips for lighting, heating, cooling, and improving the home's thermal envelope.

Figure 5-1 below provides a screenshot of the "Improve My Home" page where end use modules can be chosen by the customer. Each module, if selected, will ask the customer a series of detailed questions about a wide variety of factors that impact the overall efficiency of the home. Each module provides the customer with information about no-cost, low cost and moderate cost improvements that pay for themselves through long-term cost savings realized through reduced consumption.

[7] The Home Energy Analyzer, developed by Aclara.

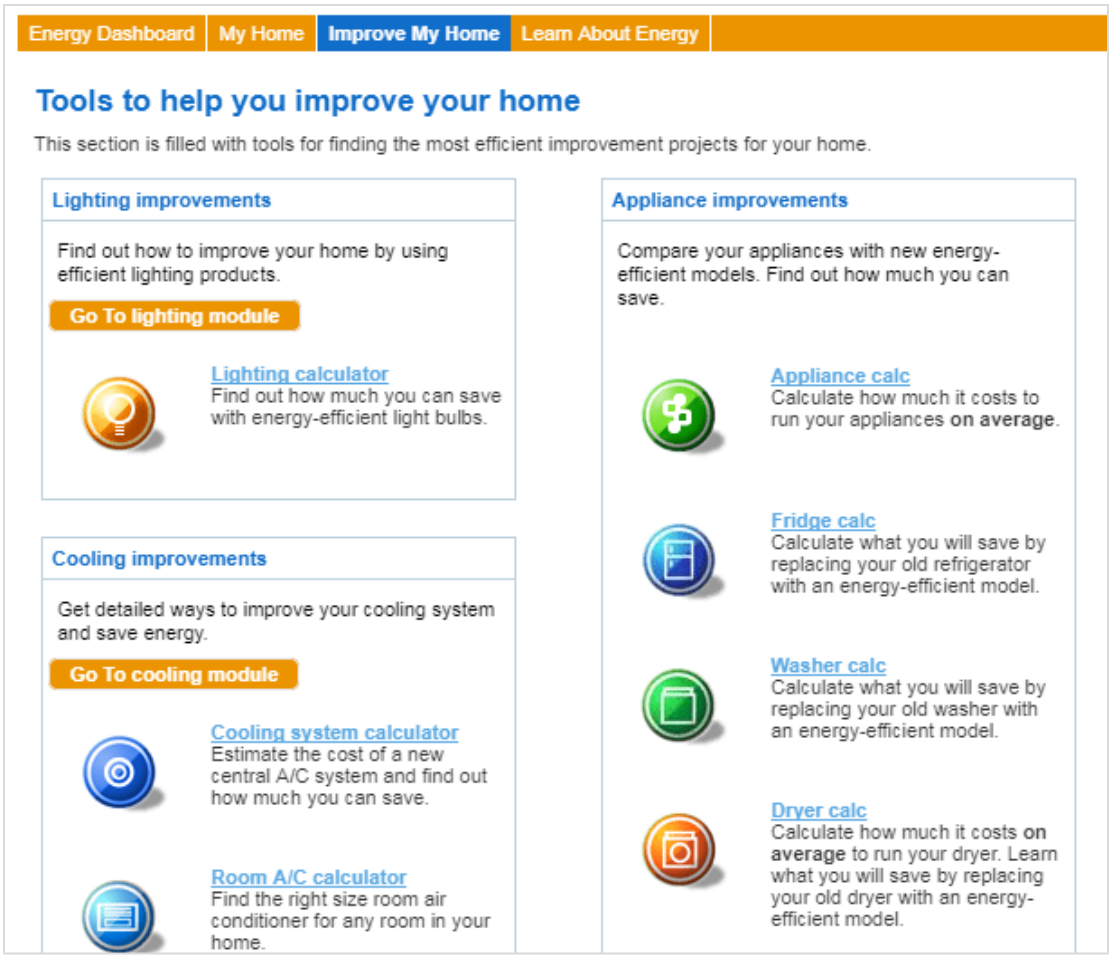


Figure 5-1: "Improve My Home" from the Home Energy Analyzer

According to staff, customers are also considered participants of the Audits & Education subprogram if they call into the Companies' customer call center to discuss issues, such as a high bill and receive energy savings tips. A customer service representative (CSR) will ask the customer questions about their home including size, ownership status, heating type, and usage patterns. The CSR may provide the customer with the top 3 energy users, tips for saving energy, a brochure about energy savings (shown in Figure 5-2), and/or a link to the Energy Save Ohio website. As part of the participant survey effort, ADM obtained feedback from customers who participated via the online tool and the customer call center, their collective feedback is summarized in the participant survey sections that follow.

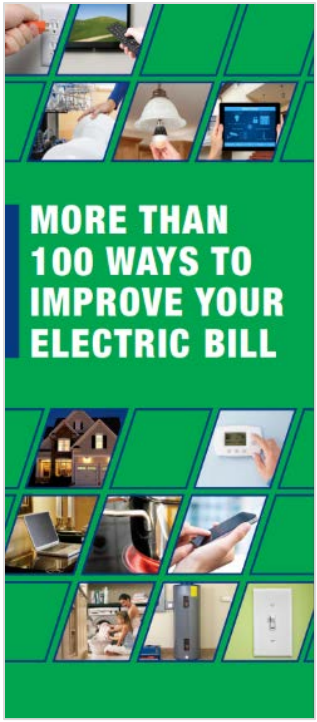


Figure 5-2: Energy Saving Brochure Provided to Customers

On a monthly basis, the residential program manager receives a report from IT that provides details on customers that accessed the Home Energy Analyzer, via the program website, and those that contacted the customer call center and received energy savings tips. Program staff upload the monthly participant data into program database, referred to internally as Vision. Overall, program staff indicated that the databases used to implement and track program activity are sufficient for the administering the Audits & Education subprogram.

Online Audits - Participant Survey Results

This section summarizes feedback received from a sample (192 responses) of customers that participated in the Audits & Education subprogram through the online Home Energy Analyzer tool, as well as a sample (185 responses) of nonparticipants (control group). The evaluation team administered online surveys to the participant group and contracted with VuPoint Research to conduct telephone surveys with the control group. The surveys collected data on program awareness and experience (participant group only), energy-savings behaviors and equipment installed, satisfaction (participant group only), and home characteristics.

The goal of having two groups (participants and control) for this survey was to have a separate control group to identify if there were any significant actions taken by those who received took an audit via the Home Energy Analyzer (participant group) and those who did not (control group).

Program Awareness and Experience

The majority (88%) of Audits & Education subprogram participants first learned about the Home Energy Analyzer via the Companies' website. Other sources of awareness include word-of-mouth (5%) and other methods (7%) not listed, email being mentioned most often. Figure 5-1 displays the results.

Table 5-5: Sources of Program Awareness

How did you first hear about the Home Energy Analyzer?	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
FirstEnergy Utility website	58	91%	53	83%	57	90%	168	88%
Word-of-Mouth	4	6%	3	5%	3	5%	10	5%
Other	2	3%	8	13%	3	5%	13	7%

Participants decided to complete an online audit for various reasons; most frequently mentioned was for the purposes of learning more about how their home uses energy (65%). Other reasons for completing an audit include concerns over a high bill (48%) and interest in Energy Efficiency (45%). Once inside the Home Energy Analyzer tool, 56% of respondents indicated they reviewed changes in the bill/usage over time. Forty-five percent were able to get detailed energy savings ideas, 41% were able to obtain information about their appliances energy use, and 21% obtained information about home weatherization measures.

Approximately half of the respondents reported that they completed the audit, while the other half either did not complete the audit or were unaware if they completed it. The feedback suggests that participants are accessing the tool but not exploring all of the content available. When asked why they stopped at the location they did, participants reported they either ran out of time (44%), were satisfied with the results (38%), or further improvements were out of budget (19%).

The Home Energy Analyzer is designed to provide customers with detailed energy savings suggestions. Seventy-two percent of participants reported receiving suggestions that involve no-cost/low-cost ways to save energy immediately, 36% received suggestions that involved ways to save energy that require investment but will pay off, and 20% received suggestions that involved ways to save energy that would not be cos-justified. Table 5-6 below summarizes the results.

Table 5-6: Energy Savings Suggestions Provided by Home Energy Analyzer

What kind of detailed energy saving suggestions did you receive?	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
No-cost /low-cost ways to save energy immediately	46	75%	45	70%	45	71%	136	72%
Ways to save requiring investment but will pay off	18	30%	26	41%	24	38%	68	36%
Ways to save that would not be cost-justified	15	25%	13	20%	10	16%	38	20%
Other	6	10%	5	8%	6	10%	17	9%

The majority of participants (58%) rated the information provided by the Home Energy Analyzer as somewhat helpful; the distribution of total responses is displayed in Figure 5-3 below. The majority of open-ended feedback was positive; customers thought the most helpful aspects of the tool were the simple ways to save energy in your home, the comparison of their home's energy use to those of an average home of the same size, and the breakdown of which appliances use the most energy and historical usage information.

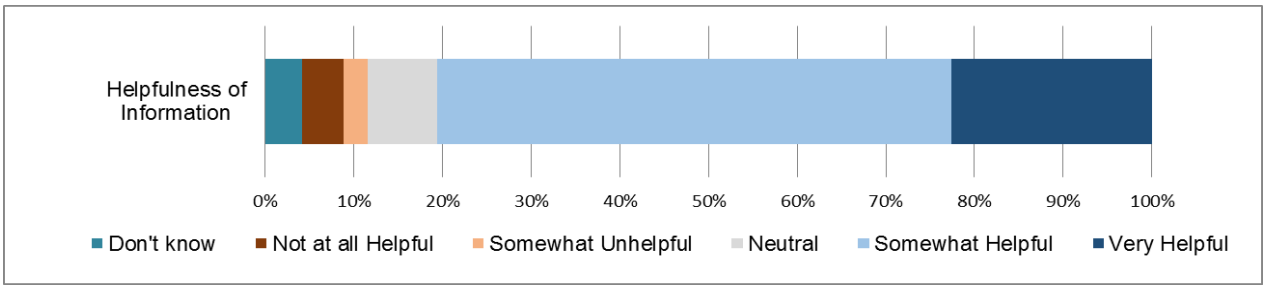


Figure 5-3: Helpfulness of Information Provided by Home Energy Analyzer

Energy Savings Actions

Participants provided feedback regarding what energy-savings actions they were able to take as a result of using the Home Energy Analyzer. Approximately half of the respondents made behavioral changes, while 23% made no change. Eleven percent made a structural change such as an appliance/equipment upgrade, and 10% made both structural and behavioral changes. Of those that made a structural change, 59% indicated they upgraded an appliance (n = 23), while 49% upgraded lighting (n = 19), and 15% upgraded their HVAC system (n = 6). Five percent upgraded their hot water heater, Figure 5-4 displays the results. Of those that upgraded appliances/equipment, 92% indicated they were still installed and 95% indicated they were either somewhat satisfied or very satisfied with their new appliances/equipment.

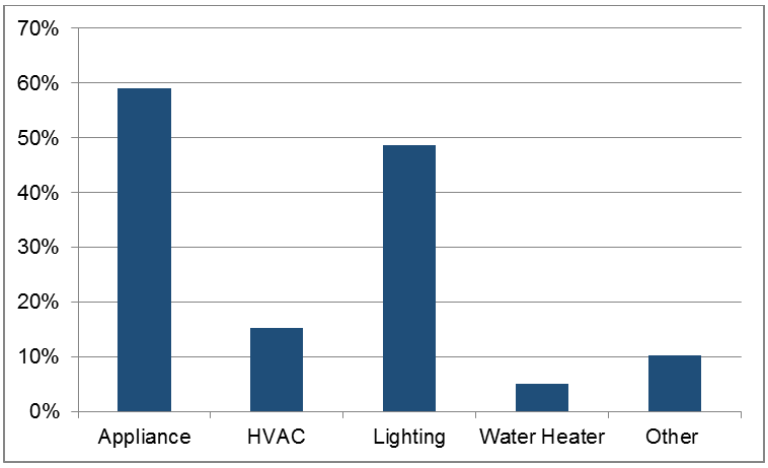


Figure 5-4: Structural Changes Made by Participants

Program non-participants that responded to the control group survey also provided feedback on structural changes they made in 2017. Most frequently mentioned was high-efficiency lighting by 78% of respondents, followed by HVAC tune-ups (31%) and insulation (20%).

The most frequent behavioral change program participants made after using the Home Energy Analyzer tool was they turned off lights when they were not in use (88%), followed by lowering the heating temperature on the thermostat during winter months (72%), and used a ceiling fan instead of an air conditioner to keep cool (38%). Figure 5-5 displays the distribution of responses.

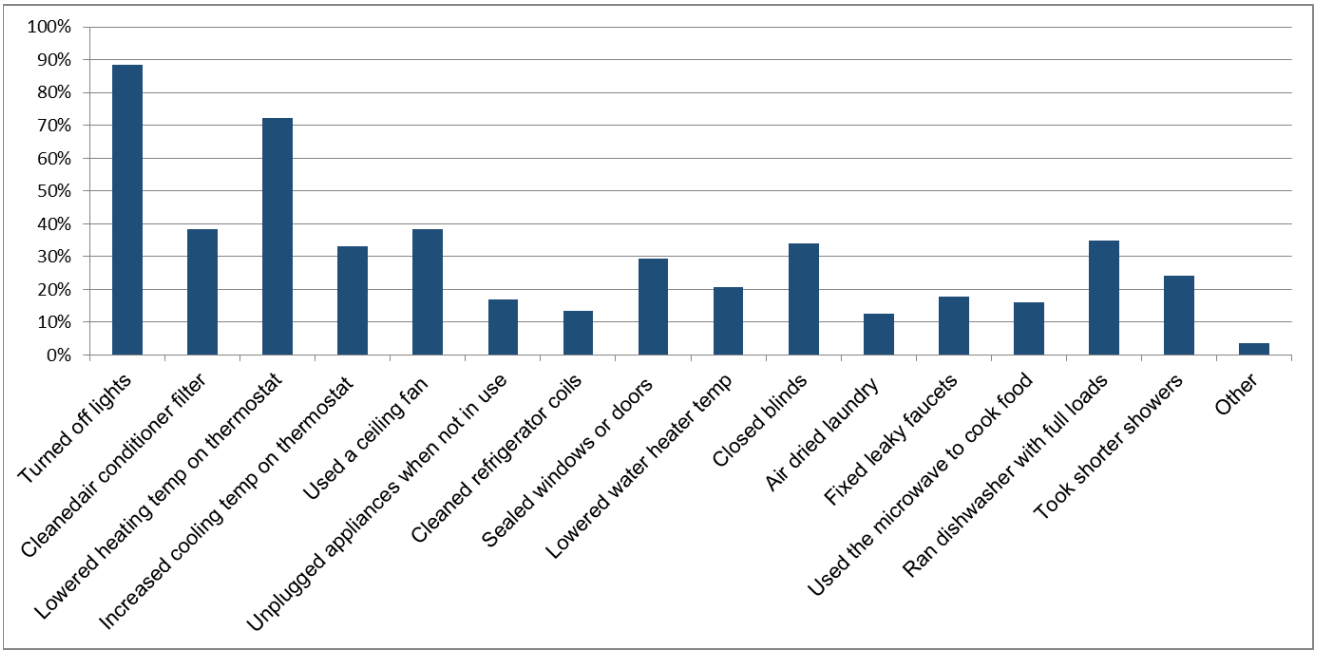


Figure 5-5: Behavioral Changes Made by Participants

Participants commented on whether their actions change based on weather conditions being hot or cold. Forty-seven percent of participant survey respondents indicated they do things differently in hot weather, as compared to 34% of control group survey respondents, Figure 5-6 displays the results. Both participant survey respondents and control group survey respondents indicated that they close blinds to avoid direct sunlight, utilize fans as often as possible and increase thermostat settings.

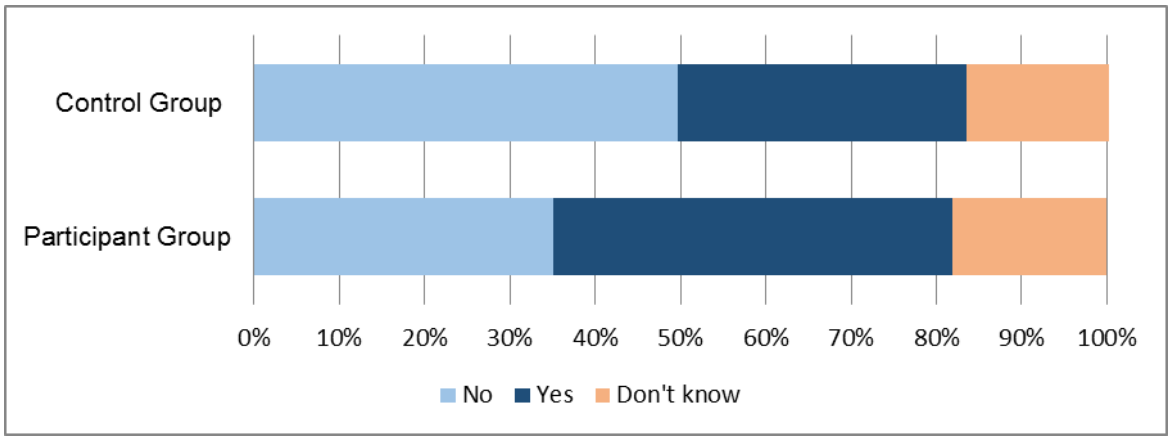


Figure 5-6: Do You Change Energy Use Behavior in Hot Weather

Sixty-seven percent of participant survey respondents indicated they do things differently in cold weather, as compared to 46% of control group survey respondents, Figure 5-7 displays the results. Both participant survey respondents and control group survey respondents indicated that they turn down the thermostat, weatherize windows and doors, and wear more clothing during the day and blankets at night.

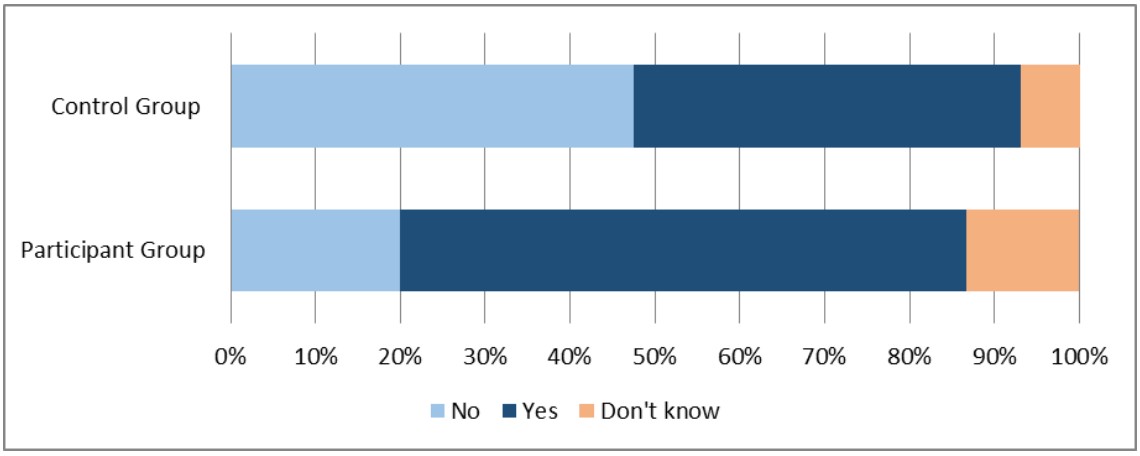


Figure 5-7: Do You Change Energy Use Behavior in Cold Weather

Survey respondents provided feedback on whether or not they've noticed savings on their electric bills since they made the behavioral changes. Thirty-five percent said they have noticed a decrease in their electric bill, 31% have not, and 31% indicated it was too soon to tell. Control group responses aligned with participant responses to this question.

Program Satisfaction

Respondents provided feedback on their satisfaction with energy savings on their electric bill and with the program overall. Of those that noticed savings on their electric bill (n = 20), 63% were somewhat satisfied and 38% were very satisfied. Regarding participants' overall satisfaction with the program, 42% were somewhat satisfied and 31% were very satisfied, 15% were neutral and 12% expressed some level of dissatisfaction.

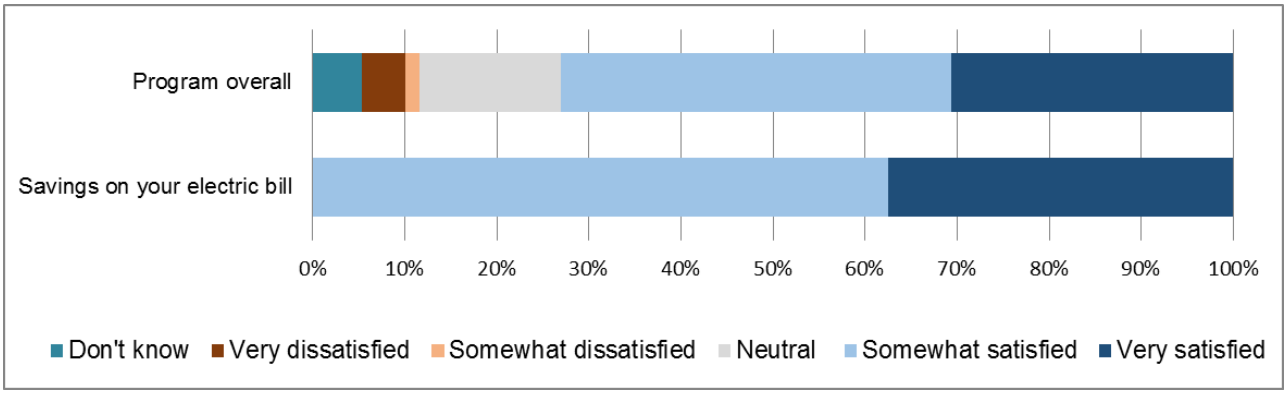


Figure 5-8: Program Satisfaction

Home Characteristics

Both the participant group and control group provided feedback regarding their homes' characteristics. The majority of participant survey respondents (59%) and control group survey respondents (77%) described their homes as single-family, detached. The control group respondents (81%) represented slighting more homeowners, than renters as compared to the participant group respondents (61%). The ages of the homes for both groups were similar with 38% of participants and 29% non-participant indicating they their homes were built before 1960. Also, approximately half the homes, from each group, were between 1,000 – 2,000 square feet. Table 5-7 summarizes all the results mentioned above.

Table 5-7: Home Characteristics

Home Characteristics	Participant Group	Control Group
Single-family home, detached	59%	77%
Single-family home, manufactured	3%	1%
Mobile home	3%	3%
Row house	1%	1%
Two or Three family attached residence	10%	3%
Apartment with 4+ families	12%	7%
Condominium	7%	4%
Other (Specify)	5%	4%
Don't know/Refused	0%	0%
Own or Rent		
Own	61%	81%
Rent	37%	18%
Don't know/Refused	2%	2%
Year Build		
Before 1960	38%	29%
1960-1969	11%	5%
1970-1979	15%	20%
1980-1989	8%	7%
1990-1999	8%	13%
2000-2005	5%	7%
2006 or Later	6%	7%
Don't know/Refused	8%	13%
Above Ground Living Space		
Less than 1,000 square feet	19%	12%
1,000-2,000 square feet	53%	52%
2,000-3,000 square feet	18%	22%
3,000-4,000 square feet	3%	5%
4,000-5,000 square feet	1%	3%
Greater than 5,000 square feet	1%	1%
Don't know/Refused	6%	6%

Telephone Audits - Participant Survey Results

This section summarizes feedback received from a sample (30 responses) of customers that participated in the Audits & Education subprogram through the Companies' customer call center, as well as a sample (62 responses) of nonparticipants (control group). ADM contracted with VuPoint Research to administer telephone surveys to both groups. The surveys collected data on the motivation for reaching out to the Companies customer call center, their experience with the customer service representative (participant group only), energy-savings behaviors and equipment installed, satisfaction (participant group only), and home characteristics.

The goal of having two groups (participants and control) for this survey was to have a separate control group to identify if there were any significant energy savings actions taken by those who spoke with the customer call center (participant group) and those who did not (control group).

Participants discussed the initial reason they reached out to the customer call center. Seventy-two percent of participants reached out because of a high-bill complaint; the complete distribution of responses is displayed in Figure 5-9 below.

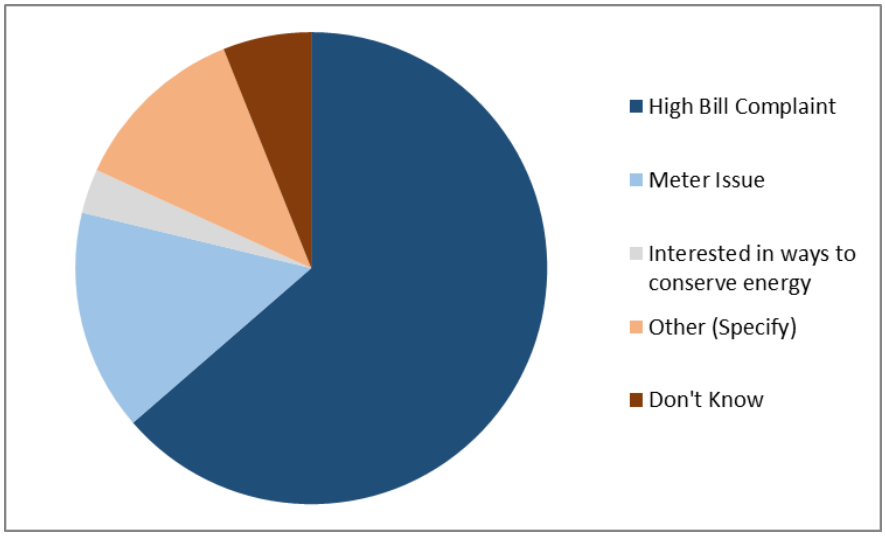


Figure 5-9: Reasons for Contacting Customer Call Center

Customers provided feedback regarding what they discussed with the customer service representative. Forty-one percent of respondents indicated they reviewed changes to their bill/usage over time, 34% discussed their home appliances, and 17% of participants were offered literature about saving energy at home. The other topics most frequently mentioned by customers are payment plan and budget billing. Sixty-two percent of participants thought the information provided by the customer service center was either somewhat helpful or very helpful.

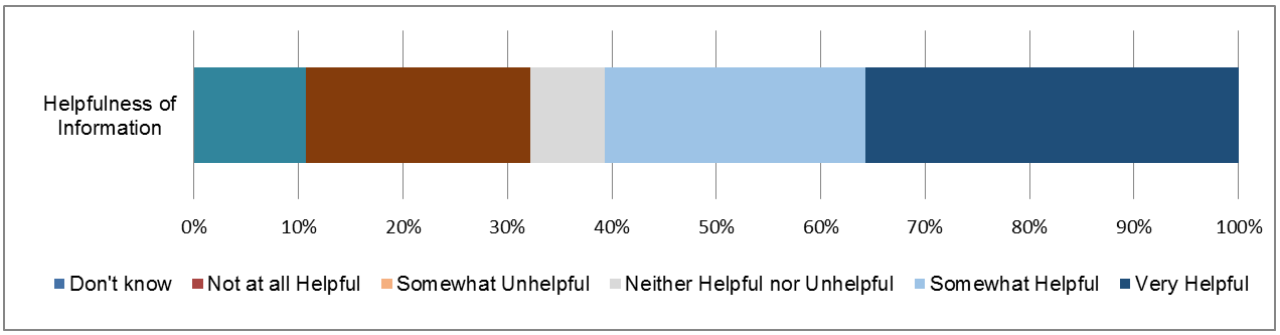


Figure 5-10: Helpfulness of Information Provided

As a means for follow up, customer service representatives may send customers a brochure with energy savings tips and/or a link to the online Home Energy Analyzer tool. Seventy-two percent of respondents indicated they did not receive anything, 21% indicated they received an energy savings brochure. Of those that received the energy savings tips (6 customers), 60% rated them as either somewhat helpful or very helpful.

After the call is complete, the customer may decide to make some sort of structural or behavioral change in an effort to conserve energy; an example of a structural change is the purchase of a more-efficient appliance or high-efficiency light bulbs. Behavioral changes are actions taken to conserve energy such as turning off lights or adjusting the thermostat. Just over half of the customers (55%) that called the Companies' call center reported they made no changes after the call, 21% made behavioral changes, 10% made structural changes, and 14% were unable to answer.

Of those that made behavioral changes (n = 6), half noted that they turned off the lights more frequently, 17% said they unplugged appliances when not in use, and the remaining respondents indicated they adjusted the thermostat and did laundry during off-peak hours. Sixty-seven percent (n = 4) of those that made behavioral changes, noted that they did things differently in hot weather, turned on fans instead of turning on the air conditioner was the most frequent behavioral changed mentioned by customers. Thirty-three percent (n=2) of those that made behavioral changes, noted that they did things different in cold weather, lowered thermostat setting was mentioned by customers. Eight-three percent stated that the behavior was still in practice.

Of those that made structural changes (n = 5), the most frequent change mentioned by customers was an appliance upgrade (40%), followed by lighting (20%), water heating (20%), and septic system (20%)[8]. All customers indicated that the upgraded measures are still installed and operating, and all are very satisfied with the structural upgrade they made.

[8] Customer could choose more than one option; therefore, the total percent may exceed 100%.

Of the participants that did make changes to conserve energy, one-third said their electric bill decreased, one-third said it was too soon to tell, 17% did not notice a change in their bill, and 17% did not know. All of the participants that noticed a change in their bill were very satisfied.

Home Characteristics

Both the participant group and control group provided feedback regarding their homes' characteristics. The majority of participant survey respondents (49%) and control group survey respondents (79%) described their homes as single-family, detached. The control group respondents (79%) represented slightly more homeowners than renters as compared to the participant group respondents (50%). The ages of the homes for both groups were similar with 32% of participants and 27% non-participant indicating they their homes were built before 1960. Also, approximately half the homes, from each group, were between 1,000 – 3,000 square feet. Table 5-8 summarizes all the results mentioned above.

Table 5-8: Home Characteristics

Home Characteristics	Participant Group	Control Group
Single-family home, detached	48%	79%
Single-family home, manufactured	7%	3%
Mobile home	7%	0%
Row house	3%	0%
Two or Three family attached residence	14%	3%
Apartment with 4+ families	10%	2%
Condominium	0%	3%
Other/Don't Know	10%	2%
Don't Know/Refused	0%	8%
Own or Rent		
Own	50%	79%
Rent	43%	16%
Don't Know/Refused	7%	5%
Year Build		
Before 1960	32%	27%
1960-1969	10%	6%
1970-1979	13%	15%
1980-1989	10%	8%
1990-1999	3%	10%
2000-2005	0%	8%
2006 or Later	10%	10%
Don't Know/Refused	16%	16%
Above Ground Living Space		
Less than 1,000 square feet	10%	8%
1,000-2,000 square feet	34%	42%
2,000-3,000 square feet	14%	23%
3,000-4,000 square feet	3%	10%
4,000-5,000 square feet	0%	2%
Greater than 5,000 square feet	0%	5%
Don't Know/Refused	38%	11%

6 Energy Efficiency Kits

The purpose of this chapter is to present the results of the Energy Efficiency Kits subprogram impact and process evaluations. The objective was to verify the energy savings and peak demand reduction achieved during the 2017 program year.

6.1 Description of the Energy Efficiency Kits Subprogram

The Energy Efficiency Kit subprogram 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.

The Companies contracted with Power Direct to deliver the Energy Efficiency Kits subprogram. Energy Efficiency Kits are provided to customers upon request, and the contents of kits vary slightly depending on the customers' water heating fuel source.[9] Participants receive measure descriptions and installation guidelines with their kits and can choose which measures to install. The energy efficiency 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 Efficiency Kit subprogram requires customers to request kits via the electronic application on OhioEnergyKit.com 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 Plan. Kits are typically shipped to customers within a few weeks of the request date. The energy efficiency kits include a help line telephone number that allows participants to report measure defects or ask questions regarding the program and specific measures.

[9] Customers that state that they have an electric water heater receives an electric residential kit while customers stating they do not have an electric water heater receive a standard residential kit.

The residential kit includes the following measures:

Table 6-1: Contents of Kit by Measure Type

Measures	All Electric	All Standard
3-Way CFL bulb	1	1
15W LED bulb	1	1
9W LED bulb	3	3
LED night light	2	3
Furnace Whistle	1	1
Swivel Faucet Aerator	1	
Low Flow Showerhead	1	

The total number of kits distributed by the Companies in 2017 by type and operating company is shown in Table 6-2[10].

Table 6-2: Count of Kit Types Delivered by Operating Company

Kit Type	Operating Company			
	CEI	OE	TE	Total
Electric	13,215	24,412	6,169	43,796
Standard	45,407	53,509	14,058	112,974
Total	**58,622**	**77,921**	**20,227**	**156,770**

6.1.1 Sampling Plan

ADM completed a census review of all measures listed in the tracking system to ensure there were no date entry error or duplicate entries.

The sample size for the follow-up surveys in each service territory achieved a relative precision of ± 10% at the 90% confidence interval. The sample size calculation for achieving 90% confidence with 10% precision is shown in the formula below.

$$n_0 = \frac{N \times \frac{1}{4}}{(N-1) \times \frac{D^2}{Z^2_{\alpha/2}}}$$

Equation 6-1: Minimum Sample Size Formula for 90 percent Confidence

Where:

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

n_0 = Minimum sample size
N = Population size, assumed to be 100,000 or greater
$Z\alpha/2$ = Z value at 90% confidence interval, 1.645
¼ = The maximum value of p(1-p) at p=1/2, a conservative estimate for sample size
D = Relative Precision (0.10)

ADM surveyed 241 residential kits survey customers with respondents across the various EDC. There were three survey efforts, one during the program year and two during the first quarter of 2018.

The sample sizes for each audit method meet the requirement for ±10 percent precision Table 6-3.

Table 6-3: Sampling Plan 2017 Residential Kits Participants

EDC	Sampling Proportion	Sample Size Residential Kits
CEI	0.35	n = 84
OE	0.35	n = 84
TE	0.30	n = 73
Total	1	n = 241

6.1.2 Energy Savings and Peak Demand Reduction Calculations

Data Collection

ADM audited a census of the Energy Efficiency 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 Efficiency Kits are shown in Table 6-4.

Table 6-4: Ex Ante Annual kWh & kW per Unit

EDC	Kit Type	*Ex Ante* kWh	*Ex Ante* kW
CEI	Electric	489.99	0.056
	Standard	336.05	0.035
OE	Electric	489.99	0.056
	Standard	336.05	0.035
TE	Electric	489.99	0.056
	Standard	336.05	0.035

Customer Survey

Data for the sample of conservation kits participants were collected through a telephone survey. The survey was distributed to determine measure specific installations, bulb quantities by room type. This data was used to calculate ISRs, HOU, and coincidence factors for peak demand.

The primary deemed savings and/or engineering algorithm source for determining program impacts was the OH TRM. The PA TRM was used as a secondary calculation source for all measures not listed in the OH TRM.

Per Ohio RC §4928.662, for all measure types listed in the OH TRM; all installation rates, deemed savings, and hours of use were calculated per the OH TRM ("Deemed"). In addition, ADM calculated gross savings for measures in the program with "as found" baseline conditions, hours of use, and installation rates. The values reported for both *ex ante* and *ex post* energy savings (kWh) and peak demand reduction (kW) represent the higher calculated value obtained from both methodologies.

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 6-5.

Table 6-5: Analysis Source

Measure Type	Source for Analysis Method
9W LED	PA TRM
11W LED	PA TRM
15W LED	PA TRM
3 Way CFL	OH TRM
3 Way LED	PA TRM
LED Night Lights	PA TRM
Furnace Whistle	PA TRM
Aerators	PA TRM
Showerhead	OH TRM

Detailed below are the analysis methods used to calculate kWh and kW savings for the measures included in the Energy Efficiency Kits.

Furnace Whistles

The OH TRM does not specify an algorithm for furnace whistles, so energy savings are calculated using the PA TRM algorithm as follows:

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

Equation 6-2: Furnace Whistle Calculation of Energy Savings

Where:

MkW = Average motor full load electric demand (kW)

= 0.5 kW

EFLH = Estimated Full Load Hours (Heating and Cooling) [11]

= Will be taken from OH TRM

EI = Efficiency Improvement

=15%

ISR = In-service Rate[12]

According to the PA TRM, there is no measurable peak demand savings attributed to furnace whistles.

LED Nightlights

The OH TRM does not specify an algorithm for LED night lights, so energy savings will be calculated using the PA TRM algorithm as follows:

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

Equation 6-3: LED Nightlights Calculation of Energy Savings

Where:

$Watts_{base}$ = Wattage of baseline nightlight

$Watts_{NL}$ = Wattage of LED nightlight

NL_{hours} = Average hours of use per day per Nightlight

ISR = In-service rate[13]

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

LED Bulbs

The OH TRM does not specify an algorithm for LED bulbs, so energy savings will be calculated using the PA TRM algorithm as follows:

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

[12] This rate will be determined by ADM through participant surveys.

[13] This rate will be determined by ADM through participant surveys.

$$\Delta kWh = \frac{Watts_{base} - Watts_{EE}}{1000} * HOU * (1 + IE_{kWh}) * 365.25 * ISR$$

Equation 6-4: LED Bulb Calculation of Energy Savings

Where:

$Watts_{Base}$ = Wattage of baseline equipment

$Watts_{EE}$ = Wattage of efficient equipment

HOU = Average hours of use per day

IE_{kWh} = HVAC Interactive effect

ISR = In-service Rate[14]

$$\Delta kW = \frac{Watts_{base} - Watts_{EE}}{1000} * CF * (1 + IE_{kW}) * ISR$$

Equation 6-5: LED Bulb Calculation of Peak Demand Savings

Where:

CF = Demand coincidence factor

IE_{kW} = HVAC Interactive effect

3-Way CFL

Savings algorithms were taken from the OH TRM.

$$\Delta kWh = \frac{\Delta Watts}{1000} * HOU * (1 + IE_{kWh}) * 365.25 * ISR$$

Equation 6-6: 3-Way CFL Bulb Calculation of Energy Savings

Where:

ΔWatts = Compact Fluorescent Watts * 3.25

HOU = Average hours of use per day = 2.85

IE_{kWh} = HVAC Interactive effect

ISR = In-service Rate = 0.86

$$\Delta kW = \frac{\Delta Watts}{1000} * (1 + IE_{kW}) * CF * ISR$$

Equation 6-7: 3-Way CFL Bulb Calculation of Peak Demand Savings

Where:

IE_{kW} = HVAC Interactive effect

[14] This rate will be determined by ADM through participant surveys.

CF = *Summer Peak Coincidence Factor = 0.11*

Low Flow Showerhead

Savings algorithms were taken from the OH TRM.

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

Equation 6-8: Low Flow Showerhead Calculation of Energy Savings

Where:

GPM_{base} = Gallons per minute of baseline showerhead = 2.87

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

ISR = In Service Rate = 0.81

$kWh/GPM_{reduced}$ = Assumed kWh savings per GPM Reduction

$$\Delta kW = \Delta kWh * 0.000112$$

Equation 6-9: Low Flow Showerhead Calculation of Peak Demand Savings

Faucet Aerator

The OH TRM does not specify an algorithm for Faucet Aerators, so energy savings will be calculated using the PA TRM algorithm as follows:

$\Delta\, kWh/yr$

$$= ISR \times ELEC \times \left[\frac{(GPM_{base} - GPM_{low}) \times T_{person/day} \times N_{persons} \times 365\frac{days}{yr} \times DF \times (T_{out} - T_{in}) \times 8.3\frac{Btu}{gal \cdot °F}}{\#_{faucets} \times 3412\frac{Btu}{kWh} \times RE}\right]$$

Equation 6-10: Faucet Aerator Calculation of Energy Savings

Where:

GPM_{base} = Gallons per minute of baseline showerhead = 2.2

GPM_{low} = Gallons per minute of low flow showerhead = 1.5

$T_{person/day}$ = Average time of hot water usage per person per day

$N_{persons}$ = Average number of person per home

DF = Percentage of water flowing down drain

T_{out} = Average mixed water temp flowing from faucet

T_{in} = Average mixed water temp entering home = 55

$\#_{faucets}$ = Average number of faucets in home

RE = Recovery efficiency of electric water heater

$$\Delta kW_{peak} = \Delta\, kWh/yr \times ETDF$$

Equation 6-11: Faucet Aerator Calculation of Peak Demand Savings

Where:

ETDF = *CF/HOU*

$$CF = \frac{\%_{faucet\ use,peak} \times \mathrm{T}_{\mathrm{person/day}} \times \mathrm{N}_{\mathrm{persons}}}{\#_{\mathrm{faucets}} \times 240 \frac{minutes}{daily\ peak}}$$

$$HOU = \frac{\mathrm{T}_{\mathrm{person/day}} \times \mathrm{N}_{\mathrm{persons}} \times 365 \frac{days}{yr}}{\#_{\mathrm{faucets}} \times 60 \frac{minutes}{hour}}$$

6.1.3 Detailed Impact Evaluation Findings

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

The 2017 evaluation results for estimated gross kWh energy savings and kW peak demand reductions for the Energy Efficiency Kits subprogram in the Companies' service territories are summarized in Table 6-6. The subprogram level kWh realization rate is 112% and kW is 119%

The variation in the *ex ante* and *ex post* savings calculation was primarily caused by the LED ISRs and allocation of LED bulb quantities by room type. The *ex ante* estimate used a deemed ISR of 92 % from the PA TRM while the ex post relied on data collected though the evaluation surveying efforts. The *ex ante* input for hours of use was the deemed hours of use from the OH TRM. The ex post input for hours of use was calculated by allocating the percentage of installation by specific room type and assigning hours use by room type from the PA TRM.

The *ex post* analysis ISRs from the 2017 surveying effort are reported in Table 6-6.

Table 6-6: Ex Post Annual kWh Savings by Kit Type

EDC	Kit Type	*Ex Ante* kWh	*Ex Post* kWh	Realization Rate
CEI	Electric	6,475,181	6,639,911	103%
	Standard	15,258,719	17,839,465	117%
	Total	**21,733,900**	**24,479,376**	**113%**
OE	Electric	11,961,567	12,265,872	103%
	Standard	17,981,342	21,022,572	117%
	Total	**29,942,910**	**33,288,445**	**111%**
TE	Electric	3,022,731	3,099,630	103%
	Standard	4,724,097	5,523,096	117%
	Total	**7,746,828**	**8,622,726**	**111%**
Grand Total		**59,423,638**	**66,390,546**	**112%**

Table 6-7 below shows the *ex post* Annual kW demand savings by kit type for each EDC.

Table 6-7: Ex Post Annual kW Reduction by Kit Type

EDC	Kit Type	*Ex Ante* kW	*Ex Post* kW	Realization Rate
CEI	Electric	738.96	805.99	109%
	Standard	1,589.47	1,985.83	125%
	Total	**2,328.43**	**2,791.81**	**120%**
OE	Electric	1,365.07	1,488.89	109%
	Standard	1,873.08	2,340.16	125%
	Total	**3,238.15**	**3,829.05**	**118%**
TE	Electric	344.96	376.25	109%
	Standard	492.10	614.81	125%
	Total	**837.06**	**991.06**	**118%**
Grand Total		**6,403.64**	**7,611.92**	**119%**

In Service Rates

The residential kit ISR, as determined from the participant survey, for each measure in the Energy Efficiency Kit as shown in Table 6-8.

Table 6-8: Impact Evaluation ISRs Determined by Survey (Residential Kits)

Measure	N	Measure In-Service Rate (ISR)
9W LED	226	76%
15W LED	225	69%
3 Way CFL	217	86%[15]
LED Night Lights (2)	219	84%
Furnace Whistle	197	14%
Faucet Aerator (2)	221	13%
Showerhead (3)	60	51%

6.1.4 Detailed Process Evaluation Findings

This section presents the findings of the process evaluation of the Energy Efficiency Kits subprogram.

Program Operations Perspective

The following section provides an overview of the Energy Efficiency Kits subprogram's operations constructed through in-depth discussions with program staff. The interviews addressed topics such as staff roles and responsibilities, 2017 program operations and changes, marketing and outreach, as well as communication between the Companies and program implementation contractor, Power Direct.

Roles and Responsibilities

Program staff explained each of their roles and responsibilities as it relates to the program. The Companies' program manager works as the single point of contact between the Companies and the implementation contractor. The program manager is responsible for overseeing implementation and providing guidance on program delivery and issue resolution, as needed. Throughout the program year, the program manager tracks program performance to goal and maintains internal program reporting to ensure key program metrics are distributed among upper management and implementation.

ADM spoke with the Power Direct program manager as well. Power Direct is responsible for generating program awareness, managing kit enrollment and fulfillment, and program reporting. The program manager is the liaison between the Companies and Power Direct internal operations. The Power Direct program manager also ensures that goals are being met, confirms inventory, and approves marketing as well as the distribution of the marketing materials, as necessary. Power Direct contracts with a third-party call center to manage the enrollment process. Once a participant is enrolled in the program, Power

[15] OH TRM.

Direct ensures kits are properly assembled at the Ohio warehouse and tracks kit delivery.

Program Design

The Energy Efficiency kit includes:

- One 3-Way CFL Bulb
- Three 9-Watt LED Bulbs
- One 11-watt LED Bulb
- One 15-Watt LED Bulb
- Two LED Night Lights
- One Furnace Whistle

If customers stated that they have an electric water heater then they receive two additional measures.

- One Low Flow Showerhead
- One Low Flow Faucet Aerator

In 2017, the program also updated some of the marketing material; including a referral insert (Figure 6-2) encouraging participants to tell family and friends about the program.

Marketing

Power Direct program staff reported that the Residential Kit subprogram's successful performance was due to an aggressive outreach campaign in 2017. Program staff also noted that the program was cross promoted through other Energy Efficient Homes subprograms including through the HERs for the Behavioral subprogram. Program staff indicated that program cross-promotion is a marketing strategy Power Direct would like to continue to explore because if a customer participates in another program it may increase the likelihood of ordering a residential kit.

The HERs distributed to homeowners includes information on how to request a kit via the program website. Figure 6-1 provides a screenshot of the Residential Kits add placed in the Home Energy Report.

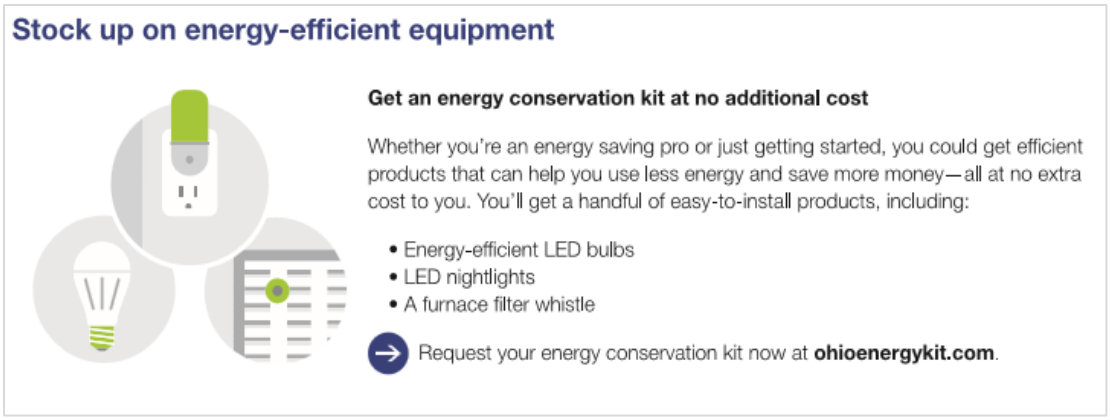


Figure 6-1: Oracle HERS Kit Referral

Power Direct Staff noted that the program added a referral slip to the HERS kit contents as a way to encourage the participant to refer family and friends. Figure 6-2 provides a screenshot of the insert.

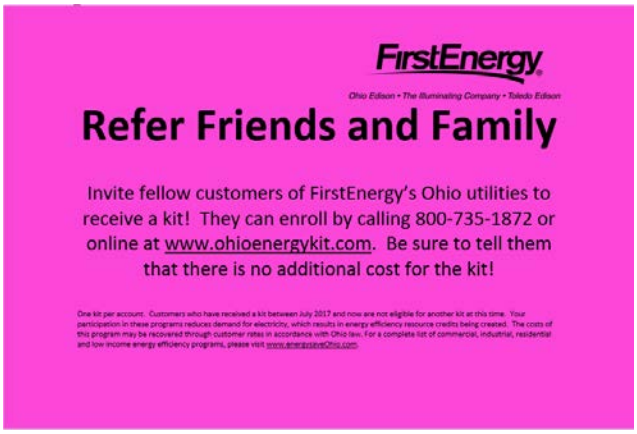


Figure 6-2: Program Kit Referral Insert

Energy Efficiency Kits Participant Survey

This section presents key findings from surveys conducted with 241 customers who participated in the 2017 Energy Efficiency Kits subprogram provided by the Companies. ADM contracted with VuPoint Research to administer the survey via telephone. The survey gathered information regarding program awareness, measures installed and in-service rates, decision making and overall program satisfaction.

ADM administered a telephone survey for participants who were listed in the program tracking data. The survey instrument was designed for collecting data for the process evaluation and impact analysis.

Order Method and Kit Contents

Participants provided feedback regarding the way in which they enrolled in the Energy Efficiency Kits subprogram through ordering an energy efficient kit. Sixty percent

requested their kit over the phone, meanwhile, 30% requested it online, and 10% did not know how they requested the kit. Figure 6-3 displays the results. This correlates with staff interview with Power Direct of how they met the Companies' goals which were increasing call volumes to increase enrollment.

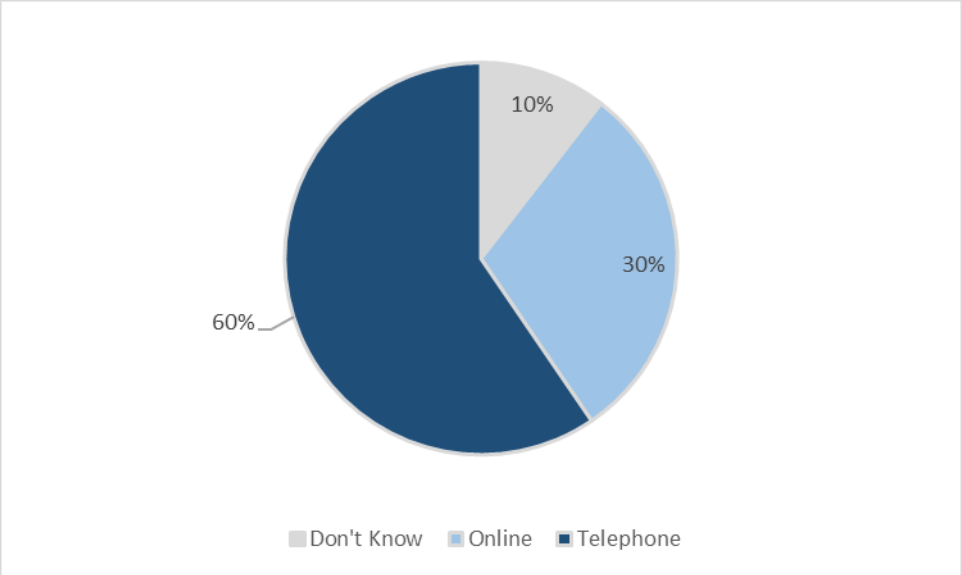


Figure 6-3: Participant Kit Enrollment

Most of the respondents indicated that they have received all measure were in the Residential kit contents. Table 6-9 shows the percentages of the measures received by participants.

Table 6-9: Measures Received by Participants

Which of the following measures did you receive in your energy efficient kit?	CEI	OE	TE	Total
	Percent	Percent	Percent	Percent
(1) Three-way CFL light bulb	90%	86%	89%	88%
(1) 15W LED light bulb	86%	86%	69%	80%
(1) 11W LED light bulb	66%	67%	53%	62%
(3) 9W LED light bulbs	69%	64%	67%	67%
(1) Furnace whistle	50%	50%	63%	54%
(1) Faucet aerator	9%	11%	16%	12%
(1) Low-flow showerhead	7%	11%	13%	10%

Customer Installation of Measures

Participants provided feedback regarding the contents of the kit they installed. Approximately 30% of participants surveyed stated they did install all measures in the kit. While 64% of participants responded that they only installed some of the products that they received in the kits. Six percent of survey respondents indicated that they did not install any of the measures that they received within the kit. Figure 6-4 illustrates the reasons participants gave for not installing all or any of the measures in the kit. Forty-five percent of respondents (n=66) indicated they were waiting for bulbs to burn out, 33% provided other reasons but most frequently mentioned they have not had the time or the furnace whistle did not fit their furnace.

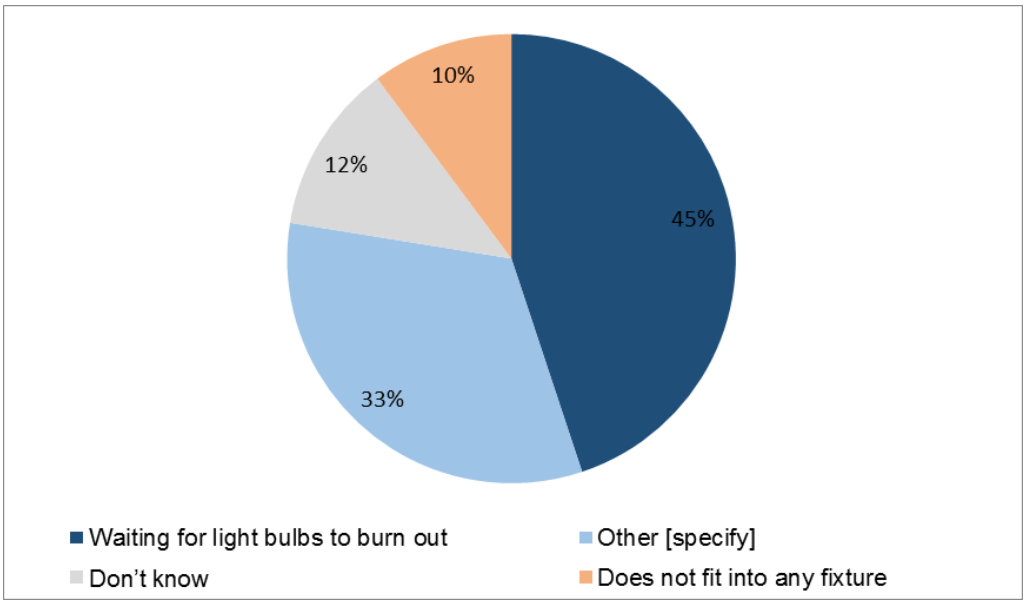


Figure 6-4: Factors for Measure Not Installed

The measure most frequently installed by 84% customers was the LED nightlights, followed by the 9-watt LED bulbs (76%), the 15-wall LED bulbs (69%), and the 3-way CFL (66%). Table 6-10 provides reported installation activity for each measure.

Table 6-10: Participant Installation of Conservation Measures

Measure	Percentage of Respondents
LED Nightlight	84%
9 watt LED	79%
15 watt LED	58%
3 way CFL	54%
11 watt LED	43%
Faucet Aerator	29%
Low Flow Showerhead	22%
Furnace Whistle	14%

The survey results indicate that the majority of participants installed at least one or both 9w LED lightbulbs, at least one or both of the LED nightlights and the 15w LED. The following provides a summary of surveyed installation findings for each measure category:

- **LED Night Lights**: Approximately 84% of survey respondents indicated that they had installed one or both LED nightlights that were included in their kit. Approximately 40% of respondents who had installed the nightlight indicated that they had installed it in a location that was previously occupied by a standard-efficiency night light. Sixteen percent of survey respondents indicated that they did not install either of the LED nightlights that they received.
- **LEDs:** Approximately 76% of respondents reported that they had installed at least one, two, or all three 9w LEDs from their kit. Twenty-one percent of respondents declared to have not installed any of the 9w LEDs. For the 15w LED lightbulb, 69% of participants stated that they had installed this in their home.
- **3-way CFL**: Approximately 66% of respondents indicated that they had installed the 3 way CFL bulb included in the kit. Participants responded about why they did not install the 3-way CFL bulb open ended responses indicated that the 3-way bulb did not fit into any of the fixtures into their home or because they just do not like the CFL bulb in general.
- **Furnace Whistle**: Thirteen percent of respondents elected to install the furnace whistle. When participants were asked why they had not installed the furnace whistle open ended commentary was provided by some participants. The feedback states that reasons for the low installation rate are due to the uncertainty of installation and/or that the participants could not use the furnace whistle due to incompatibility or simply because they did not have a furnace.

- **Faucet Aerator:** Sixty-four percent of the survey participants stated they have an electric water heater. Customers that have an electric water heater received faucet aerators. Out of the recipients of this measure, 51% claimed to have installed the faucet aerator. Open ended commentary suggests that participants may not have had time to install.
- **Low Flow Showerhead**: Additionally, the same participants that responded to having an electric water heater also received the low flow showerhead measure. Approximately 38% of recipients stated they did install the low flow showerhead. Participants that chose not to install the low flow showerhead indicated that the reason for not installing the measure was due to their preference for the additional water pressure provided by traditional showerhead over the low flow shower head.

Participant Motivations and Preferences

Respondents provided feedback regarding what influenced them to request the kit. Forty-seven percent of respondents indicated that they chose to participate in the program because they were interested in saving money and 40% were looking for ways to save energy in their home. Thirty-two percent requested a kit because it was provided at no additional cost and 25% through the kit contents looked useful. Table 6-11 displays the responses.

Table 6-11: Factors Motivating Participation

What factors influenced your decision to request a kit through this program?	Percent of Respondents (n = 210)
Interested in saving money	47%
Looking for ways to save energy	40%
Provided at no additional cost	32%
The kit looked useful	25%
Other	24%
Recommendation from a friend	8%

Respondents indicated which single item from the kit was most useful. As shown in the following table, 38% of respondents thought the 3-way CFL light bulb was most useful, 31% respondents indicated that the 9-watt LEDs were the most useful measure that was included in the kit, and 27% thought the 15-watt LED was the most useful. Table 6-12 displays these survey responses along with percentages.

Table 6-12: Usefulness of Individual Conservation Measures

What single item from the Energy Efficiency Kit was MOST useful to you?	Percent of Respondents (n=210)
3-Way CFL bulb	38%
9W LED bulbs	31%
15W LED bulb	27%
Furnace whistle	3%
Faucet aerator	1%
Showerhead	0%

Customer Satisfaction and Knowledge of EE

Survey respondents reported their levels of satisfaction with the items in the kit, the time it took to receive the kit, and the energy efficiency education provided through the program itself. Participants responses are provided on a 5-point scale of very satisfied to very dissatisfied.

Figure 6-5 displays the satisfaction results. Respondents reported very high satisfaction levels with kit contents and the time it took to receive the kit.

Participant satisfaction ratings and other commentary suggest that customers value the program and that there are no systematic issues with kit contents included in the kit, the process of customer engagement and education, or issues regarding receiving the kit.

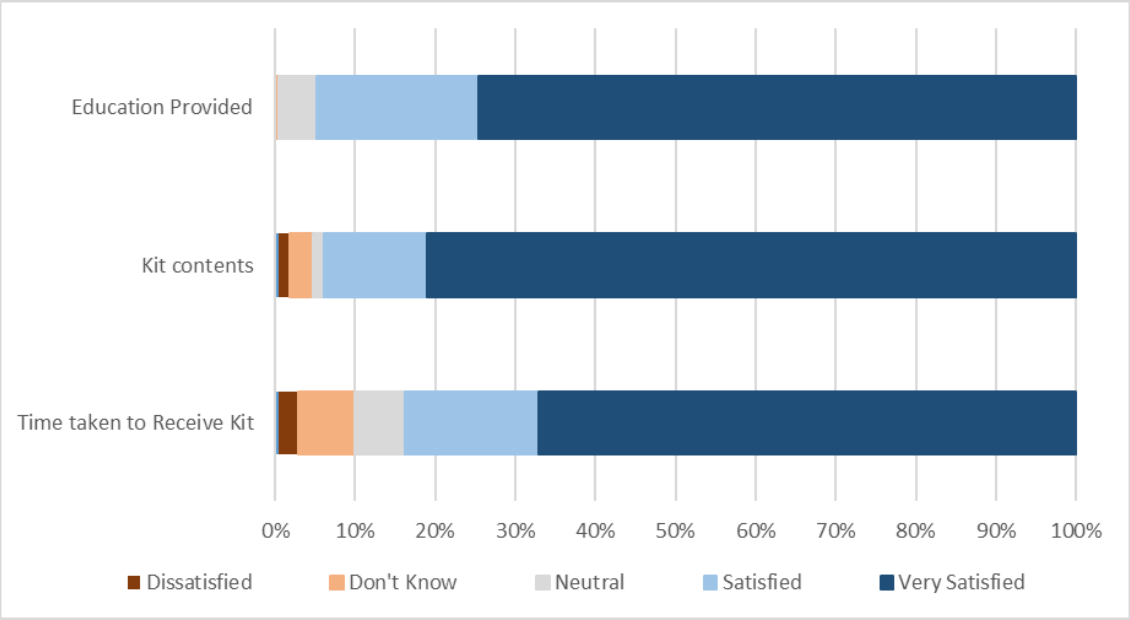


Figure 6-5: Participant Satisfaction

Respondents rated their overall level of knowledge with ways to save energy in their home, as a result of receiving the kit. A little more than two-thirds (67%) of respondents indicated that their knowledge of ways to save energy has increased somewhat or increased a lot. This suggests that the program has continued to provide participants with valuable information regarding energy efficiency behaviors and opportunities.

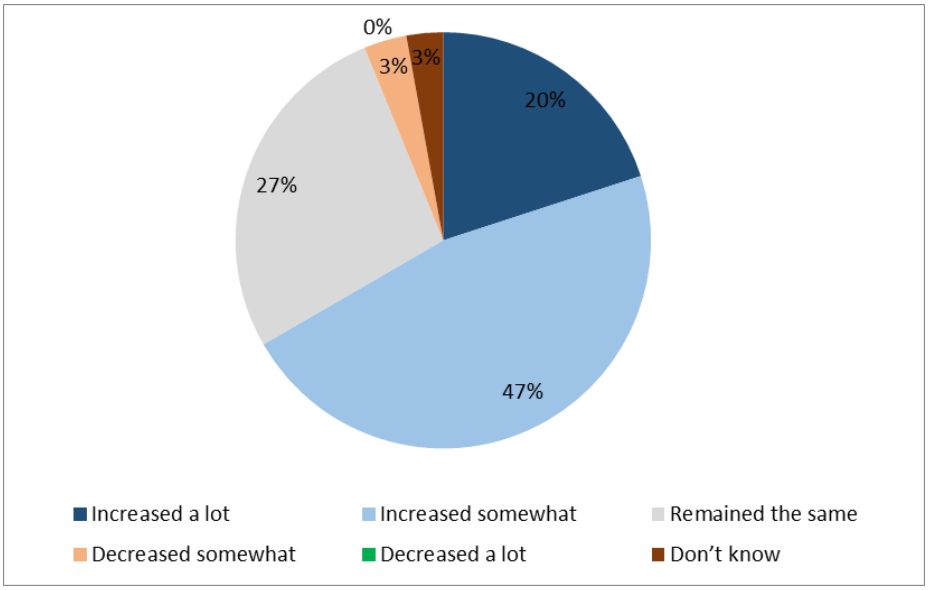


Figure 6-6: Participant Knowledge with Energy Efficiency

Cross-Program Awareness and Participation

Respondents provided feedback regarding their awareness of other discounts and rebates offered by the Companies to help them purchase energy efficient equipment. Fifty-two percent stated they were aware of the Companies offerings of discounts and rebates to help customers purchase energy efficient equipment to help save them energy in their homes. The remaining participants stated that they were not aware of these discounts and rebates (45%) or were unable to answer (3%). Of the respondents that were aware of the Companies' rebates and discounts of energy efficiency equipment, 41% indicated they learned about the rebates through information provided in the energy efficiency kit.

The survey included a series of questions related to participants' behaviors after participating in the program. Survey respondents reflected whether they had purchased and installed any additional measures because of information provided in the kit. Fifty-seven percent of participants indicated they have not purchased or installed additional energy efficiency items because of the information they received in the kit, 38% had purchased additional items. Of those that had purchased additional items (n = 36), 67% indicated they had purchased energy efficient light bulbs, 17% purchased appliances and 8% purchased nightlights. Table 6-13 displays the results.

Table 6-13: Post Installation of Individual Conservation Measures

Measure Type	Percent of Respondents Indicating Prior Installation (n=36)
Energy efficiency light bulbs	67%
Other	22%
Energy efficient appliances	17%
Energy efficient nightlights	8%
Energy efficient HVAC equipment	0%

Communication Procedures

Program staff noted that communication has been effective and that the two parties are in communication with one another. The Companies and Power Direct have a monthly call to discuss program metrics and ad hoc items. Power Direct staff explained that unscheduled communication through emails and phone calls are carried out weekly to address program tasks as well as other topics. Additionally, Power Direct staff states that they participate in a weekly meeting to reconcile discrepancies within the data.

Home Characteristics

Participants provided feedback regarding their home characteristics, Table 6-14 summarizes the results.

Table 6-14: Home Characteristics

Home Characteristics	Participant Group
Single family detached home	70%
Townhome	5%
Mobile or manufactured home	2%
Apartment 2-4 units	4%
Apartment 5-10 units	7%
Apartment with more than 10 units	9%
Don’t know	3%
Own or Rent	
Own	58%
Rent	38%
Don't know	2%
Year Build	
Before 1970	38%
1970's	12%
1980's	5%
1990's	7%
2000's	6%
2010 or newer	4%
Don’t know	28%
Above Ground Living Space	
Less than 1,000	9%
1,001-1,500	19%
1,501-2,000	20%
2,001-2,500	13%
Greater than 2,500	8%
Don’t know	30%
Heating Type	
Natural gas heating	72%
Electric heating	14%
Other (Please specify)	6%
Don't know	8%

7 School Education

The purpose of this chapter is to present the findings from the evaluation of the School Education subprogram, which reflects impact and process evaluation effort undertaken by ADM to verify the energy savings and peak demand reduction.

7.1.1 Description of School Education Subprogram

The School Education subprogram provides an opportunity for parents or guardians of students in grades kindergarten thru 5th grade to request an Energy Efficiency 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 can request a kit of energy efficient measures 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.

For the program component, the Companies partnered with AM Conservation and the National Theater for Children (NTC) to perform approximately 400 performances in the Companies' service territory. The performances were targeted for kindergarten to 5th-grade classrooms.

Parents request a kit through a permission slip sent to the student's teacher, or through an electronic application on the Student Energy Kit website. The Schools Kits are shipped to the student's homes within a few weeks of the request.

The School Education Kits include the following energy efficiency measures:

Table 7-1: School Education Kits Energy Efficiency Measures

Measure	School Kit
3-Way LED	1
15W LED	2
11W LED	1
9W LED	3
Night Lights	2

The total number of kits distributed by the Companies in 2017 by type and operating company is shown in Table 7-2.

Table 7-2: Count of Kit Types Delivered by Operating Company

Kit Type	Operating Company			
	CEI	OE	TE	Total
School Education	15,980	21,382	8,823	46,185

7.1.2 Sampling Plan

ADM completed a census review of all measures listed in the tracking system to ensure there were no date entry error or duplicate entries.

The sample size for the follow-up surveys in each service territory achieved a relative precision of ± 10% at the 90% confidence interval. The sample size calculation for achieving 90% confidence with 10% precision is shown in the formula below.

$$n_0 = \frac{N \times \frac{1}{4}}{(N-1) \times \frac{D^2}{Z^2_{\alpha/2}}}$$

Equation 7-1: Minimum Sample Size Formula for 90 percent Confidence

Where:

n_0	= Minimum sample size
N	= Population size, assumed to be 100,000 or greater
$Z\alpha/2$	= Z value at 90% confidence interval, 1.645
¼	= The maximum value of p(1-p) at p=1/2, a conservative estimate for sample size
D	= Relative Precision (0.10)

ADM surveyed 244 school kit customers with respondents across the various EDC. There were three survey efforts, one during the program year and two during the first quarter of 2018.

The sample sizes for each audit method meet the requirement for ±10 percent precision at the 90 percent confidence level for each company. The sampling plan is shown in Table 7-3.

Table 7-3: Sampling Plan 2017 School Education Kits Participants

EDC	Sampling Proportion	Sample Size School Kits
CEI	0.38	n = 93
OE	0.31	n = 76
TE	0.31	n = 75
Total	1	n = 244

7.1.3 Energy Savings and Peak Demand Reduction Calculations

Data Collection

ADM audited a census of the School Education 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 School Education Kits are shown in Table 7-4.

Table 7-4: Ex Ante Annual kWh & kW per Unit

Operating Company	*Ex Ante* kWh	*Ex Ante* kW
CEI	350.82	0.036
OE	350.82	0.036
TE	350.82	0.036

Customer Survey

Data for the sample of school kits participants were collected through a telephone survey. The survey was distributed to determine measure specific installations, bulb quantities by room type. This data was used to calculate ISRs, HOU, and coincidence factors for peak demand.

The primary deemed savings and/or engineering algorithm source for determining program impacts was the OH TRM. The PA TRM was used as a secondary calculation source for all measures not listed in the OH TRM.

Per Ohio RC §4928.662, for all measure types listed in the OH TRM; all installation rates, deemed savings, and hours of use were calculated per the OH TRM (“Deemed”). In addition, ADM calculated gross savings for measures in the program with “as found” baseline conditions, hours of use, and installation rates. The values reported for both *ex ante* and *ex post* energy savings (kWh) and peak demand reduction (kW) represent the higher calculated value obtained from both methodologies.

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 7-5.

Table 7-5: Analysis Source

Measure Type	Source for Analysis Method
9W LED	PA TRM
11W LED	PA TRM
15W LED	PA TRM
3 Way LED	PA TRM
LED Night Lights	PA TRM

Detailed below are the analysis methods used to calculate kWh and kW savings for the measures included in the School Kits.

LED Nightlights

The OH TRM does not specify an algorithm for LED night lights, so energy savings will be calculated using the PA TRM algorithm as follows:

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

Equation 7-2: LED Nightlights Calculation of Energy Savings

Where:

Wattsbase = Wattage of baseline nightlight

WattsNL = Wattage of LED nightlight

NLhours = Average hours of use per day per Nightlight

ISR = In-service rate[16]

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

LED Bulbs

The OH TRM does not specify an algorithm for LED bulbs, so energy savings will be calculated using the PA TRM algorithm as follows:

$$\Delta kWh = \frac{Watts_{base} - Watts_{EE}}{1000} * HOU * (1 + IE_{kWh}) * 365.25 * ISR$$

Equation 7-3: LED Bulb Calculation of Energy Savings

[16] This rate will be determined by ADM through participant surveys.

Where:

$Watts_{Base}$ = Wattage of baseline equipment

$Watts_{EE}$ = Wattage of efficient equipment

HOU = Average hours of use per day

IE_{kWh} = HVAC Interactive effect

ISR = In-service Rate[17]

$$\Delta kW = \frac{Watts_{base} - Watts_{EE}}{1000} * CF * (1 + IE_{kW}) * ISR$$

Equation 7-4: LED Bulb Calculation of Peak Demand Savings

Where:

CF = Demand coincidence factor

IEkW = HVAC Interactive effect

7.1.4 Detailed Impact Evaluation Findings

This section presents the findings of the impact evaluation of the School Education subprogram.

The 2017 evaluation results for estimated gross kWh energy savings and kW peak demand reductions for the School Education subprogram in the Companies' service territories are summarized in Table 6-6. The subprogram level kWh realization rate is 77% and kW is 78%

The variation in the *ex ante* and *ex post* savings calculation was primarily caused by the LED ISRs and allocation of LED bulb quantities by room type. The *ex ante* estimate used a deemed ISR of 92 % from the PA TRM while the ex post relied on data collected though the evaluation surveying efforts. The *ex ante* input for hours of use was the deemed hours of use from the OH TRM. The *ex post* input for hours of use was calculated by allocating the percentage of installation by specific room type and assigning hours use by room type from the PA TRM.

The *ex post* analysis ISRs from the 2017 surveying effort are reported in Table 7-6.

[17] This rate will be determined by ADM through participant surveys.

Table 7-6: Ex Post Annual kWh Savings by Kit Type

Operating Company	*Ex Ante* kWh	*Ex Post* kWh	Realization Rate
CEI	5,606,180	4,307,091	77%
OE	7,501,335	5,763,093	77%
TE	3,095,327	2,378,064	77%
Total	**16,202,843**	**12,448,248**	**77%**

Table 7-7 below shows the *ex post* Annual kW demand savings by kit type for each EDC.

Table 7-7: Ex Post Annual kW Reduction by Kit Type

Operating Company	*Ex Ante* kW	*Ex Post* kW	Realization Rate
CEI	586.34	456.91	78%
OE	784.55	611.36	78%
TE	323.73	252.27	78%
Total	**1694.62**	**1320.54**	**78%**

In Service Rates

The ISR for each measure in the School Education Kit is shown in Table 7-8.

Table 7-8: Impact Evaluation ISRs Determined by Survey (Schools Kits)

Measure	N	Measure In-Service Rate (ISR)
9W LED	177	72%
11W LED	222	82%
15W LED	186	62%
3-way LED	212	54%
LED Night Light	184	83%

7.1.5 Detailed Process Evaluation Findings

This section presents the findings of the process evaluation of the School Education subprogram of the Energy Efficient Homes Program.

Program Operations Perspective

The following section provides an overview of the School Education subprogram's operations constructed through in-depth discussions with three key program staff. The interviews addressed topics such as staff roles and responsibilities, 2017 program operations and changes, marketing and outreach, as wells as communication between the Companies and program implementation contractor, AM Conservation Group

(AMCG).

Roles and Responsibilities

Program staff explained each of their roles and responsibilities as it relates to the program. The Companies' program manager works as the single point of contact for the implementation contractor. Their role includes, but is not limited to program coordination, refining and approval of the school list, approval of AMCG's invoice accrual and tracking performance to goal, they also handle any customer issues that arise, although very few issues have come up to date.

The Companies contracted with AMCG to implement the Schools Education subprogram of the Energy Efficient Homes Program. ADM researchers spoke with two key staff that identified themselves as program managers. Together, the two AMCG staff handles the day to day operations of the program including, forecasting, curriculum approval, outreach and marketing oversight, reporting, data tracking and kit fulfillment. AMCG staff will review the curriculum and ensure its in-line with state standards and ensure branding protocols are adhered to and disclaimers are in place. Reporting tends to focus on the program's progress towards goals. AMCG also manufactures and distributes the kits to students' homes.

AMCG staff works closely with the National Theater for Children (NTC) to deliver the program offerings to the schools. NTC manages a call center responsible for contacting schools; they also develop the initial curriculum, as well as schedule and conduct the live performances at participating schools.

Program Goals and Design

AMCG staff provided feedback on AMCG's role with program design. They indicated that the Companies provide the kWh goals, and then AMCG staff backs into the number of schools they need to reach per operating company. AMCG staff noted that one school will average between 70 and 100 kits, referred to internally as the "take-rate."

Program implementation staff from AMCG noted that they had worked with similar student kit programs in other service territories around the country. Staff explained that each program is slightly different with regard to the contents of kits, how kits are distributed to students, the marketing messages used to recruit schools and inform students, and other characteristics. AMCG staff reported that the School Education subprogram design was based on guidance from the Companies, and the subprogram has been successful in achieving its objectives.

The curriculum is comprised of the following for each classroom:

- A teacher guide that includes recommendations for before and after the performance, keywords, class activities and critical thinking questions

- Poster for the classroom
- Booklets and activities for the students
- Business Reply Card, for parents to provide feedback about their experience and what they installed
- Order cards used to order the kit

The energy efficiency kit includes:

- One 3-Way LED Bulb
- Three 9-Watt LED Bulbs
- One 11-Watt LED Bulb
- Two 15-Watt LED Bulbs
- Two LED Night Lights
- One LED Glow Ring Toy

Typically, the Schools Education subprogram has two segments, Fall and Spring. In 2017 the program only had a fall segment and successfully hit its overdrive goal of 46,000 kits. During the Fall segment, the program implemented several rewards designed to motivate teachers, schools, and parents to enroll in the program and order energy efficiency Kits. Every teacher, that enrolled 20 students or more received $50. The school that ordered the most kits received $2,500 and every family that returned the business reply card was entered to win $1,500. All staff interviewed referred to 2017 as a success and thought the rewards were motivational for schools, teachers, and families. Staff also went on to express their enthusiasm; they truly enjoy the Schools Education subprogram as an opportunity to bring energy efficiency to the younger generation.

Program Implementation

Once a school is enrolled, teachers receive a sample kit and a lesson plan that outlines the curriculum objectives and tools for success. The teacher kit is provided in advance of the live performance; the objective is to create enthusiasm and interest among the students. The National Theater for Children performs two acts based on the ages of the student audience. The performance stars characters that were part of the original curriculum; the actors address topics such as power generation as well as renewable and non-renewable resources. The performance also addresses topics such as energy and water conservation.

Students can order kits either before or after the performance. Kit orders are collected via a form that students return to the teacher, through the program website[18], or by phone.

[18] http://ohiostudentkit.com/

According to staff, they see a significant uptake in kit orders directly after the performances. Teachers and parents provide feedback on the program and the kits via an online survey and the Business Reply Cards. Staff noted that the feedback is overwhelmingly positive and said they commonly receive feedback that praises the creative format of the live performance which teaches children about energy efficiency and the connection the students feel to the materials once they are able to take home actual energy savings measures.

Program staff noted that they hold regular bi-weekly conference calls in order to discuss program updates and other topics related to program implementation. AMCG staff explained that additional emails and phone calls occur on a weekly, sometimes daily basis in order to address program open items or topics as necessary. Staff also meets several times a year to view the live performances and discuss program happenings in-person.

The Companies staff indicated that program implementation is effective and efficient. They noted that AMCG successfully fulfills the kit orders and provides program data and invoicing in a timely manner. The Companies staff attributed successful program implementation to consistent communication between the Companies and AMCG and the institutional knowledge held by the various contractors who work to deliver the program offerings. The implementation contractor described the Companies staff as organized and easy to work with.

Marketing

AMCG staff provided feedback on the Schools Education Program's marketing and outreach strategy. AMCG contracts with the NTC to reach out to, inform and enroll eligible schools in the program. Staff stated that many schools are familiar with the NTC, as they offer a variety of school programs delivered through performing arts.

NTC staff makes initial contact with schools through various sources such as personal emails, email blasts, phone calls, faxes and letters with marketing materials, addressed to school administrators. Included in the letters are postcards with the program characters, "The Energized Guyz." Figure 7-1 provides a screenshot of the bi-fold flyer included in outreach materials. The NTC also has a call center responsible for additional direct outreach.

Figure 7-1: Program Bi-fold Flyer

When asked whether the program had encountered any unforeseen challenges during the 2017 program year, the Companies and AM Conservation staff both noted that refining the list of eligible schools is the primary program challenge. They also noted that this was not necessarily a negative aspect but just a yearly challenge they face.

School Education Participant Survey

This section presents key findings from surveys conducted with 244 parents whose children participated in the 2017 School Education subprogram administered by the Companies. ADM contracted with VuPoint Research to administer the survey via telephone. The survey gathered information regarding parents' perspectives, program awareness, measures installed and in-service rates, decision making and overall program satisfaction.

School Education Kit Contents

Most of the respondents indicated that they have received all measures that were in the kit contents. Table 7-9 the percentages of the measures received by participants.

Table 7-9: Measures Received by Participants

Which of the following measures did you receive in your energy efficiency kit?	CEI	OE	TE	Total
	Percent	Percent	Percent	Percent
(1) Three-way LED light bulb	79%	87%	90%	85%
(2) 15W LED light bulb	81%	84%	91%	86%
(1) 11W LED light bulb	77%	83%	90%	83%
(3) 9W LED light bulbs	87%	86%	94%	89%

Customer Installation of Measures

Participants provided feedback on the contents of the kits they installed. Twenty-seven percent of participants surveyed stated they did install all measures in the kit. While 61% of participants responded that they only installed some of the products and 12% did not install any measures received. Open-ended commentary given by respondents who did not install all or any of the measures most frequently said they did not have the time or they did not have long-term plans to stay at the residence. No respondents stated the bulbs were broken. Figure 7-2 illustrates the reasons participants gave for not installing all or any of the measures in the kit.

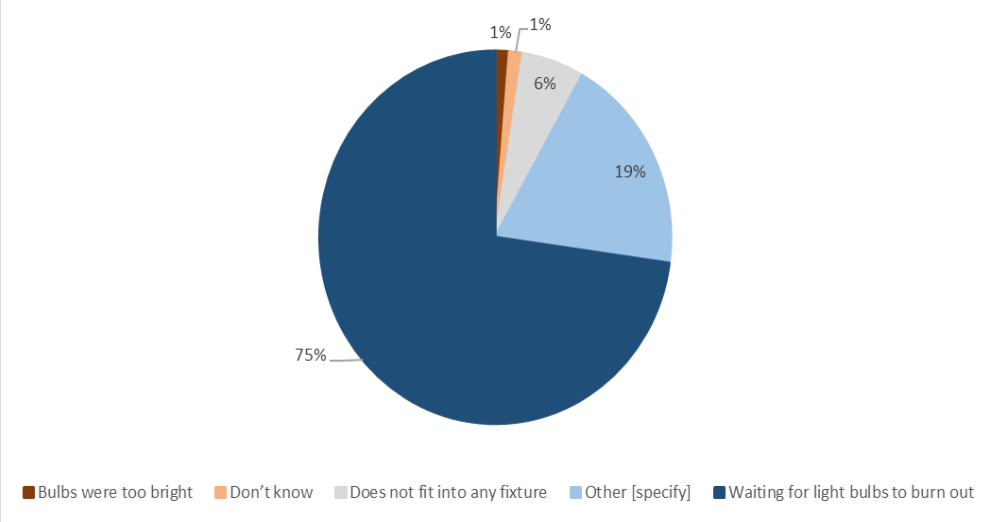


Figure 7-2: Factors for Measure Installation

The following Table 7-10 provides reported installation activity for each measure type.

Table 7-10: Participant Installation of Conservation Measures

Measure	Percent of Respondents (n = 244)
LED Night Light	72%
15 watt LED	62%
11 Watt LED	82%
3 way LED	54%
9 Watt LED	72%

The survey results indicate that a high majority of participants installed at least one or both of the LED nightlights and the 11w LED. The following provides a summary of findings for each measure category:

LED Nightlights: Approximately 72% of survey respondents indicated that they had installed one or both LED nightlights that were included in the kit. Approximately 46% of respondents who had installed the nightlight indicated that they had installed it in a location that was previously occupied by a standard-efficiency night light. When asked why they had not installed the nightlights, these respondents most commonly reported (48%) that they had not used for the LED nightlight yet while others provided open ended responses stating they were waiting for their other nightlights to burn out.

LEDs: Approximately 73% of respondents reported that they had installed at least two of the three 9-watt LEDs from their kit. Respondents who had not installed all of the 9-watt LEDs were asked why they had not installed the measures, the majority of those respondents explained that they chose to store the bulbs for future use. Other LEDs included in the kit were more utilized as the 11W had 82% of respondents claimed to have installed this measure. Participants were also provided with two 15-watt LED light bulbs 22% stated that they installed one or while 39% installed both of the bulbs they received in the kit.

3 way LED: Approximately 43% of respondents indicated that they had installed the 3 way LED bulb included in the kit.

Customer Satisfaction

Survey respondents were asked about their levels of satisfaction with each kit measure they reported installing. Results are provided on a 5-point scale of very satisfied to very dissatisfied. Respondents reported very high satisfaction levels with kit contents. In total, zero respondents stated that they were dissatisfied with the items included in the kit. These results suggest that the quality of measures provided through the program is sufficient to meet customer needs and preferences.

Respondents rated their satisfaction with the energy efficiency education provided through the program itself. Results are provided on a 5-point scale of very satisfied to very dissatisfied. As shown in Figure 7-3, none of the respondents indicated that they were very dissatisfied with either program element. Zero respondents indicated being dissatisfied with the energy efficiency education provided through the program.

Participant satisfaction ratings and other comments suggest that customers highly value the program and that there are no systematic issues with kit contents included in the kit or the process of customer engagement and education.

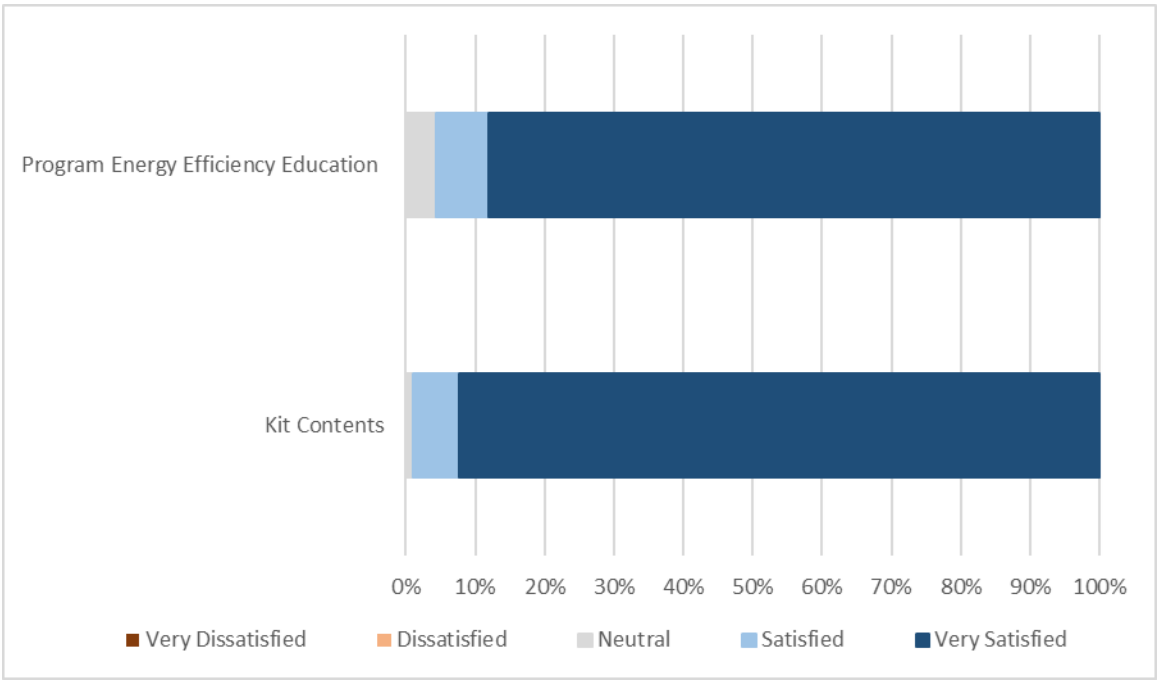


Figure 7-3: Participant Satisfaction

Participant Motivations and Preferences

Respondents provided information on why they participated in the program. As displayed in Table 7-11, 71% of respondents indicated that they chose to participate in the program because of their child's interest in the kit.

Almost one-quarter of respondents (20%) provided open-ended commentary providing responses that were not given as an option on the survey. Majority of the comments indicated that they enrolled in the program because it helped the school; while others stated that they wanted to try a different type of bulb, ease of program enrollment, and finding it as a good opportunity to teach their children about energy efficiency. These responses were categorized as other below. Nineteen percent of respondents indicated that they participated due to the kit having no additional cost.

Table 7-11: Factors Motivating Participation

What factors influenced your decision to request a kit through this program?	Percent of Respondents (n = 210)
I was looking for ways to save energy in my home	40%
Recommendation from a friend	8%
The kit looked useful	25%
It was provided at no additional cost	32%
Interested in saving money	47%
Other	24%

Respondents provided feedback regarding their knowledge of and familiarity with energy efficiency behaviors and measures. They began by rating how knowledgeable they are about ways to save energy in their home. Approximately three-quarters of respondents indicated that they have a greater understanding of energy efficiency since they've received the kit. As shown in Figure 7-4, 74% of respondents reported that their overall knowledge of energy efficiency, after they received the kit, increased a lot or increased somewhat. Only 4% of respondents reported that they are now only a little familiar, with ways to save energy in their home after receiving the kit.

The feedback suggests that the program provides participants with valuable information regarding energy efficiency education, and parents have a greater understanding of energy efficiency since they've received the kit.

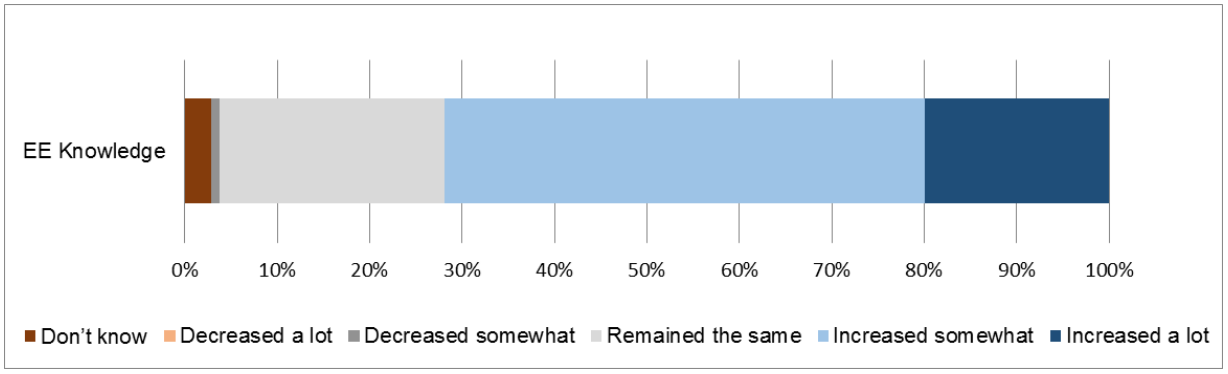


Figure 7-4: Participant Knowledge with Energy Efficiency

Most respondents (40%) found the LED night light to be the most useful, followed by the 9 watt LED (20%) and 3-way LED. Few respondents (8%) indicated that the 11-watt LED light bulbs were the most useful measure.

Table 7-12 displays these survey responses along with percentages.

Table 7-12: Usefulness of Individual Conservation Measures

What single item from the Energy Efficiency Kit was MOST useful to you?	Percent of Respondents (n = 210)
LED Night Light	44%
9 watt LEDs	20%
3-way LED bulb	18%
15 watt LED	10%
11 watt LED	8%

Program Awareness and Cross-Program Participation

Respondents provided feedback on whether they were aware of other discounts and rebates offered by the Companies to help them purchase energy efficient equipment and save energy in their home. Fifty-three percent stated that they were not aware of additional discounts and rebates, while 46% were aware. Of the 46% of respondents that indicated that they were aware of discounts and rebates offered by the Companies to help purchase energy efficient equipment to help them save money in their homes, 44% reported the kit as the source of awareness. The feedback suggests that Schools Education subprogram is a fairly good source by which customers learn of other energy efficiency programs offered by the Companies.

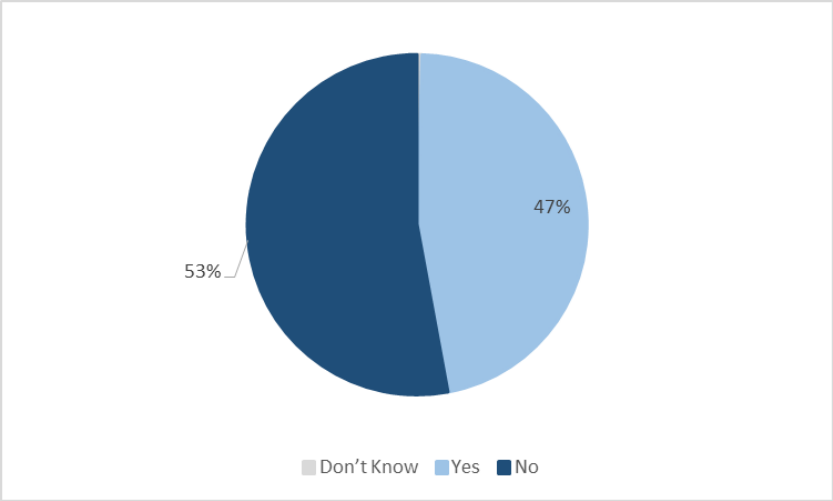


Figure 7-5: Equipment Discounts and Rebates Participant Awareness

The survey included a series of questions related to participants' behaviors after participating in the program. Survey respondents were asked whether they had purchased and installed any additional measures because of their experience with the Schools Education subprogram.

Most respondents (91%) did not purchase and install additional energy efficiency measures because of the information provided to them in the kit, while 8% did. Figure 7-6 provides a summary of the results.

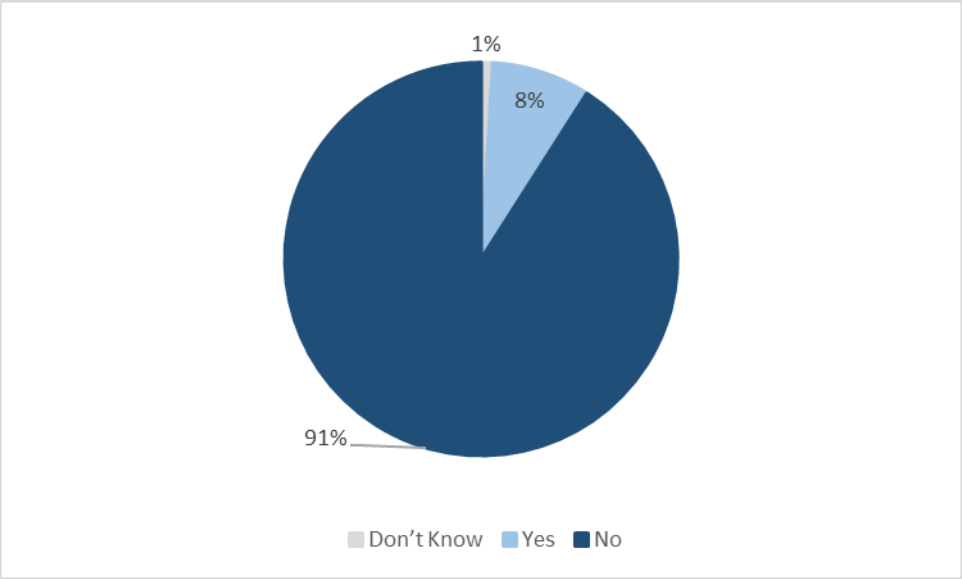


Figure 7-6: Additional Purchased and Installed Measures

Of those respondents that indicated that they did purchase and install additional items due to the information included in the kit, 82% reported purchasing and installing energy efficient light bulbs. A small percentage of participants reported purchasing energy efficient nightlights, appliances, and windows. Table 7-13 summarizes the results.

Table 7-13: Additional Measures Installed

Measure Type	Percent of Respondents (n = 17)
Energy efficient light bulbs	82%
Energy efficient nightlights	12%
Energy efficient appliances such as refrigerators, clothes washer/dryers	6%
Other	6%
Energy efficient HVAC equipment	0%

8 Behavioral

For the 2017 program year, the Companies contracted with Oracle Corporation to administer the Behavior Modification (Behavioral) subprogram targeted at residential customers. The evaluation of the 2017 Behavioral subprogram was consisted of two main components:

1) Participants in the program received monthly usage reports which contained information about their energy use; how their energy use compared to that of a group of similar households (both average and most efficient neighbors).
2) Low-cost measures, practices, or behaviors they could take 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 222,439 customers participated in the Behavioral subprogram in 2017. Table 8-1 below details participant counts by operating company.[19]

Table 8-1: Participation Levels for 2017 Behavioral Subprogram by Utility

EDC	Participants
CEI	72,942
OE	119,729
TE	29,768
Total	**222,439**

The impact evaluation component was framed by the following research question:

To what extent has the program resulted in electric energy savings (monthly and annual kWh) for program participants in each of the three Ohio utilities? The goal of the process evaluation component was to determine participant satisfaction and program effectiveness. 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 subprogram?

[19] Participation counts determined from data supplied by the implementation contractor. Reported participation counts are from the beginning of the program year. Participants may be lost due to attrition over the course of the program year.

8.1 Description of Behavioral Subprogram

The Behavioral subprogram provides home energy reports (HER) to residential customers in FirstEnergy's OH service territory. These reports detail customers' historical energy usage; compares the energy usage to similar households (both an average household and a most-efficient neighbor household); and provides information regarding low-cost measures, practices, or behaviors that customers can engage in to reduce energy usage.

The Behavioral program utilized an opt-in randomized control trial (RCT) design—a type of quasi-experimental design in which a treatment group is compared to a control group that is determined to be statistically similar prior to treatment onset. The Companies targeted high energy users[20] as the target population for the Behavioral subprogram. After selecting the initial target population, Oracle randomly assigned each household to either the treatment (household receives a HER) or control group (household receives no communication from Oracle). The program was designed as an opt-out program—treatment group participants automatically began receiving the HER measure at the beginning of the treatment period and could un-enroll from the program if they did not wish to continue to receive the HER.[21]

8.2 Sampling

Oracle selected program participants with the following criteria:

- Oracle started with the 2014 randomly selected participant group. Then randomly selected new participants based on pre-specified eligibility criteria.
    - Participants must have a valid mailing address and not be an outlier in terms of high or low energy use.
    - Oracle chose customers from the group of highest usage households among those eligible.
- Participants are randomly assigned to the treatment group and the control group. The overall size of the treatment group was based on program needs/savings goals.

Once the treatment group has received its first report, tracking energy usage between the two groups begins. Customers can opt-out of the program at any time by going online or calling the customer experience call center. As customers move out (for either the

[20] It is important to note that targeting of high-use customers will produce savings estimates that are not representative of the full customer population and should not be extrapolated beyond the calculation of energy savings for this program.

[21] The lifetime of HERS measures are not currently well-understood—therefore, participants who opt-out of the program are still considered part of the treatment group.

participant or control groups) they drop from the RCT.

8.3 Impact Evaluation Methodology

Impact evaluation for the program made use of a regression analysis of monthly billing data. The regression model compares the monthly energy use of the participant group to that of a control group while, simultaneously, controlling for individual variability in the pre-treatment period. The main purpose of the regression analysis is to isolate and quantify the treatment effect on monthly energy usage. The following section describes ADM's gross impact evaluation methodology.

8.3.1 Data Gathering

Monthly billing data dating back to 12 months prior to each experimental cohort's treatment start date through December 2017 was requested from the Companies for all participants. Additionally, ADM utilized a map of account numbers to treatment or control group assignment and cohort assignment to categorize monthly billing data.

8.3.2 Data Preparation

The majority of the Companies' residential customers currently use traditional meters which are read monthly. On occasion, meter reads are not available at the time a customer is billed; therefore, the Companies generate an estimated meter read based on building load profiles and customer's historical usage. The customer's subsequent metered bill features an adjustment factor to accommodate for any differences between the estimated read and the actual read.

As part of the data preparation process, ADM corrected for estimated reads and adjusted actual reads by using a "true-up" process. For each metered read and all estimated reads immediately preceding it, ADM totaled the billed usage and number of days spanning those bills. The total billed usage for that cumulative period was then divided by the total number of days to generate an average usage per day value. This average usage per day value was then multiplied by the number of days in each individual bill to generate a corrected usage value. Because the number of estimated reads per actual read is inconsistent, the number of estimated reads prior to the first actual read in the provided dataset could not be assumed. Therefore, the first metered read and all estimated reads preceding it were excluded from the dataset. Similarly, estimated reads that did not have a corresponding actual read (generally towards the tail end of provided billing data) were also excluded from analysis. The following equation provides the equation for calculating the adjusted usage for billing data after the first metered read and all prior estimated reads have been excluded:

$$Adjusted\ usage = \sum_{i}^{n} Billed\ usage \times \frac{Billing\ days_m}{\sum_i^n Billing\ days}$$

Equation 8-1: Billing Data Adjustment Calculation

Variable	Definition
i	First estimated bill in a sequence of estimated bills leading to a metered bill.
n	A metered bill providing an adjustment factor for preceding estimated bills.
m	The billing month of interest.
Billed usage	The total kWh billed in a monthly bill.
Billing days	The total number of days in a monthly bill's billing period.

Billing periods for customers do not fall on consistent dates between participants. For example, one customer's June bill may run from May 16th to June 17th while another's may run from May 20th to June 20th. Furthermore, the billing periods do not correspond to calendar months. To make the monthly billing data consistent between participants, ADM calendarized the data. Calendarization is the process of correcting monthly billing data to match calendar dates. For example, if 15 days in a billing period belonged to June and 15 days belonged to July; 50% of the billed usage would be attributed to June and 50% attributed to July. The proportionated usage and number of days that fall under a given calendar month are then summed to generate a calendarized usage value and the number of billed days for that month. The following equation provides the equation for calculating the monthly usage by calendar month:

$$Monthly\ usage_m = \sum_{i}^{n} \left(Adjusted\ usage_i \times \frac{Month\ days_i}{Billing\ days_i} \right)$$

Equation 8-2: Monthly Billing Data Calculation

Variable	***Definition***
i	First bill containing the month of interest.
n	Last bill containing the month of interest.
m	Month of interest.
Monthly usage	The calendarized monthly usage for a given month.
Month days	The number of days belonging to the month of interest in a given billing period.
Billing days	The total number of days in a given billing period

After calendarization was completed, an average daily usage value was calculated by dividing the monthly usage by the number of billed days in a month. Additionally, data was filtered using the following criteria:

- Customer months that had less than one billed day or exceed the total number of days in that calendar month for that year were excluded from analysis—months that meet these criteria have overlapping bills and are unreliable for analysis.
- Months that were present after a customer's move out date were also excluded from analysis.
- Customer months in which average daily usage exceeded 300 kWh or was less than -300 kW were considered outliers and were excluded from analysis.
- Pre-treatment data was limited to the 12 months prior to the treatment start date for each experimental cohort.

8.3.3 Billing Analysis

ADM utilized a post-only regression model known as the lagged seasonal (LS) model. The LS model predicts average daily usage in the post-period using a series of variables constructed from their pre-treatment usage and an interaction of the treatment impact over time. Previous simulation work conducted by ADM has shown that lag-term post-only models provide better accuracy when compared to fixed effects models. Given the need to correct for estimated meter reads, ADM used broader seasonal lag-terms instead of using a month-specific lag-term. The control variables constructed were average daily pre-use, average daily pre-use during summer, and average daily pre-use during winter. Summer months were defined as the months of June - September, and winter months were defined as the months of December - March.

$$daily\_usage_{it} = \beta_0 + \beta_{1t} treatment_i \cdot month_t + \beta_{2t} month_t \cdot (avg\_preusage_i + avg\_preusage\_summer_i + avg\_preusage\_winter_i)$$

Equation 8-3: Regression Model

Where:

$daily\_usage_{it}$ = the average daily usage for customer i in month t,
$treatment_i$ = a dummy variable – 1 if customer i is in treatment group, 0 if in control group,
$month_t$ = a matrix of dummy variables representing the months present in the dataset as a categorical variable,
$avg\_preusage_i$, $avg\_preusage\_summer_i$, and $avg\_preusage\_winter_i$ = the three pre-usage variables for customer i,

β_0 = is the intercept,
β_{1t}= a series of regression coefficients representing the difference in average daily usage between the treatment group and the control group in a given month t,
β_{2t} = a series of regression coefficients controlling for individual variability in the predicted kWh as a function of each participants' seasonal pre-treatment usage.

Because the treatment effect is interacted with the time variable, the data set can be truncated to observations corresponding only to the months of interest without any impact to the savings calculation.

By default, the model specification is fitted using standard OLS regression, which treats the variability of each observation as independent. However, because multiple observations are taken per participant over the course of time, observations from the same participant do not vary independently. Therefore, the standard error of the regression coefficient must be adjusted appropriately prior to interpreting the statistical significance of any given regression coefficient. ADM utilized a standard cluster-robust standard error correction to correct for the variation attributable to panel-data observations.[22]

8.3.4 Method for Calculating Program Level Savings

Monthly kWh savings are then taken by using the following equation:

$$monthly\_savings_t = -1 \cdot \beta_{1t} \cdot days_t \cdot participants_t$$

Equation 8-4: Monthly kWh Savings

Where:

t = a given month in the program year,
β_{1t} = the regression coefficient for the treatment effect of month t
$days_t$ = the number of days in the given month
$participants_t$ = the number of active participants in month t

Because the regression equation predicts average daily usage as a function of the treatment effect, and the treatment indicator has been coded as "1", the regression coefficient for the treatment effect of a given month should be negative if savings occurs. Therefore, multiplying the savings calculation by -1 will correct the sign of the results.

[22] Arai, Mahmood (2015). Cluster-robust standard errors using R. Department of Economics, Stockholm University, Stockholm, Sweden. URL https://www.ne.su.se/polopoly_fs/1.216115.1426234213!/menu/standard/file/clustering1.pdf.

Dual Participation Correction

Participants in both the treatment and control groups participate in other FirstEnergy energy efficiency programs. Furthermore, the "Home Energy Report" measure received by participants in the treatment group may cause treatment group participants to seek out other programs and measures offered in the Companies' efficiency portfolio more than the control group. To the extent that the treatment group participates in other Company energy efficiency programs at a rate above and beyond that of the control group, those incremental savings will be reflected in the gross energy savings calculated using the method above. However, savings for these items will also have been attributed to their respective programs and subprograms. ADM corrected for dual participation that occurred after treatment began to the extent that the treatment group participated at a higher rate than the control group.

Adjustment for Downstream Measures

For downstream measures, ADM conducted a review of the tracking and reporting system for each experimental cohort to identify EE program participation that occurred from the treatment start date onwards. The following steps detail the process of correcting for these measures:

- The measures for the treatment group and control group were assigned to an appropriate month based on the reported date of installation for measures installed after the treatment start date.
- For each month of the program year, the annual savings for all measures installed prior to the month of interest dating back to the treatment start date that had not yet reached the end of their effective useful life were summed for all active participants for each group. For measures installed prior to 2017, ADM used verified savings for dual participation analysis. For measures installed during 2017, ADM utilized reported savings due to verification activities occurring concurrently to the evaluation of the Behavioral program.
- The totaled savings for each group was then divided by 365.25 and then divided by the number of active customers in each group to create a daily average dual participation savings value per home.
- For each month, the daily average dual participation savings value per home for the control group was then subtracted from the daily average dual participation savings value per home from the treatment group. This resulted in an adjustment factor which was then multiplied by the number of active participants in the treatment group and subtracted from the monthly kWh savings.

Adjustment for Upstream Measures

Customer identifying information is not captured for point-of-sale rebates (commonly referred to as upstream measures). As with downstream program participation, participating in the Behavioral program may encourage participants to seek out additional cost-saving measures via FirstEnergy's residential upstream portfolio. The Evaluation Framework for Pennsylvania Act 129[23] provides an approximation of the effect of Behavioral program participation on upstream program participation and flat multipliers that can be used to discount the impact of upstream program participation on Behavioral program savings.

The following table provides the multiplier used as a function of the number of years since the treatment start date:

Table 8-2: Participation Levels for 2017 Behavioral Subprogram by Utility

Years Since Enrollment	Multiplier
1	99.25%
2	98.5%
3	97.75%
4 or more	97%

The multiplier is applied after downstream program participation has already been accounted for.

Method for Calculating kW Reduction

Annual savings for the Behavioral program is assumed to be primarily driven by reducing end use energy consumption (e.g., reducing HVAC usage or reducing interior lighting usage). On average, we can anticipate that the savings curve for the Behavioral program is directly related to the underlying end use load profiles from these primary savings drivers. Previous work conducted by ADM has shown high levels of collinearity between different residential end use load profiles and most residential energy use can be captured via HVAC load profiles and interior lighting load profiles. Therefore, ADM used these two load profiles to generate peak demand savings.

To generate peak demand savings, ADM used the following method:

Step 1: Normalize kWh Usage

ADM normalized the kWh savings value predicted by the impact evaluation regression model into a percent savings value by dividing each month's savings by the total annual

[23] NMR Group, Inc., EcoMetric Consulting, LLC, & Demand Side Analytics, LLC (2016). Evaluation Framework for Pennsylvania Act 129 Phase III Energy Efficiency and Conservation Programs. Pennsylvania Public Utility Commission. Pennsylvania. URL http://www.puc.state.pa.us/Electric/pdf/Act129/SWE_PhaseIII-Evaluation_Framework102616.pdf.

savings as follows:

$$\%\ savings_{my} = {kWh\ savings_{my}}/{kWh\ savings_{y}}$$

Equation 8-5: Normalization kWh Usage

Step 2: Calculate Monthly Load Factors for Component Variables

The model assumes a linear relationship between the end uses of interest and the percent savings calculated above. Because load shape information is available for multiple residential end uses at an 8,760 resolution, ADM can estimate the relationship between end use load shapes and percent savings to estimate total demand savings. To make sure that the model is interpretable, hourly load factors must be aggregated to a monthly resolution, providing a monthly load shape with 12 data points. To calculate monthly load shapes, ADM will take the sum of all hourly loads in a given month for each end use of interest.

Step 3: Fixed Multivariate Regression

To determine the relationship between the percent savings and the residential end uses, ADM used a multivariate regression approach. Because the model was used to assign weights to each end use, ADM held the intercept constant at 0 to ensure that the model produced percent weights for each end use. The following equation provides the model specification used:

$$\%\ savings_{my} = \beta_1 end\ use_{heat\ pump} + \beta_2 end\ use_{interior\ lighting}$$

Equation 8-6: Fixed Multivariate Regression

The regression coefficients for the above regression equation represent the relationship of each of the component variables to percent savings. Because both independent and dependent variables are calculated in units of months, the numerator of the regression weights are time invariant and can be used to estimate the percent contribution across any unit of time.

Step 4: Demand Savings Calculation

After obtaining the percent weight of each of the three end uses, the 8,760 end use load profiles are then scaled by applying the percent weight to the normalized end use load profile. The total normalized whole house load can then be assumed to be the sum of the weighted load of the three end uses at a given hour. Averaging this value for all hours of the peak demand window will provide an average peak demand whole building load. Multiplying this value by the total annual kWh savings will then predict the kW savings for the program year.

As with gross energy savings, ADM anticipates that some participants in the treatment group will also participate in other Company programs. Because the peak demand savings is predicted from the dual participation adjusted monthly savings, an additional adjustment does not be made.

8.3.5 Detailed Impact Evaluation Findings

The sections below detail the impact evaluation results for the Behavioral subprogram in 2017.

For all participants in across all service territories during 2017, e*x ante* expected annual savings were 18,991,737 kWh. The *ex post* verified annual electricity savings for all participants in 2017 were 17,388,872 kWh. The realization rate for electric savings was 92 percent.

For all participants combined across all service territories during 2017, *ex ante* expected critical peak demand reduction was 3,294.50 kW. The *ex post* verified critical peak demand reduction was 3,429.63 kW.

Table 8-3 Shows program-level results for kWh savings and kW reductions for the 2017 Behavioral subprogram for each of the Companies.

Table 8-3: Program Level Results for 2017 Behavioral Subprogram

EDC	***Ex Ante* Savings**		***Ex Post* Savings**		**Realization Rate**	
	kWh	**kW**	**kWh**	**kW**	**RR kWh**	**RR kW**
CEI	6,223,971	1,323.19	5,436,284	1,004.70	87%	76%
OE	11,372,700	1,743.95	10,695,632	2,181.19	94%	125%
TE	1,395,067	227.36	1,256,956	243.75	90%	107%
Total	**18,991,737**	**3,294.50**	**17,388,872**	**3,429.63**	**92%**	**104%**

Ex ante kWh and *ex post* kWh savings were generally consistent. The primary difference between the *ex ante* and *ex post* kWh savings stemmed from the correction for cross-program participation in other Company energy efficiency programs (a correction of 765,947 kWh across all three companies).

Household-Level kWh and kW Savings

The results from the regressions reported in Table 8-4 were used to determine annual kWh savings and kW reductions at the program level by month.

The 2017 program was administered from May 2017 through December 2017. Average savings was obtained by dividing the program-level savings by the total number of participants.

Table 8-4: Ex Post Annual Savings and Reductions per Customer for 2017 Behavioral Participant by EDC

EDC	Annual Savings (kWh/year)	Peak Demand Savings (kW)	Number of Participants	Average Savings Per Household (kWh/year)	Average Peak Demand Savings (kW)
CEI	5,436,284	1,004.70	72,942	74.53	0.01
OE	10,695,632	2,181.19	119,729	89.33	0.02
TE	1,256,956	243.75	29,768	42.23	0.01
Total	**17,388,872**	**3,429.63**	**222,439**	**78.17**	**0.01**

8.3.6 Subprogram-Level kWh Savings

Subprogram-level savings were determined by multiplying the average daily treatment effect by the number of days in that month and the number of active customers in that month. The *ex post* subprogram-level kWh savings by utility are shown in Table 8-5 below. Total kWh savings is 17,388,872 kWh for 2017.

Table 8-5: Ex Post Subprogram-Level Electric Energy Savings (kWh) for 2017 Behavioral Program by EDC

Month	CEI	OE	TE	Total
	Monthly Savings (kWh/month)	Monthly Savings (kWh/month)	Monthly Savings (kWh/month)	Monthly Savings (kWh/month)
May	188,438	150,376	14,474	353,288
June	568,001	561,636	31,699	1,161,336
July	693,985	874,077	123,003	1,691,066
August	955,232	1,167,490	285,561	2,408,284
September	845,930	1,563,714	285,433	2,695,077
October	792,512	1,954,852	143,439	2,890,803
November	639,206	2,165,102	111,798	2,916,106
December	752,980	2,258,385	261,549	3,272,913
Total kWh	**5,436,284**	**10,695,632**	**1,256,956**	**17,388,872**

8.3.7 Subprogram-Level Critical Peak Demand Impacts

Subprogram-level *ex post* peak demand savings were calculated using the method detailed in the methodology section above.

Table 8-6: Ex Post Subprogram-Level kW Reductions During Critical Peak Hours by Utility

EDC	Program Demand Reductions (kW)
OE	2,181.19
CEI	1,004.70
TE	243.75
Total kW	**3,429.63**

8.3.8 Results of Regression Analysis

The regression coefficients for the treatment effect, the standard error of the coefficient, and the R-squared of the model are reported below by month for both the 2013 cohort and the 2017 cohort by operating company. The model specification and variable definitions can be found in the methodology section above.

Table 8-7: Average Daily Treatment Effect by Month and Cohort for the 2017 Behavioral Subprogram

Month	CEI		OE		TE	
	2013 Group	2017 Group	2013 Group	2017 Group	2013 Group	2017 Group
May	-0.294 (0.131)	-0.017 (0.065)	-0.467 (0.128)	0.096 (0.077)	-0.294 (0.18)	0.082 (0.076)
June	-0.508 (0.16)	-0.194 (0.098)	-0.508 (0.15)	-0.056 (0.11)	-0.326 (0.223)	0.064 (0.114)
July	-0.525 (0.178)	-0.256 (0.114)	-0.583 (0.165)	-0.142 (0.124)	-0.373 (0.249)	-0.061 (0.133)
August	-0.7 (0.164)	-0.361 (0.109)	-0.655 (0.153)	-0.231 (0.117)	-0.415 (0.224)	-0.303 (0.123)
September	-0.593 (0.147)	-0.354 (0.104)	-0.715 (0.14)	-0.386 (0.112)	-0.416 (0.204)	-0.323 (0.114)
October	-0.554 (0.135)	-0.319 (0.097)	-0.785 (0.134)	-0.499 (0.112)	-0.201 (0.195)	-0.162 (0.109)
November	-0.507 (0.172)	-0.265 (0.132)	-0.701 (0.173)	-0.659 (0.156)	-0.089 (0.255)	-0.159 (0.149)
December	-0.507 (0.234)	-0.359 (0.189)	-0.768 (0.231)	-0.702 (0.217)	-0.248 (0.336)	-0.355 (0.204)
R-Squared	**0.5612**	**0.8005**	**0.5708**	**0.8022**	**0.5421**	**0.7746**

8.3.9 Detailed Process Evaluation Findings

The following section provides detailed findings from the process evaluation for the Behavioral subprogram of the Energy Efficient Homes Program.

Program Operations Perspective

The following section provides a detailed overview of the Behavioral subprogram design and operational landscape, constructed through in-depth discussions with the Companies' program staff and program implementation staff. The evaluation team also reviews the various mechanisms used to communicate with customers and guide program implementation practices. Program staff is encouraged to share their experiences, so the evaluation team can assess how the subprogram is meeting its objectives and if operational improvements can be made to better serve customers while delivering cost effective energy savings. This section will summarize key elements of subprogram design, management, marketing and outreach and implementation.

Program Design

The evaluation team conducted interviews with staff during the month of October 2017. Program staff provided feedback on subprogram design as well as energy and non-energy goals. They indicated the subprogram is designed to reach its energy savings goals while adhering to the budget.

Program staff in conjunction with the portfolio design team develops the energy savings goals for the overall portfolio, individual programs, and subprograms. This interdisciplinary team utilizes the programs' historical participation data and takes into consideration portfolio level needs, goals and possible constraints. Oracle developed the subprogram around these parameters. The subprogram is designed to generate greater awareness of home energy use and ways to manage energy use through energy efficiency conservation and education. Customers receive customized Home Energy Reports (HERs) that contain information about their home's energy use, compares that energy use to that of a group of similar households (both average and most efficient neighbors), and educates customers on low-cost measures, practices, and behaviors to reduce their energy use.

It is expected that through this education, customers will implement measures or adopt practices that will lead to more efficient energy use in their homes. Customers will receive the HER by. mail and those customers that have e-mail addresses on file with the Companies also receive e-mail HERs.

Program Management and Staffing

ADM evaluators spoke with program staff about their roles and responsibilities as it pertains to the Behavioral subprogram of the Energy Efficient Homes Program. The Residential program manager is responsible for program implementation and general oversight and is the interface between the Companies and program implementation contractor, Oracle. The Residential program manager is responsible for forecasting the program budget and energy savings, addressing implementation issues including communication with Oracle and reporting. The Residential program manager is also

responsible for resolving customer service issues that arise.

As the program implementer, Oracle is responsible for creating the output of customer information involved in participant selection and tracking energy savings. Oracle owns the software that creates the Home Energy Reports which are distributed to customers enrolled in the program. Oracle also hosts the website for participants to view additional energy savings tips.[24] A screenshot of the program website is displayed in Figure 8-1 below.

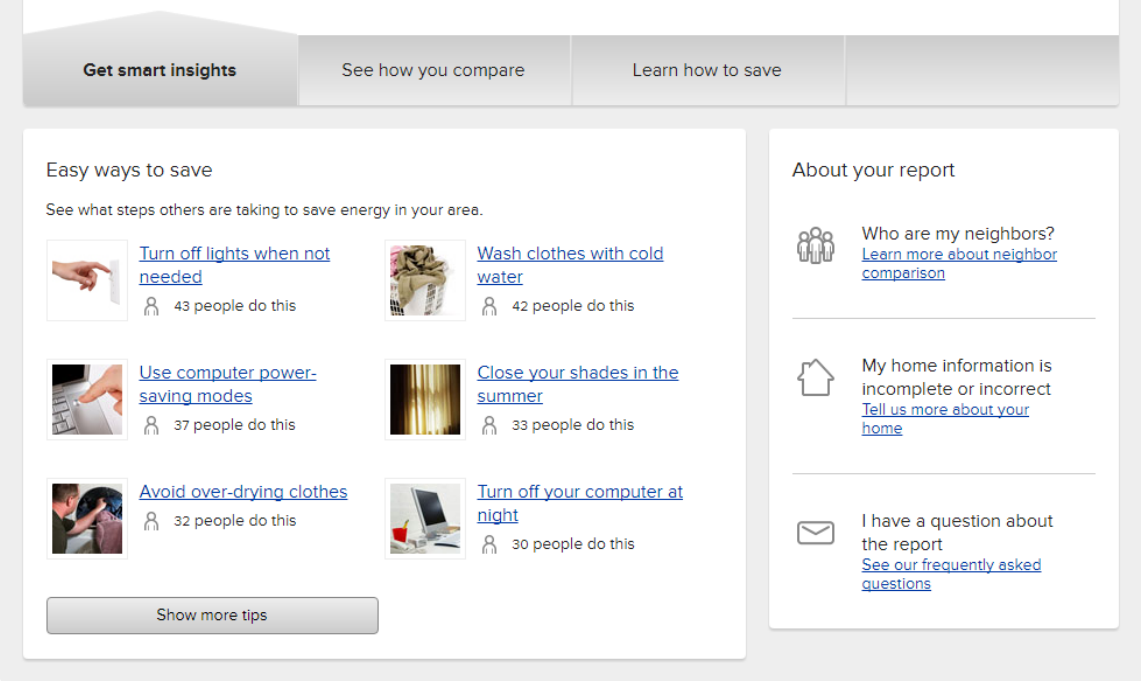


Figure 8-1: Home Page of Oracle's Website

General support for all online tools and questions regarding the report itself are handled by Oracle's customer experience call center. Printing and mailing of reports are subcontracted to a 3rd party vendor.

ADM spoke with the three key Oracle staff responsible for supporting the implementation of the Behavioral subprogram: (1) client success manager, (2) client success associate and (3) senior forecast analyst. The client success manager is responsible for helping deliver reports to customers, as well as working hand-in-hand with the client success associate on to enhance the reports and improve the program overall. The client success associate works on the timing of reports and also coordinates with the Companies' residential program manager on marketing modules. The senior forecast analyst is responsible for forecasting energy savings for the program, as well as reporting energy savings data to the Companies. The senior forecast analyst is involved in high-level

[24] Oracle's website: https://fete.opower.com/

program design, which includes how customers are selected for the program and how many reports are distributed per year. Oracle uses a third-party company for different aspects of program support, including printing and mailing the reports and the customer experience call center.

The Companies' residential program manager hosts a weekly meeting with Oracle to obtain status updates, discuss any issues related to the development and/or delivery of the HER, and report progress metrics, including online tools. Oracle observes week-to-week execution and meets based on program needs. Staff also email and speak on the phone as needed and in-between the regularly scheduled meetings. The staff interviewed indicated the relationship and level of communication between the residential program manager and program implementer team support the administration needs of the program.

2017 Program Launch and Changes

The Behavioral subprogram was relaunched in 2017 and met its target start date. The first reports were generated starting on May 21st; it took approximately two weeks for customers to receive their first report.

Marketing and Outreach

Customers cannot opt-into receive HERs, therefore there is no direct marketing associated with the Behavioral subprogram. The HERs do contain information on other energy efficiency programs offered by Companies.

Program Participation – Treatment vs. Control Group

Customers are selected to participate in the program. Oracle described how participants are selected:

- They started with the 2014 participant group. Then selected new participants based on specific eligibility criteria.
- Participants must have a valid mailing address and not be an outlier in terms of high or low energy use.
- Oracle will then choose customers from the group of highest usage households among those eligible. The reason they select the highest energy users to participate is because those are the households with the greatest savings potential.
- Participants are then randomly assigned to the treatment group and the control group. The overall size of the treatment group is based on program needs/savings goals.
- On rare occurrences, customers have requested to participate in the subprogram and receive a Home Energy Report. In such instances, the customer is put on a

list and Oracle adds them if they meet the eligibility criteria.

Once the treatment group has received its first report, tracking energy usage between the two groups begins. Customers can opt-out of the program at any time by going online or calling the customer experience call center.

On a monthly basis, Oracle completes a template with reporting results. Overall, program staff indicated that the template used to report savings activity is sufficient for the administering the Behavioral subprogram.

Behavioral Participant Survey

This section summarizes feedback received from a sample (215 responses) of Energy Behavioral subprogram participants, as well as a sample (81 responses) of non-participants (control group). The evaluation team contracted with VuPoint Research to conduct telephone surveys of both program participants and non-participants. The surveys collected data on program experiences (participant group only), energy efficiency knowledge, experiences with installed equipment and energy efficiency behaviors, cross program awareness, satisfaction (participant group only), and home characteristics.

The goal of having two groups (participants and non-participants) for this program was to have a separate control group to identify if there were any significant changes in overall energy efficiency knowledge and/or behaviors from those who received Home Energy Reports (participant group) and those who did not (control group).

Program Experiences

Program participants received paper copies of their HER monthly, via mail, as well as emails with energy savings tips. Program participants, as well as non-participants, could also access their home's energy information and additional energy saving tips via the program website. Non-participants who were not enrolled in the program did not receive Home Energy Reports or emails with energy saving tips. Figure 8-2 summarizes how many HERs survey respondents recall receiving during 2017. Most respondents (54%) reported receiving 3 – 4 reports and out of those who received reports, 98% said they had read all or some of the reports they received.

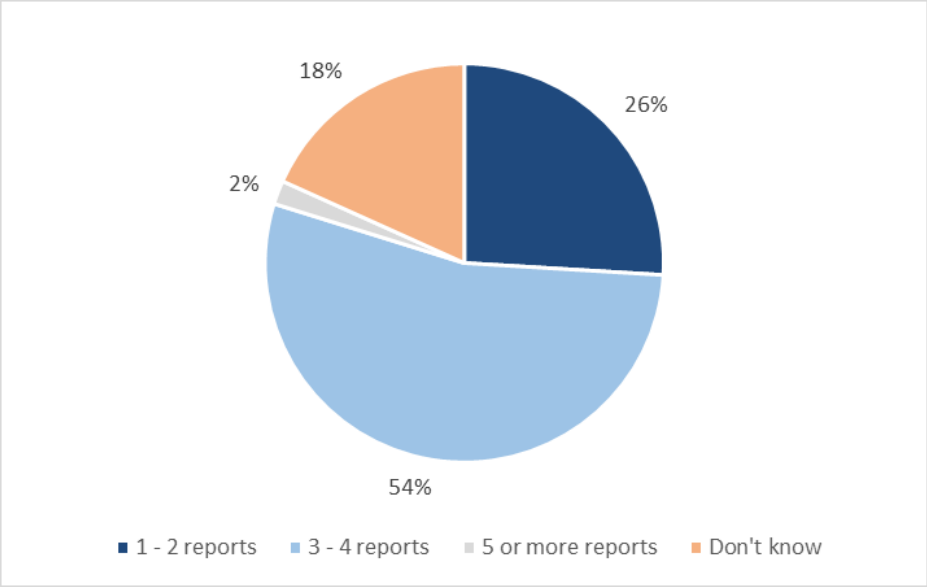


Figure 8-2: Number of Reports Received in 2017

Figure 8-3 summarizes how valuable information in the HERs was to program participants. Respondents reported the most valuable information (rated as very valuable) to be the energy savings tips/recommendations (53%) and the comparison of their household energy use to similar households (50%). In comparison, respondents reported the least valuable information (rated as not very valuable) to be the information on appliance recycling (27%) and the frequently asked questions (26%). However, most respondents found the information on the HERs to be very or somewhat easy to understand (93%), as well as being very or somewhat accurate (67%).

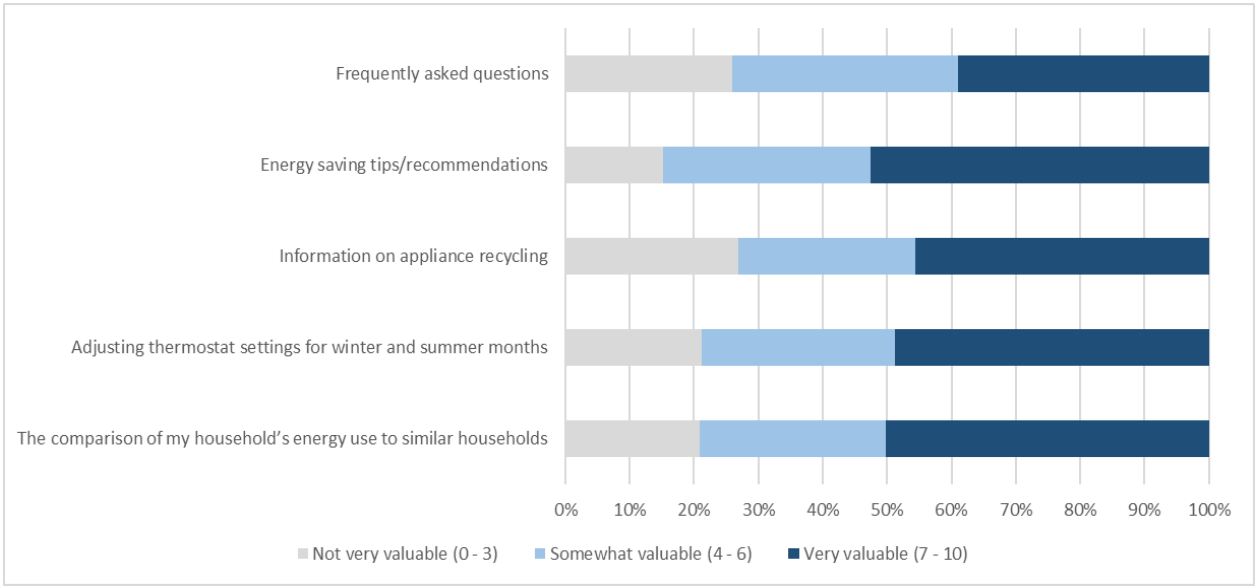


Figure 8-3: Information Provided in HERs

In addition to receiving the HERS, participants in the program also received emails throughout 2017 with energy savings tips. Most respondents reported receiving those emails (61%) and out of those who received emails, 97% said they had read all or some of the emails they received. Most respondents (83%) who received those emails found the information to be somewhat or very valuable.

In addition to the HERs, participants can also access their home's every use information and additional energy saving tips via the program website. Seventy-six percent of respondents indicated they had never visited the website, while 20% had visited the website and 4% were unable to answer. Those that had visited the website provided additional feedback regarding the extent to which they explored the website and accessed energy savings tips that were unique to their home, Table 8-8 below summarizes the feedback.

Table 8-8 Experience with the Website

Which of the following best describes your experience(s) with the program website?	Total	
	n	Percent
You logged in on the website with your utility account number and reviewed energy use information and tips that were unique to your home.	27	64%
You have not created an account on the website, but you visited the website site and reviewed the general energy savings tips.	10	24%
Other	1	2%
Don't know	4	10%

Energy Efficiency Knowledge

Both the participant group and control group were surveyed about energy efficiency attitudes, knowledge, and intent. For the people who participated in the program, the majority of respondents (67%) reported at least 7 or higher on a scale of 1 to 10 (where 1 means "not at all knowledgeable" and 10 means "very knowledgeable") about ways to save energy in their home. In addition to being knowledgeable, most participant survey respondents (62%) reported at least 7 or higher on a scale of 1 to 10 (where 1 means "you have not done much" and 10 means "you have done almost everything you can") doing almost everything they could to lower their monthly gas bill in their home.

Figure 8-4 summarizes how program participants either agreed or disagreed with statements about energy efficiency in their home. Respondents most strongly agreed that saving energy is important (68%), as well as understanding how their actions affect their energy use (58%) and being concerned about their household's energy costs (58%).

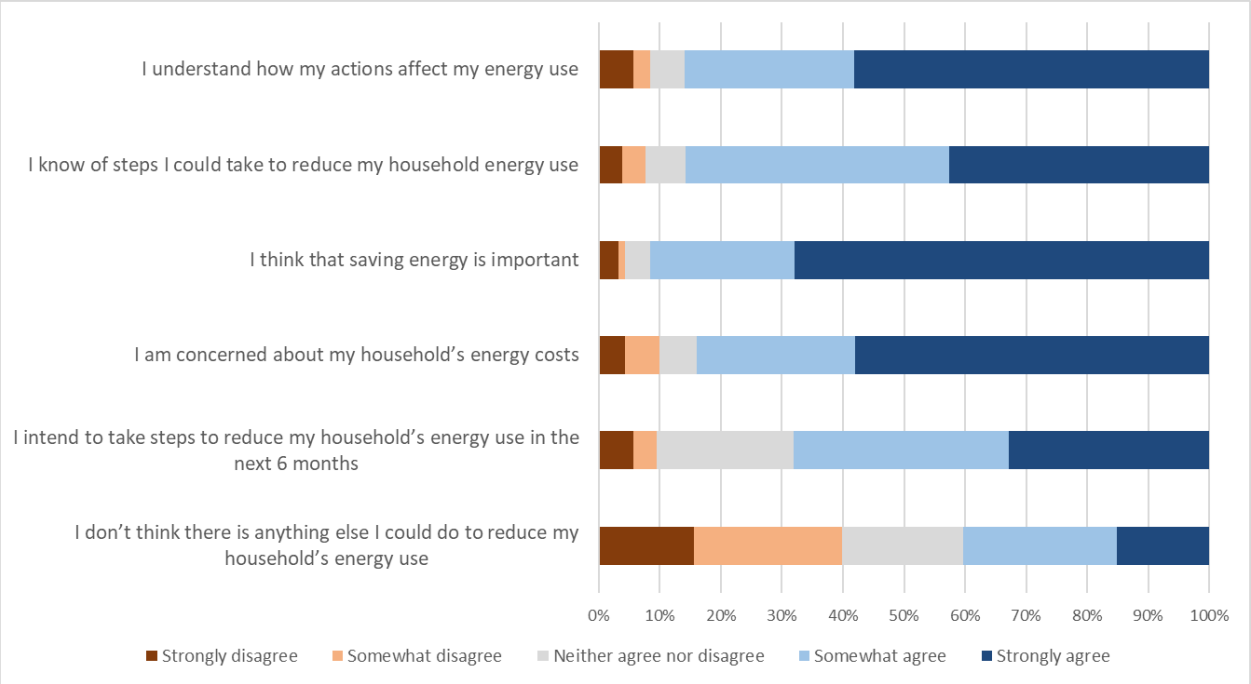


Figure 8-4: Energy Efficiency Knowledge and Intent

The survey results indicate that while customers do feel knowledgeable about ways to save energy and report that they do take action to save energy, there is still significant opportunity to provide information on home energy use and energy savings tips to residential customers who don't feel as knowledgeable and who are not taking action to save energy in their homes.

Experiences with Installed Equipment and Energy Efficiency Behaviors

Both the participant group and control group provided feedback regarding ways they conserve energy in their homes, energy efficiency measures installed, and any rebates received the installation of those measures. During 2017, 86% of program participants and 81% of program non-participants reported taking actions to reduce their energy use, those actions taken specifically by participants is summarized in Figure 8-5 below.

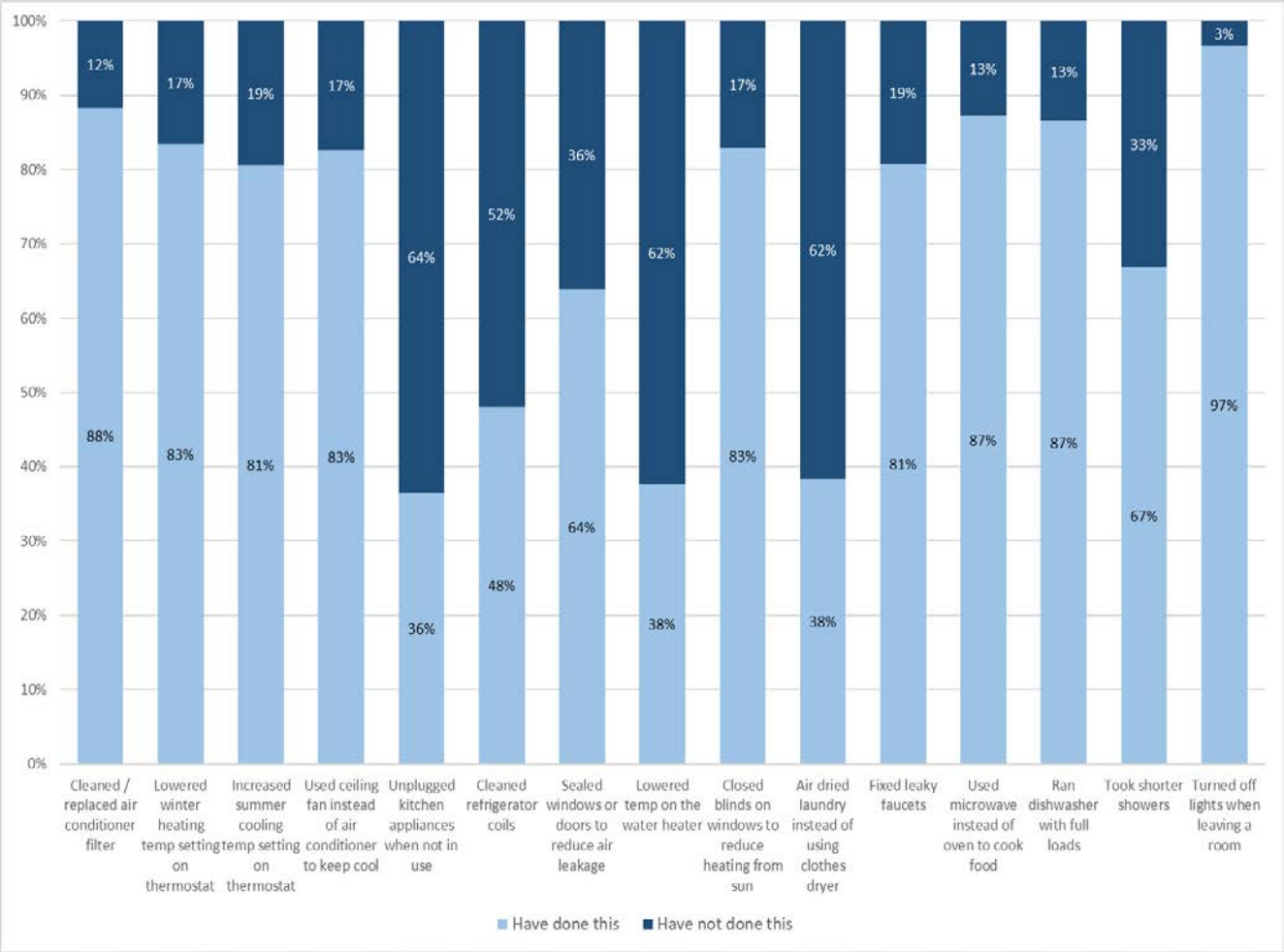
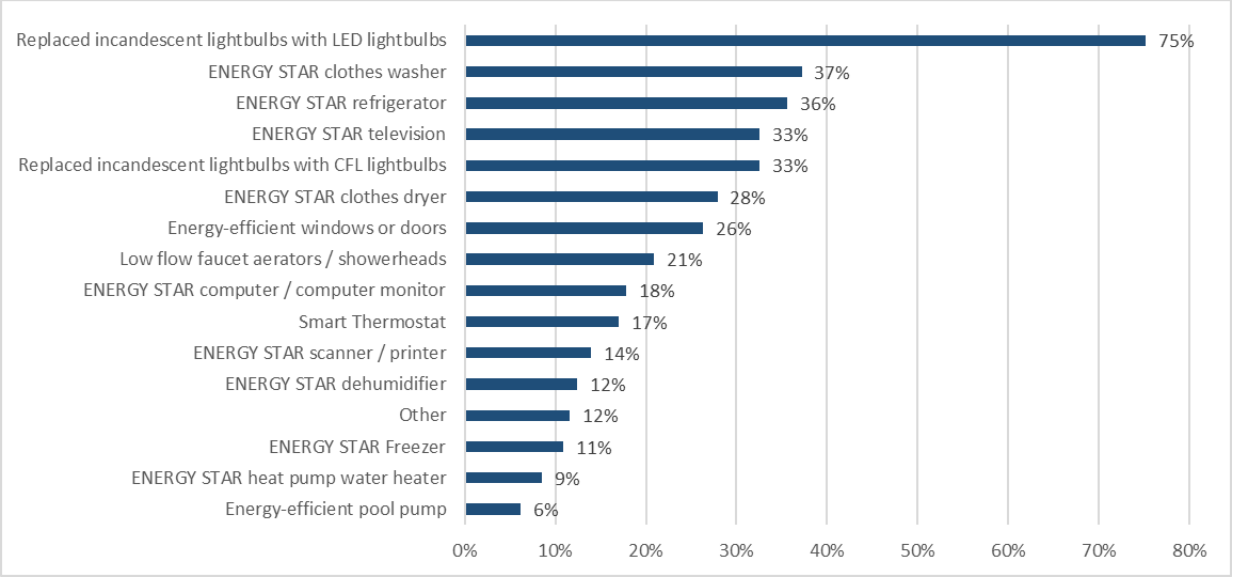


Figure 8-5: Energy Reducing Actions Taken

In addition to the energy reducing actions listed above, 49% of respondents took additional actions not listed in the survey. Most notably, respondents reported using alternative sources to heat their homes, such as kerosene heaters, pellet stoves, and wood burning fireplaces.

The majority of respondents (82%) reported that the information provided through the HERs, tips emails, or program website were very or somewhat important in their decision in taking actions to save energy in 2017. In addition to these actions, 62% of program participants also reported installing energy-efficient equipment/appliances or making energy efficiency improvements, which are summarized in Figure 8-6.



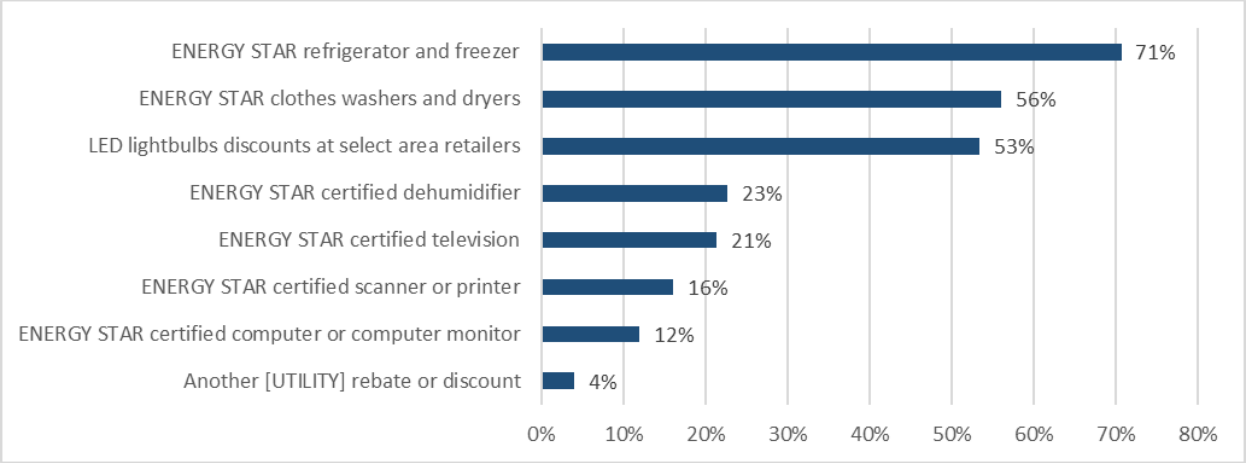
Note: The sum of percentages may exceed 100% because respondents could choose more than one response.

Figure 8-6: Energy Efficient Equipment Installed

Thirteen percent of survey respondents reported applying for a rebate for the energy efficient equipment they had installed in 2017. Forty-nine total people who installed additional energy efficient equipment went on to say that they did not apply for a rebate because they were not aware the rebates were available. In deciding to install energy efficient equipment in 2017, most respondents (77%) reported the information provided through the home energy reports, tips emails or program website as being very or somewhat important in that decision.

Cross Program Awareness

The Companies also offer discounts and rebates on energy-efficient equipment, and 39% of program participants reported being aware of them, while 23% of non-participants were aware of the discounts and rebates. The feedback suggests that customers enrolled in the Behavioral subprogram were more aware of the discounts and rebates that the Companies offer on energy efficient equipment than people who were not enrolled in the subprogram. Program participants who were aware of the discounts and rebates had most commonly reported knowing about ENERGY STAR refrigerator and freezer rebates/discounts (71%). Other rebates and discounts program participants reported being aware of were for ENERGY STAR clothes washers and dryers (56%) and LED lightbulb discounts at select area retailers (53%). Figure 8-7 displays the results.



Note: Percentages may exceed 100% because respondents could choose more than one response.

Figure 8-7: Cross-Program Awareness

Table 8-9 summarizes the various sources of rebate/discount awareness identified by survey respondents. Most frequently mentioned, by 32% of respondents, was from an email from the Companies. Other common sources included the Home Energy Report (23%) or a print advertisement (12%).

Table 8-9: Sources of Rebate/Discount Awareness

How did you learn of the rebates and discounts that [UTILITY] provides?	Total	
	n	Percent
Home Energy Report	18	23%
Email from [UTILITY]	25	32%
Internet search	2	3%
[UTILTIY] website	7	9%
Print advertisement	9	12%
Service provider or contractor	1	1%
Friend, family, or colleague	5	6%
Recorded phone message	0	0%
Other	3	4%
Don't know	8	10%

Satisfaction

Program participants indicated their levels of satisfaction with certain information provided in the HER, as well as their satisfaction with one of the energy saving behaviors promoted in the program. The majority of program participants surveyed (64%) reported being very or somewhat satisfied with the comparison of their household's energy use to similar households (provided in the HER). The majority of respondents (52%) also reported being

very or somewhat satisfied (58%) with adjusting thermostat setting for winter and summer months in order to save energy. Figure 8-8 summarizes all satisfaction levels for both of measures mentioned above.

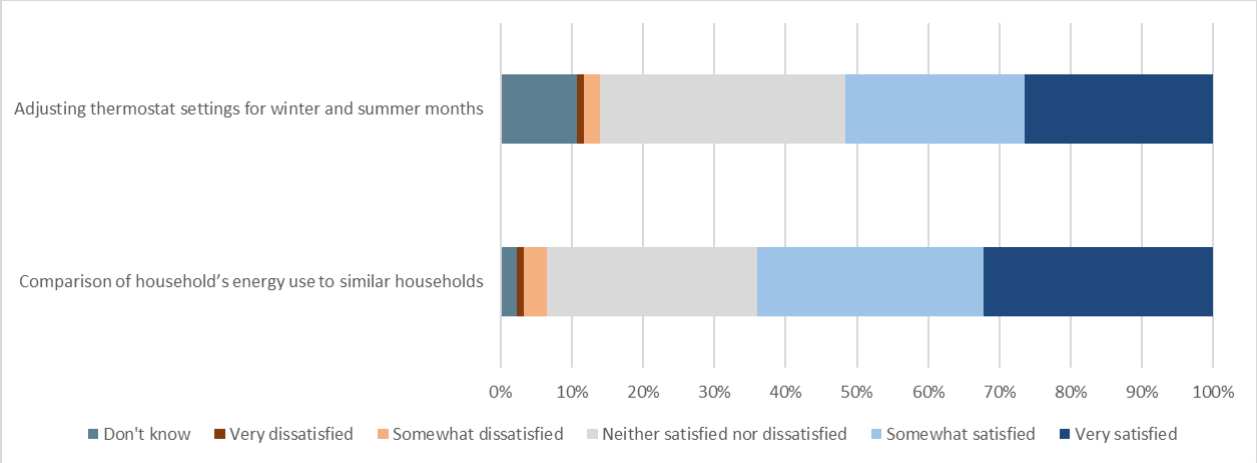


Figure 8-8: Various Aspects of the Program Satisfaction

Home Characteristics

Both the participant group and control group provided feedback regarding their homes' characteristics, such as overall home square footage, household size and the type of fuel used for water heating and whole home heating. The majority of the program participants surveyed used natural gas to heat both the water in their home (56%) and their home itself (57%). The second most common way to heat both the water in their home (38%) and their home itself (30%) was electricity. Non-participants used similar fuel types, with using natural gas being the most common way to heat both the water in their home (54%) and their home itself (60%). As for overall home size, most program participants (78%) lived in a home between that was between 1,001 and 3,000 square feet, while 37% of the control group live in homes between 1,001 and 3,000 square feet. It is important to note that people enrolled in the Behavioral subprogram were chosen based on higher energy usage in their homes compared to the rest of the population in their areas.

Table 8-10: Home Characteristics

Home Characteristics	Participant Group	Control Group
Home Square Footage		
Less than 1,000 sq ft	5%	2%
1,001 - 2,000 sq ft	44%	23%
2,001 - 3,000 sq ft	34%	14%
3,001 - 4,000 sq ft	13%	17%
4,001 - 5,000 sq ft	4%	16%
More than 5,000 square feet	0%	1%
Don't know	16%	28%
Household Size		
1 - 2 people	46%	39%
3 - 4 people	37%	46%
5 - 6 people	12%	14%
More than 6 people	3%	1%
Don't know	2%	0%
Water Heating Type		
Natural gas	56%	54%
Electricity	38%	42%
Propane	4%	2%
Other	0%	1%
Don't know	1%	0%
Whole Home Heating Type		
Natural gas	57%	60%
Electricity	30%	31%
Propane	7%	4%
Other	5%	2%
Don't know	1%	2%

9 Low Income Program Participation

The Companies expanded their evaluation, measurement and verification effort to identify participation and savings from low income customers in the residential programs. A “low income” customer was defined by household income below 150% of Federal Poverty Level.

Table 9-1 shows the quantity of units, kWh, and kW that can be attributed to low income population participant in the EE Homes Program.

Table 9-1: Savings Attributable to Low Income Customers

EDC	Subprogram	Percentage of Low Income Purchasers	Quantity	kWh Savings	kW Savings
CEI	Audits & Education	41%	1,198	317,367	71.86
	Behavioral	15.60%	11,379	970,939	206.42
	Energy Efficiency Kits	22.90%	13,424	4,977,063	533.21
	School Education	22.20%	3,548	1,244,572	130.17
	Sub-Total	23.30%	35,058	8,000,781	1,028.28
OE	Audits & Education	33%	1,411	200,373	28.22
	Behavioral	13.70%	16,403	1,558,060	238.92
	Energy Efficiency Kits	24.30%	18,935	7,276,127	786.87
	School Education	0%	0	0	0.00
	Sub-Total	22.50%	50,244	11,120,431	1,316.74
TE	Audits & Education	17.50%	216	34,552	4.32
	Behavioral	9.70%	2,887	135,321	22.05
	Energy Efficiency Kits	27.10%	5,482	2,099,390	226.84
	School Education	0%	0	0	0.00
	Sub-Total	18.10%	10,869	2,250,674	255.72
Total	Audits & Education	30.70%	2,588	484,660	87.64
	Behavioral	13.10%	29,140	2,487,918	431.58
	Energy Efficiency Kits	24.80%	38,879	14,737,062	1,588.10
	School Education	22.20%	10,253	3,597,031	376.21
	EE Homes Program Total	**21.50%**	**93,272**	**20,682,337**	**2,510.82**

10 Conclusions and Recommendations

10.1 Program Operations Conclusions

The major conclusions and recommendations for each Home Performance subprogram are summarized below.

10.1.1 Audits & Education Conclusions

The Companies' residential program manager handles day-to-day operations and oversight of the Audits & Education subprogram. Aclara has hosted the Home Energy Analyzer tool since 2009 and does not play a role with outreach and/or support. Communication between the residential program manager, program staff, customer call center, and Aclara is sufficient for supporting the administrative needs of the program.

Customers can also complete an audit via the customer call center. The customer typically calls for high bill complaint. The customer service representative (CSR) asks the customer questions about their home including size, ownership status, heating type. The CSR may identify top three energy users and provide tips over the phone. They may also direct them to the Energy Save Ohio website and send them a brochure in the mail that provides information on ways to save energy.

Staff considers key strengths of the Audit & Education subprogram to be the Home Energy Analyzer's ease of use, the good energy savings recommendations it provides, and the fact that it serves a gateway to market other energy efficiency programs to customers via increased traffic to the Energy Save Ohio website.

The vast majority of participants learned about the Home Energy Analyzer through the Companies' website. Most reported they accessed the tool because of interest in their home's energy use and ways to conserve energy, or due to concerns about a high bill.

While using the tool, most reported they reviewed their bill usage over time and obtained detailed information about their home energy use and energy savings ideas including weatherization tips. Approximately half of the 2017 participants' surveyed indicated they stopped halfway through. The feedback suggests that participants are accessing the tool but not exploring the entire content available.

Participants provided feedback regarding what energy-savings actions they were able to take as a result of using the Home Energy Analyzer. Most frequently mentioned were behavioral changes such as turning off lights when not in use and lowering the heating temperature on the thermostat during winter months. Of those that made structural changes, most indicated they upgraded appliances and lighting. Both participant and control group survey respondents indicated they more frequently change their energy use behavior in the cold weather.

Participants reported high levels of satisfaction with the energy savings they've noticed on their electric bills and the program overall. Several respondents offered suggestions for improving the tool including more no-cost options, assistance with purchasing high-efficiency appliances and improving the user-interface.

10.1.2 Energy Efficiency Kits Conclusions

The most significant change that occurred in 2017 was the move from CFLs to LEDs. Although there is one specialty CFL still in the kit, all other kit bulbs are LEDs.

Survey respondents indicated they most frequently requested kits over the phone. Once received, 94% of respondents reported installing some or all of the measures. The measure most frequently installed was the LED nightlights, followed by 9-Watt LED bulb, the 15-watt LED bulb, and the 3-way CFL. The primary reason for not installing measures was the customer was waiting for other bulbs to burn out or they just have not had the time yet.

Customers reported that saving energy and money were the primary benefits that motivated them to order the Energy Efficiency kit. They found the 3-way CFL, the 9-watt LED, and the 15-watt LED as the most useful measures.

Customers reported high levels of satisfaction with the Energy Efficiency Kits subprogram. Over 90% of respondents were satisfied or very satisfied with the kit contents and the educational materials provided in the kit. Over 80% of respondents were either satisfied or very satisfied with the time it took to receive the kit. Many customers (67%) also noted that their knowledge of ways to save energy increased significantly.

Participants' reported moderate levels of cross-program awareness. About half of the survey respondents were aware of other opportunities to receive rebates or purchase energy-efficient equipment at discounted prices. Of those that were aware of other programs, just under half reported they learned of other opportunities through the kit.

10.1.3 School Education Conclusions

Overall, the findings from the program staff interviews suggest that the School Education subprogram 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 (AMCG) is well-suited to effectively and efficiently manage program operations and has extensive experience in administering similar programs in other areas. The Companies' program staff noted that AMCG successfully fulfills the kit orders and provides program data and invoicing in a timely manner. The Companies' staff attributed successful program implementation to consistent communication between the Companies and AMCG and the institutional knowledge held

by the various contractors who work to deliver the program offerings.

Most participants were motivated to order the kit because of their child's interest in the kit as well as the monetary incentives available to the school.

Installation rates for the various measure types were just under 50% for the LED bulbs and just under 90% for the LED nightlight; the main reason for parents not installing the bulbs was because they were waiting for other bulbs to burn out first.

Participant satisfaction ratings and other comments suggest that customers highly value the program and that there are no systematic issues with kit contents included in the kit or the process of customer engagement and education.

The program provides participants with valuable information regarding energy efficiency education, and parents have a greater understanding of energy efficiency since they've received the kit. However, few very survey respondents (8%) were motivated to purchase additional energy efficiency measures as a result of their experience with the program.

Cross-program awareness is low. Less than half of the survey respondents indicated they were aware of discounts and rebates offered by the Companies.

10.1.4 Behavioral Conclusions

The Companies' residential program manager handles day-to-day operations and oversight of the overall program, as well as the point of contact with the program implementer. Oracle (formerly Opower) is the program implementer and handles the software that creates the Home Energy Reports (HERs) and hosts the website where participants can view additional energy saving tips. They are also responsible for participant selection, printing/mailing of reports, tracking energy savings and participation, and customers service support.

As customers cannot opt-in to the program, there is no general marketing associated with the program. Cross-program marketing for other programs is included in the reports. Customers enrolled in the Behavioral subprogram were selected based on higher energy usage in their homes compared to the rest of the population in their areas.

The Companies' residential program manager considers the strengths of this program to be the overall format of the program specifically the reports and the accompanying software, and the fact that the program is an efficient gateway to market other energy efficiency programs to customers. Oracle considers one of the strengths of this program to be a straightforward program implementation process.

Program participants reported that the most valuable information provided on the Home Energy Reports was the energy savings tips/recommendations and the comparison of their household energy use to similar households. The majority of survey respondents reported that the information provided through the Home Energy Reports, tips emails, or

program website was very or somewhat important in their decision in taking actions to save energy in 2017.

Only a small percentage of program participants reported applying for a rebate for any energy efficient equipment they had installed in 2017. The majority of the people who installed additional energy-efficient equipment said they did not apply for a rebate because they were not aware the rebates were available. Although, customers enrolled in the Behavioral subprogram (39%) were more aware of the discounts and rebates that the Companies offer for energy-efficient equipment than customers who were not enrolled in the program (23%).

10.2 Recommendations

ADM offers the following recommendations for consideration for future program cycles.

Audits & Education Recommendations:

- Utilize the Audits as a means for cross-promoting other residential energy efficiency programs offered by the Companies.
- Increase the number of suggestions offered for ways to save energy during hot months. Survey feedback indicates that both the participant and control groups more frequently made behavioral changes during colder months and not as frequently during hot months.

Energy Efficiency Kits Recommendations:

- Continue to cross-promote other programs through the kits. Feedback suggests that the kits do generate a moderate amount of awareness of other programs. Consider more detailed information about the other programs including retail locations where discounted products/appliance can be purchased, etc.

School Education Recommendations:

- Continue to cross-promote other programs through the kits. Feedback suggests that the kits do generate a moderate amount of awareness of other programs. Consider more detailed information about the other programs including retail locations where discounted products/appliance can be purchased, etc.

Behavioral Recommendations:

- Emphasize the ways in which program participants can access more detailed information about their home energy use through the program website and energy savings tips. Few participants are accessing these tools; the ones that are found them to be influential in their decision to implement additional energy savings equipment and make behavioral changes.
- Continue to utilize the HERs as a way to inform residential customers about their

home energy use and cross-promote other rebate programs provided by the Companies. While cross-program awareness was relatively low, customers that received the reports were more aware than the control group. The feedback suggests the reports are a good way in which the Companies can continue to cross-promote programs. Consider the benefit of identifying specific retail locations where high-efficiency equipment can be purchased at a discounted price or where a customer can apply for a rebate.

11 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 11-1 below.

Lifetime Savings = Measure Life x Annualized Savings

Equation 11-1: Normalization kWh Usage

11.1 Audits & Education

Table 11-1: Annual kWh & kW Savings by Operating Company

EDC	***Ex Ante* Savings**		***Ex Post* Savings**		**RR**	
	kWh	**kW**	**kWh**	**kW**	**kWh**	**kW**
CEI	774,065	175.26	1,062,426	175.26	137%	100%
OE	607,192	85.12	1,555,267	256.56	256%	300%
TE	197,440	24.68	448,830	74.04	227%	300%
Total	**1,578,697**	**285.46**	**3,066,523**	**505.86**	**194%**	**177%**

Table 11-2: Annual Ex Post & Lifetime Savings

EDC	***Ex Post* Savings**		**Lifetime**
	kWh	**kW**	**kWh**
CEI	1,062,426	175.26	3,187,278
OE	1,555,267	256.26	4,665,801
TE	448,830	74.04	1,346,490
Total	**3,066,523**	**505.86**	**9,199,569**

11.2 Energy Efficiency Kits

Table 11-3 :Annual kWh & kW Savings by Operating Company

EDC	*Ex Ante* Savings		*Ex Post* Savings		RR	
	kWh	kW	kWh	kW	kWh	kW
CEI	21,733,900	2,328.43	24,479,376	2,791.81	113%	120%
OE	29,942,910	3,238.15	33,288,445	3,829.05	111%	118%
TE	7,746,828	837.06	8,622,726	991.06	111%	118%
Total	**59,423,638**	**6,403.64**	**66,390,546**	**7,611.92**	**112%**	**119%**

Table 11-4:Annual Ex Post & Lifetime Savings

EDC	*Ex Post* Savings		Lifetime
	kWh	kW	kWh
CEI	24,479,376	2,792.81	148,746,511
OE	33,288,445	3,829.05	225,474,451
TE	8,622,726	991.06	57,848,476
Total	**66,390,546**	**7,611.92**	**432,069,438**

11.1 School Education

Table 11-5: Annual kWh & kW Savings by Operating Company

EDC	*Ex Ante* Savings		*Ex Post* Savings		RR	
	kWh	kW	kWh	kW	kWh	kW
CEI	5,606,180	586.34	4,307,091	456.91	77%	78%
OE	7,501,335	784.55	5,763,093	611.36	77%	78%
TE	3,095,327	323.73	2,378,064	252.27	77%	78%
Total	**16,202,843**	**1,694.62**	**12,448,248**	**1,320.54**	**77%**	**78%**

Table 11-6 Annual Ex Post & Lifetime Savings

EDC	*Ex Post* Savings		Lifetime
	kWh	kW	kWh
CEI	4,307,091	456.91	56,623,376
OE	5,763,093	611.36	75,764,770
TE	2,378,064	252.27	31,263,332
Total	12,448,248	1,320.54	163,651,478

11.2 Behavioral

Table 11-7: Annual kWh & kW Savings by Operating Company

EDC	*Ex Ante* Savings		*Ex Post* Savings		RR	
	kWh	kW	kWh	kW	kWh	kW
CEI	6,223,971	1,323.19	5,436,284	1,004.70	87%	76%
OE	11,372,700	1,743.95	10,695,632	2,181.19	94%	125%
TE	1,395,067	227.36	1,256,956	243.75	90%	107%
Total	**18,991,737**	**3,294.50**	**17,388,872**	**3,429.63**	**92%**	**104%**

Table 11-8: Annual Ex Post & Lifetime Savings

Program	EDC	*Ex Post* Savings		Lifetime
		kWh	kW	kWh
Behavioral	CEI	5,436,284	1,004.70	5,436,284
Behavioral	OE	10,695,632	2,181.19	10,695,632
Behavioral	TE	1,256,956	243.75	1,256,956
	Total	**17,388,872**	**3,429.63**	**17,388,872**

12 Appendix B: Audit Survey Instruments

12.1 Online Audit Participant Online Survey

Email Survey Introduction [DO NOT DISPLAY]

Hello. I'm contacting you on behalf of [UTILITY]. According to our records you recently completed a home energy audit via the Home Energy Analyzer online tool on or around [INSERT DATE]. We would like to hear about your experience. Please take a few moments to complete the online survey using the password provided below. We'll send you a $5 Walmart gift card as our way of saying thanks.

Your response will be kept anonymous and will be used to improve the program in the future.

You can access the survey at:
Your password is:

Thank you in advance for your time!

Kind Regards,

ADM Staff Contact
ADM Associates / Contractor to [NAME OF EDC]

1. First, could you tell me how you heard about the Home Energy Analyzer?
    1. FirstEnergy Utility website
    2. Word-of-Mouth
    97. Other (Specify)

2. 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? [Check all the apply]
    1. Investigate –To learn more about my home's energy use
    2. Financial (High Bills)
    3. Conserve Energy
    97. Other (Specify)
    98. Don't know

3. Using 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

97. Other _____ [Specify]
98. Don’t know

4. Did you complete the entire online audit?

    1. Yes
    2. No
    98. Don't know

[DISPLAY Q5 IF Q4 = 2]

5. 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 were out of budget

6. What kind of detailed energy saving suggestions 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]

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

[DISPLAY Q8 IF Q7 = 4 or 5]

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. Appliance upgrade (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

[DISPLAY Q11 IF Q10 = 1 or 3]
11. What appliances and/or equipment did you upgrade? [Select all that apply]
    1. Appliance
    2. HVAC
    3. Lighting
    4. Water Heater
    97. Other (Specify)

[DISPLAY Q12 IF Q10 = 2 or 3]
12. What behavioral changes did you make?[Check all that apply]
    1. Turned off lights more frequently
    2. Cleaned or replaced air conditioner filter
    3. Lowered the winter heating temperature setting on my thermostat (so that the heater ran less)
    4. Increased the summer cooling temperature setting on my thermostat (so that the air conditioner ran less)
    5. Used a ceiling fan instead of my air conditioner to keep cool
    6. Unplugged kitchen appliances when not in use
    7. Cleaned refrigerator coils
    8. Sealed windows or doors to reduce air leakage
    9. Lowered the temperature on the water heater
    10. Closed blinds on windows to reduce heating from the sun
    11. Air dried laundry instead of using the clothes dryer
    12. Fixed leaky faucets
    13. Used the microwave instead of the oven to cook food
    14. Ran the dishwasher with full loads
    15. Took shorter showers
    97. Other (Specify)

[DISPLAY Q13 IF Q10 = 1 or 3]
13. Are the appliance(s)/equipment/material that you purchased still installed?
    1. Yes, it's still installed
    2. No, I removed it/took it out
    98. Don't know

[DISPLAY Q14 IF Q10 = 1 OR 3]
14. How satisfied are you with your new appliance(s)/equipment/materials?
    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    98. Don't know

[DISPLAY Q15 IF Q10 = 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 Q10 = 2 or 3]
17. Do you do things differently now to save energy in cold weather?
    1. Yes
    2. No
    3. Don't know

[DISPLAY Q18IF Q17 = 1]
18. What do you do differently now?

[DISPLAY Q19 IF Q10 = 2 or 3]
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

[DISPLAY Q20 IF Q10= 2 or 3]
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

[DISPLAY Q21 IF Q20 = 1]
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

[DISPLAY Q23 IF Q22 = 4 or 5]

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

[DISPLAY Q25 IF Q24 = 1]

25. What are your suggestions for improving the Home Energy Analyzer?

Demographic Information [DO NOT DISPLAY]

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

[DISPLAY Q31 IF Q30 = 1]

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

32. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

    1. _____ Record Number [1-97]
    98. Don’t know
    98. Refused

33. What is your approximate total household income? [READ CATEGORIES]
    1. Less than $10,000
    2. $10,000 to $29,999
    3. $30,000 to $49,999
    4. $50,000 to $69,999
    5. $70,000 to $89,999
    6. $90,000 to $99,999
    7. $100,000 to $149,999
    8. $150,000 or more

98. Don’t know
99. Refused

34. Thank you for your time in answering questions regarding the Online Audits Program in Ohio. We have finished with the questions we have for this survey. We would like to mail you a $5 Walmart gift card for your participation. To do that, I’ll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.

First name
Last name
Mailing Address
City
State
Zip code

Valediction

Thank you for taking our survey. Have a great day!

12.2 Online Audit Participant Telephone Survey

Introduction for phone administration

Hello. My name is _____. I am calling on behalf of [UTILITY]. You recently called the Customer Service Center and I’d like to speak with you about your experience. I’m wondering if you made the call and if you have a few minutes to answer my questions? We’ll send you a $5 Walmart gift card as our way of saying thanks.

(If not the right person) May I please speak to the person who would know the most about this call?

REPEAT INTRODUCTION AND CONTINUE

(If the correct person) Do you have 5 to 10 minutes to complete a survey regarding your experiences with the call and information provided?

1. Yes
2. No

[If Intro=2, terminate survey]

1. Our records indicate that you called the Customer Service Center in [month that customer called]. Can you tell me why you called the Customer Service Center? What were your concerns? [Check all that apply, Prompt if necessary]

    1. High Bill Complaint
    2. Meter Issue

3. Power Outage
4. Interested in ways to conserve energy
5. 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. Other _____[Specify]
    98. Don’t know

3. How helpful was the information provided over the phone? 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

[DISPLAY Q4 IF Q3 = 4 or 5]

4. What aspects of the phone conversation with Customer Service were not helpful? Why? (ex: Did the conversation provide you new or actionable info?)

5. Did the Customer Service Representative send you any of the following?

    1. Brochure(s) on Energy Savings Tips
    2. PC Link to Home Energy Analyzer software
    3. Nothing was sent
    97. Other (Specify)

[DISPLAY Q6 IF Q5 = 1]

6. 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

[DISPLAY Q7 IF Q5 =2]

7. Have you viewed the Online 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

8. What energy saving actions were you able to take, if any, as a result of your telephone call to the Customer Service Center?

    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

[DISPLAY Q9 IF Q8 = 2 or 3]

9. What behavioral changes did you make? [Check all that apply]

    1. Turned off lights more frequently
    2. Cleaned or replaced air conditioner filter
    3. Lowered the winter heating temperature setting on my thermostat (so that the heater ran less)
    4. Increased the summer cooling temperature setting on my thermostat (so that the air conditioner ran less)
    5. Used a ceiling fan instead of my air conditioner to keep cool
    6. Unplugged kitchen appliances when not in use
    7. Cleaned refrigerator coils
    8. Sealed windows or doors to reduce air leakage
    9. Lowered the temperature on the water heater
    10. Closed blinds on windows to reduce heating from the sun
    11. Air dried laundry instead of using the clothes dryer
    12. Fixed leaky faucets
    13. Used the microwave instead of the oven to cook food
    14. Ran the dishwasher with full loads
    15. Took shorter showers
    97. Other (Specify)
    98. Don't Know

[DISPLAY Q10 IF Q8 = 1]

10. I made structural changes to my...

    1. Appliance

2. HVAC
3. Lighting
4. Water heating measures
97. Other (Specify)
98. Don't Know

[DISPLAY Q11 IF Q8 = 1 or 3]
11. 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

[DISPLAY Q12 IF Q11 = 1]
12. 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

[DISPLAY Q13 IF Q8 = 2 or 3]
13. Do you do things differently now to save energy in hot weather?

1. Yes
2. No
98. Don't know

[DISPLAY Q14 IF Q13 = 1]
14. What do you do differently now?

[DISPLAY Q15IF Q8 = 2 or 3]
15. Do you do things differently now to save energy in cold weather?

1. Yes
2. No
98. Don't know

[DISPLAY Q16IF Q15 = 1]
16. What do you do differently now?

[DISPLAY Q17 IF Q8 = 2 or 3]

17. 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

[DISPLAY Q18 IF Q8 = 2 or 3]

18. 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 Q19 IF Q18 = 1]

19. 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

Demographic Information [DO NOT DISPLAY]

20. 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

21. Do you own or rent this residence?

    1. Own
    2. Rent
    98. Don't know

22. 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

23. 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
    99. Refused

24. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

    1. _____ Record Number [1-97]
    98. Don’t know
    99. Refused

25. What is your approximate total household income? [READ CATEGORIES]
    1. Less than $10,000
    2. $10,000 to $29,999
    3. $30,000 to $49,999
    4. $50,000 to $69,999
    5. $70,000 to $89,999
    6. $90,000 to $99,999

7. $100,000 to $149,999
8. $150,000 or more
98. Don't know
99. Refused

26. Thank you for your time in answering questions regarding the Online Audits Program in Ohio. We have finished with the questions we have for this survey. We would like to mail you a $5.00 Walmart gift card for your participation. To do that I'll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.
    First name:
    Last name:
    Mailing Address:
    City:
    State:
    Zip Code:

Valediction

Thank you for taking our survey. Have a great day!

12.3 Online Audit Control Group Survey

Phone Survey Introduction [DO NOT DISPLAY]

Hello. My name is _____. You have been randomly selected to participate in this survey about your experience saving energy with [UTILITY]. You will receive a $5 Walmart gift card for completing this survey. Is now a good time to talk with you? This will only take a few minutes.

1. Yes [PROCEED WITH INTERVIEW]
2. No [THANK AND TERMINATE]
3. Refused [THANK AND TERMINATE]

1. Did you participate in any of the following [UTILITY] residential energy efficiency programs in 2017? These include:

		Yes	No	DK	Refused
a. Appliance Rebate Program		1	2	98	99
b. Community Connections Program		1	2	98	99
c. Home Energy Reports Program		1	2	98	99
d. Energy Efficiency Kit Program	1	2	98	99	
e. School Education Program		1	2	98	99

2. Have you taken any of the following energy saving steps this year? Have you:

	Yes	No	DK	Refused	
1. Purchased CFLs	1	2	98	99	
2. Purchased LEDs	1	2	98	99	
3. Added insulation to your home	1	2	98	99	
4. Tuned up your central AC system	1	2	98	99	
5. Installed a high efficiency central AC system	1	2	98	99	
6. Installed a high efficiency furnace	1	2	98	99	
7. Installed a new high efficiency heat pump	1	2	98	99	
8. Installed ENERGY STAR windows	1	2	98	99	
9. Installed a programmable thermostat	1	2	98	99	
10. Had a residential energy audit performed	1	2	98	99	
11. Purchased ENERGY STAR home appliances[25]	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 took this year. (Record verbatim response)

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]

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]

[25] Includes Energy Star rated clothes washers, refrigerators, room AC units, dehumidifiers as well as energy saving surge protectors and torchiere floor lamps.

8. What do you do? (Record verbatim response)

[DISPLAY Q9 IF Q7= 1]

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 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

[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

17. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

2. _____ Record Number [1-97]
99. Don't know
100. ..... Refused

18. What is your approximate total household income? [READ CATEGORIES]
    9. Less than $10,000
    10. $10,000 to $29,999
    11. $30,000 to $49,999
    12. $50,000 to $69,999
    13. $70,000 to $89,999
    14. $90,000 to $99,999
    15. $100,000 to $149,999
    16. $150,000 or more
    100. ..... Don't know
    101. ..... Refused

19. Thank you for your time. We have finished with the questions we have for this survey. We would like to mail you a $5 Walmart gift card for your participation. To do that I'll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.
    First name:
    Last name:
    Mailing Address:
    City:
    State:
    Zip code:

Valediction

Thank you for taking our survey. Have a great day!

13 Appendix C: Energy Efficiency Kits Reference Materials and Survey Instruments

13.1 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: * or Account #: * (do not include any dashes or spaces)

Contact Name: * First Last

Email Address:

Confirm Email:

Phone Number: * ### - ### - ####

ZIP Code: *

Water Heating Fuel: * —Select— Non-electric water heating fuel includes natural gas, oil, propane, wood and other.

Heating Fuel: * —Select— Non-electric heating fuel includes natural gas, oil, propane, wood and other.

Referral Source: * —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.

Clear Form Submit Request

13.2 Residential Kits Participant Survey

Hello. My name is _____ and I am calling on behalf of [UTILITY]'s Energy Efficiency Kit Program. May I speak with [CUSTOMER NAME]?

(If not the right person) May I please speak to the person who would know the most about the Energy Efficiency kit that was sent to your home?

REPEAT INTRODUCTION AND CONTINUE

(If the correct person) We are conducting a study to evaluate [UTILITY]'s Energy Efficiency Kit Program. Do you have 5 to 10 minutes to complete a survey regarding your experiences with the kit? Your responses will be used to help improve the program in the future. We are offering a $10 Target gift card to people who complete the survey. May I ask you a few questions?

1. Yes
2. No

[If Intro=2, terminate survey]

Energy Efficiency Kit Verification [DO NOT DISPLAY]

1. What kind of water heater is in your home?
    1. Electric
    2. Gas
    3. Other (please specify)
    98. Don't know

2. How did you request the kit?
    1. Online
    2. Telephone
    98. Don't know

3. Which of the following measures did you receive in your Energy Efficiency kit?

    [Check all that apply]
    1. (1) Three-way CFL light bulb
    2. (1) 15W LED light bulb
    3. (1) 11W LED light bulb
    4. (3) 9W LED light bulbs
    5. (1) Furnace whistle
    6. [Display if Q0 = 1] (1) Faucet aerator
    7. [Display if Q0 = 1] (1) Low-flow showerhead

Measure Installation Verification [DO NOT DISPLAY]

4. Did you install *all* of the products you received in the Energy Efficiency Kit?
    1. Yes, I installed everything

2. No, I installed only some of the products I received
3. No, I did not install any of the products I received

[ASK Q5 IF Q4 = 2,3]

5. Why did you not install all of the products?

    1. Some of the bulbs were broken
    2. Waiting for light bulbs to burn out
    3. Bulbs were too bright
    4. Bulbs were not bright enough
    5. Does not fit into any fixture
    6. Other [specify]
    7. Don’t know

[DISPLAY Q4 IF Q5=1]

6. Did you contact [UTILITY] about the broken items?
    1. Yes
    2. No

[DISPLAY Q5 IF Q4 =1]

7. Were the broken items replaced?
    1. Yes
    2. No

[DISPLAY Q6-Q19 IF Q4=1 or 2]

8. How many of the 9 Watt LED Bulbs are currently installed in your home (up to a maximum of 3 bulbs)?
    1. 0
    2. 1
    3. 2
    4. 3

[DISPLAY Q7 IF Q6>0]

9. Where did you install the 9W LED bulb(s)?
   [grid format, first bulb, second bulb, etc]
    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

10. Is the 15 Watt LED currently installed in your home?
    1. Yes
    2. No
    98. Don't know

[DISPLAY Q9 IF Q8=1]
11. Where did you install the 15 Watt LED 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

12. Is the 11 Watt LED currently installed in your home?
    1. Yes
    2. No
    98. Don't know

[DISPLAY Q13 IF Q12=1]
13. Where did you install the 11 Watt LED 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

14. Is the 3-Way CFL currently installed in your home?
    1. Yes
    2. No
    98. Don't know

[DISPLAY Q13 IF Q12=1]

15. Where did you install the 3-Way CFL 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
    99. I didn't install the 3- Way CFL

16. How many of the two LED nightlights are currently installed in your home?
    1. 0
    2. 1
    3. 2

[DISPLAY Q15 IF Q14>0]

17. Please describe where the first nightlight was installed.
    1. Where there was no nightlight before (new nightlight)
    2. Where a standard nightlight was previously installed

[DISPLAY Q16 IF Q14 = 2]

18. Please describe where the second nightlight was installed.
    1. Where there was no nightlight before (new nightlight)
    2. Where a standard nightlight was previously installed

19. Is the furnace whistle currently installed in your home?
    1. Yes
    2. No
    98. Don't know

[DISPLAY Q20 IF Q0=1]

20. Is the low flow showerhead currently installed in your home?
    1. Yes
    2. No

98. Don’t know

[DISPLAY Q21 IF Q0=1]

21. Is the faucet aerator currently installed in your home?
    1. Yes
    2. No
    98. Don’t know

Satisfaction [DO NOT DISPLAY]

22. Do you have any suggested changes to the items included in the kit?
    [Open Ended]

23. Which of the following kit items was the MOST useful to you?
    1. 3-Way CFL bulb
    2. 9W LED bulbs
    3. 15W LED bulb
    4. Furnace whistle
    5. [DISPLAY IF Q2 = 1] Faucet aerator
    6. [DISPLAY IF Q2 = 1] Showerhead

24. Using a scale of 1-5 where 1 means very dissatisfied, and 5 means very satisfied, how satisfied or dissatisfied are you with each of the following program components?
    a. Process to request the kit
    b. Time it took to receive the kit
    c. The items included in the kit
    d. The energy efficiency education provided through the program

[DISPLAY Q21 IF Q20 a-d = 1 or 2]

25. Why were you dissatisfied?
    1. [Open Ended]

26. What factors influenced your decision to request a kit through this program? [Check all that apply]
    1. I was looking for ways to save energy in my home
    2. Recommendation from a friend
    3. The kit looked useful
    4. It was provided at no additional cost
    5. Interested in saving money
    6. Other (please specify)

27. Since receiving the kit, would you say that your knowledge of ways to save energy has…

1. Increased a lot
2. Increased somewhat
3. Remained the same
4. Decreased somewhat
5. Decreased a lot
98. Don't know

28. Would you say your participation in the [PROGRAM] has:
    1. Greatly increased your satisfaction with FE Ohio
    2. Somewhat increased your satisfaction with FE Ohio
    3. Did not affect your satisfaction with FE Ohio
    4. Somewhat decreased your satisfaction with FE Ohio
    5. Greatly decreased your satisfaction with FE Ohio
    98. Don't know

PROGRAM AWARENESS & CROSS PROGRM PARTICIPATION

29. Are you aware that [UTILITY] offers discounts and rebates to help its customers purchase energy efficient equipment to help them save energy in their homes?
    1. Yes
    2. No
    3. Don't know

[Ask Q26 if Q25 = 1]

30. Did you become aware of any of these discounts and rebates through receiving the Energy Efficiency kit?
    1. Yes
    2. No
    3. Don't know

31. Have you purchased and installed any additional energy efficient items because of the information provided to you in the kit?
    1. Yes
    2. No
    3. Don't know

[ASK Q28 IF Q27 = 1]

32. What did you purchase and install? (all that apply)
    1. Energy efficiency light bulbs
    2. Energy efficient nightlights
    3. Energy efficient appliances such as refrigerators, clothes washer/dryers
    4. Energy efficient HVAC equipment
    5. Other (Specify)

[ASK Q29 IF Q28 = 3]

33. Did you apply for a rebate for the appliance(s)?
    1. Yes
    2. No
    3. Don't know

[ASK Q30 IF Q29 = 2] (all that apply)

34. Why didn't you apply for a rebate?
    1. I did not know about the rebate
    2. The rebate was too small to go through the process
    3. I forgot to apply
    4. Other (Specify)
    5. Don't know

Demographic Information [DO NOT DISPLAY]

We have a few of questions about this residence. These are anonymous and will be used solely for the purpose of combining different customers' responses. You can choose to not answer any of these questions.

35. Which of the following best describes this residence?
    1. Single family detached home
    2. Townhome
    3. Mobile or manufactured home
    4. Apartment 2-4 units
    5. Apartment 5-10 units
    6. Apartment with more than 10 units
    98. Don't know

36. When was this residence built?
    1. Before 1970
    2. 1970's
    3. 1980's
    4. 1990's
    5. 2000's
    6. 2010 or newer
    98. Don't know

37. What is the approximate square footage of this residence?
    1. Less than 1,000
    2. 1,001-1,500
    3. 1,501-2,000
    4. 2,001-2,500

5. Greater than 2,500
98. Don’t know

38. Do you own or rent your residence?
    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don’t know

39. What type of heating system does this residence have?
    1. Natural gas heating
    2. Electric heating
    3. Other (Please specify)
    98. Don’t know

40. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

    1. _____ Record Number [1-97]
    98. Don’t know
    101. ..... Refused

41. What is your approximate total household income? [READ CATEGORIES]
    1. Less than $10,000
    2. $10,000 to $29,999
    3. $30,000 to $49,999
    4. $50,000 to $69,999
    5. $70,000 to $89,999
    6. $90,000 to $99,999
    7. $100,000 to $149,999
    8. $150,000 or more
    102. ..... Don’t know
    103. ..... Refused

Customer Contact Information [DO NOT DISPLAY]

42. Thank you for your time in answering questions regarding the Energy Efficiency Conservation Kit Program in Ohio. We have finished with the questions we have for this survey. We would like to mail you a $10.00 Target gift card for your participation. To do that I'll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.
    First name:
    Last name:
    Mailing address:
    City:
    State:
    Zip code:

13.3 Schools Kits Participation Survey

Hello. My name is _____. I am calling on behalf of [UTILITY]. Your home was recently sent an Energy Efficiency Kit through your child's school on or around [REPORTING DATE]. Are you the person most familiar with receiving the Energy Efficiency Kit?

(If not the right person) May I please speak to the person who would know the most about the Energy Efficiency Kit that was sent to your home through your child's school?

REPEAT INTRODUCTION AND CONTINUE

(If the correct person) We are speaking with households that received an Energy Efficiency Kit through their children's school from [UTILITY]. Do you have 5 to 10 minutes to complete a survey regarding your experiences with the kit? We are offering a $10 Target gift card to people who complete the survey.

1. Yes
2. No

[If Intro=2, terminate survey]

Energy Efficiency Kit Verification [DO NOT DISPLAY]

1. Which of the following measures did you receive in your Energy Efficiency kit?

    [Check all that apply]
    1. (1) Three-way LED light bulb
    2. (2) 15W LED light bulb
    3. (1) 11W LED light bulb
    4. (3) 9W LED light bulbs
    5. (2) LED nightlights

Measure Installation Verification [DO NOT DISPLAY]

2. Did you install *all* of the products you received in the Energy Efficiency Kit?
    8. Yes, I installed everything
    9. No, I installed only some of the products I received
    10. No, I did not install any of the products I received

[DISPLAY Q3 IF Q2=2 or 3]

3. Why did you not install any/some of the products?

    8. Some of the bulbs were broken
    9. Waiting for light bulbs to burn out
    10. Bulbs were too bright
    11. Bulbs were not bright enough
    12. Does not fit into any fixture
    13. Other [specify]
    14. Don't know

[DISPLAY Q4 IF Q3 = 1]

4. Did you contact the [UTILITY] about the broken items?
    3. Yes
    4. No

[DISPLAY Q5 IF Q4 = 1]

5. Were the broken items replaced?
    3. Yes
    4. No

[DISPLAY Q6-Q18 IF Q2=1 or 2]

6. How many of the 9 Watt LED Bulbs are currently installed in your home (up to a maximum of 3 bulbs)?
    5. 0
    6. 1
    7. 2
    8. 3

[DISPLAY Q7 IF Q6>0]

7. Where did you install the 9W LED bulb(s)?
   [grid format, first bulb, second bulb, etc]
    12. Living room
    13. Bathroom
    14. Kitchen
    15. Outdoors
    16. Family Room
    17. Bedroom
    18. Garage
    19. Hallway
    20. Office
    21. Laundry Room
    22. Dining Room
    98. Don't know

8. Is the 11 Watt LED currently installed in your home?
    3. Yes
    4. No
    5. Don't know

[DISPLAY Q9 IF Q8=1]

9. Where did you install the 11W bulb?
    12. Living room
    13. Bathroom
    14. Kitchen
    15. Outdoors
    16. Family Room
    17. Bedroom
    18. Garage
    19. Hallway
    20. Office
    21. Laundry Room
    22. Dining Room
    98. Don't know

10. How many of the 15 Watt LED bulbs are currently installed in your home?
    1. 0
    2. 1
    3. 2

[DISPLAY Q11 IF Q10>0]

11. Where did you install the 15W LED bulb(s)?
    [grid format, first bulb, second bulb, etc]
    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

12. Is the 3-Way LED currently installed in your home?
    3. Yes
    4. No

5. Don’t know

[DISPLAY Q13 IF Q12=1]

13. Where did you install the 3-Way LED bulb?
    12. Living room
    13. Bathroom
    14. Kitchen
    15. Outdoors
    16. Family Room
    17. Bedroom
    18. Garage
    19. Hallway
    20. Office
    21. Laundry Room
    22. Dining Room
    98. Don’t know
    99. I didn’t install the 3- Way LED

14. How many of the two LED nightlights are currently installed in your home?
    4. 0
    5. 1
    6. 2

[DISPLAY Q15 IF Q14>0]

15. Please describe where the first nightlight was installed.
    3. Where there was no nightlight before (new nightlight)
    4. Where a standard nightlight was previously installed

[DISPLAY Q16 IF Q14 = 2]

16. Please describe where the second nightlight was installed.
    1. Where there was no nightlight before (new nightlight)
    2. Where a standard nightlight was previously installed

[DISPLAY Q17 if Q14 = 1]

17. Why are you not using the LED nightlight?
    1. I had no use for it
    2. I already had LED nightlight(s)
    3. It was too bright
    4. It was not bright enough
    5. Other [specify]
    6. Don’t know

Satisfaction [DO NOT DISPLAY]

18. Do you have any suggested changes that should be made to the items included in the kit?

[Open Ended]

19. Which of the following kit items was the MOST useful to you?
    1. 9W/11W/15W 3-Way LED bulb
    2. 15W LED bulbs
    3. 11W LED bulb
    4. 9W LED bulbs
    5. LED nightlights

20. Using a scale of 1-5 where 1 means very dissatisfied, and 5 means very satisfied, how satisfied or dissatisfied are you with each of the following program components?
    a. The items included in the kit
    b. The energy efficiency education provided through the program

[DISPLAY Q21 IF Q20 a-b = 1 or 2]

21. Why were you dissatisfied?
    1. [Open Ended]

22. What factors influenced your decision to request a kit through this program?
    7. My child's interest in the kit
    8. I was looking for ways to save energy in my home
    9. Recommendation from a friend
    10. The kit looked useful
    11. It was free
    12. Interested in saving money
    13. My child was interested
    14. Other (please specify)

23. Since receiving the kit, would you say that your knowledge of ways to save energy has…
    1. Increased a lot
    2. Increased somewhat
    3. Remained the same
    4. Decreased somewhat
    5. Decreased a lot
    6. Don't know

24. Would you say your participation in the [PROGRAM] has:
    6. Greatly increased your satisfaction with [UTILITY]
    7. Somewhat increased your satisfaction with [UTILITY]
    8. Did not affect your satisfaction with [UTILITY]
    9. Somewhat decreased your satisfaction with [UTILITY]
    10. Greatly decreased your satisfaction with [UTILITY]
    99. Don't know

Program Awareness & Cross Program Participation

25. Are you aware that [UTILITY] offers discounts and rebates to help its customers purchase energy efficient equipment to help them save energy in their homes?
    1. Yes
    2. No
    3. Don't know

[Ask Q26 if Q25 = 1]

26. Did you become aware of any of these discounts and rebates through receiving the Energy Efficiency kit?
    1. Yes
    2. No
    3. Don't know

27. Have you purchased and installed any additional energy efficient items because of the information provided to you in the kit?
    1. Yes
    2. No
    3. Don't know

[ASK Q28 IF Q27 = 1]

28. What did you purchase and install?
    1. Energy efficiency light bulbs
    2. Energy efficient nightlights
    3. Energy efficient appliances such as refrigerators, clothes washer/dryers
    4. Energy efficient HVAC equipment
    5. Other (Specify)

[ASK Q29 IF Q28 = 3]

29. Did you apply for a rebate for the appliance(s)?
    1. Yes
    2. No
    3. Don't know

[ASK Q30 IF Q29 = 2]

30. Why didn't you apply for a rebate?
    1. I did not know about the rebate
    2. The rebate was too small to go through the process
    3. I forgot to apply

4. Other (Specify)
5. Don’t know

Comments

31. Do you have any comments or suggestions with regards to how the Energy Efficiency Kits could be improved?

Demographic Information [DO NOT DISPLAY]

We have a few of questions about this residence. These are anonymous and will be used solely for the purpose of combining different customers’ responses. You can choose to not answer any of these questions.

32. Which of the following best describes this residence?
    1. Single family detached home
    2. Townhome
    3. Mobile or manufactured home
    4. Apartment 2-4 units
    5. Apartment 5-10 units
    6. Apartment with more than 10 units
    98. Don’t know

33. When was this residence built?
    1. Before 1970
    2. 1970’s
    3. 1980’s
    4. 1990’s
    5. 2000’s
    6. 2010 or newer
    98. Don’t know

34. What is the approximate square footage of this residence?
    1. Less than 1,000
    2. 1,001-1,500
    3. 1,501-2,000
    4. 2,001-2,500
    5. Greater than 2,500
    98. Don’t know

35. Do you own or rent your residence?
    1. Own
    2. Rent
    3. Own and rent to someone else
    98. Don’t know

36. What type of heating system does this residence have?
    1. Natural gas heating
    2. Electric heating
    3. Other (Please specify)
    98. Don't know

37. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

    1. _____ Record Number [1-97]
    98. Don't know
    99. Refused

38. What is your approximate total household income? [READ CATEGORIES]
    1. Less than $10,000
    2. $10,000 to $29,999
    3. $30,000 to $49,999
    4. $50,000 to $69,999
    5. $70,000 to $89,999
    6. $90,000 to $99,999
    7. $100,000 to $149,999
    8. $150,000 or more
    98. Don't know
    99. Refused

Customer Contact Information [DO NOT DISPLAY]

39. Thank you for your time in answering questions regarding the Energy Efficiency School Kit in Ohio. We have finished with the questions we have for this survey. We would like to mail you a $10.00 Target gift card for your participation. To do that I'll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.
    First name:
    Last name:
    Mailing address:
    City:
    State:
    Zip code:

14 Appendix D: Behavioral Survey Instruments

14.1 Behavioral Participant Survey

Introduction for online administration

Hello. I am contacting you on behalf of [UTILITY]. According to our records you receive Home Energy Reports that provide information about your home's energy use. We would like to hear about your experience. Please take a few moments to complete the online survey using the password provided below. We'll send you a $5 Walmart gift card as our way of saying thanks.

Your response will be kept anonymous and will be used to improve the program in the future.

Thank you in advance for your time!

You can access the survey at:
Your password is:

Thank you.

ADM STAFF Name
ADM Associates / Contractor to FirstEnergy Ohio

HOME ENERGY REPORTS, TIPS EMAILS, AND WEBSITE

1. According to our records you have received Home Energy Reports from [UTILITY] with information on your household's energy use and tips on how to save energy.

   Do you recall receiving these reports during 2017?
   1. Yes
   2. No
   98. Don't know

[DISPLAY IF Q0 = 1]

2. Over the past 12 months, about how many reports do you recall receiving?
   1. ____Reports
   98. Don't know

[DISPLAY IF Q0 = 1]

3. Which of the following best describes how often you read the reports?
    1. You have read all or most of them
    2. You have read some of them
    3. You have not read any of them
    98. Don't know

[DISPLAY IF Q3 = 1 OR 2]

4. Using the scale below, please indicate how valuable you find the following information provided in the reports.
   [SCALE: 0 (Not at all valuable) – 10 (Very valuable), 98 = Don't know]
   [RANDOMIZE ORDER]
    a. The comparison of my household's energy use to similar households
    b. Adjusting thermostat settings for winter and summer months
    c. Information on appliance recycling
    d. Energy saving tips/recommendations
    e. Frequently asked questions?
    f. Other components?

[DISPLAY IF Q3 = 1 OR 2]

5. How easy or difficult would you say the information in the Home Energy Report was to understand?
    1. Very easy
    2. Somewhat easy
    3. Neither easy nor difficult
    4. Somewhat difficult
    5. Very Difficult
    98. Don't know

[DISPLAY IF Q3 = 1 OR 2]

6. How accurate do you think the information on your home energy usage is?
    1. Very accurate
    2. Somewhat accurate
    3. Somewhat inaccurate
    4. Very inaccurate
    98. Not sure

[DISPLAY IF Q3 = 1 OR 2]

7. Do you have any suggestions for improving the Home Energy Report?

8. In addition to the Home Energy Report, [UTILITY] also sends emails with energy saving tips. Do you recall receiving these emails?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q8 = 1]

9. Which of the following best describes how often you read the tips emails?
   1. You have read all or most of them
   2. You have read some of them
   3. You have not read any of them
   98. Don't know

[DISPLAY IF Q9 = 1 OR 2]

10. How valuable would you say the energy saving tips emails are?
    [SCALE: 0 (Not at all valuable) – 10 (Very valuable), 98 = Don't know]

11. In addition to the Home Energy Report, you can access your home's energy use information and additional energy savings tips via the program website at [energysaveOhio.com/ Have you ever visited this website?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q11 = 1]

12. Which of the following best describes your experience(s) with the program website? [Select all that apply]
    1. You *logged in on the website* with your utility account number and reviewed energy use information and tips that were *unique* to your home.
    2. You have not created an account on the website, but you visited the website site and reviewed the general energy savings tips.
    3. Other (Specify)
    98. Don't know

[DISPLAY IF Q12 = 1]

13. Which of the following best describes how often do you login on the program website to view information on your home's energy use?
    1. I've logged in multiple times
    2. I've logged in just once
    98. Don't know

[DISPLAY IF Q12 = 1 OR 2]

14. How valuable would you say the energy savings tips and information, available on the website, are?
    [SCALE: 0 (Not at all valuable) – 10 (Very valuable), 98 = Don't know]

[DISPLAY IF Q9 OR Q12 = 1 OR 2]

15. Have you had any difficulty implementing any of the energy saving tips or recommendations?
    1. Yes

2. No
98. Don’t know

[DISPLAY IF Q15 = 1]

16. What difficulties have you had?

[DISPLAY IF Q8 = 1 OR Q12 = 1 OR 2]

17. Do you have any suggestions for improving the energy savings tips and information provided on the program website or via email?

ENERGY EFFICIENCY ATTIDUDES, KNOWLEDGE, AND INTENT

18. Overall, on a scale of “1 to 10” where “1” means not at all knowledgeable and “10” means “Very Knowledgeable,” how knowledgeable are you about ways to save energy in your home? [SCALE: 1 (Not at all knowledgeable) – 10 (Very knowledgeable, 98 = DON’T KNOW, 99 = REFUSED]

19. How would you rate your household's efforts to save energy in your home? Using a scale of 1 to 10, with 1 meaning "you have not done much" and 10 meaning "you have done almost everything you can" to lower your monthly gas bill in your home.
    [SCALE: 1 (You have not done much) – 10 (You have done almost everything you can), 98 = DON’T KNOW, 99 = REFUSED]

20. Using the following scale, please rate the extent to which you agree or disagree with the following statements.
    [SCALE: 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Neither agree nor disagree, 4 = Somewhat agree, 5 = Strongly agree, 98 = Don’t know]
    [RANDOMIZE ORDER]
    a. I understand how my actions affect my energy use
    b. I know of steps I could take to reduce my household energy use
    c. I think that saving energy is important
    d. I am concerned about my household’s energy costs
    e. I intend to take steps to reduce my household’s energy use in the next six months
    f. I don’t think there is anything else I could do to reduce my household’s energy use

ENERGY EFFICIENCY BEHAVIORS

21. In the past [MONTHS], have you taken any actions to reduce your energy use?
    1. Yes
    2. No
    98. Don’t know

[DISPLAY IF Q21 = 1]

22. Have you taken any of the following actions to save energy in the past six months? [SCALE: 1 = Have done this, 2 = Have not done this] [RANDOMIZE ORDER]
    a. Cleaned or replaced air conditioner filter
    b. Lowered the winter heating temperature setting on my thermostat (so that the heater ran less)
    c. Increased the summer cooling temperature setting on my thermostat (so that the air conditioner ran less)
    d. Used a ceiling fan instead of my air conditioner to keep cool
    e. Unplugged kitchen appliances when not in use
    f. Cleaned refrigerator coils
    g. Sealed windows or doors to reduce air leakage
    h. Lowered the temperature on the water heater
    i. Closed blinds on windows to reduce heating from the sun
    k. Air dried laundry instead of using the clothes dryer
    l. Fixed leaky faucets
    m. Used the microwave instead of the oven to cook food
    n. Ran the dishwasher with full loads
    o. Took shorter showers
    p. Turned off lights when leaving a room

[DISPLAY IF Q21 = 1]

23. Did you take any additional actions not listed?
    1. Yes
    2. No

[DISPLAY IF Q23 = 1]

24. What additional actions have you taken?

[DISPLAY IF Q21 = 1

25. Thinking about the actions you took to save energy over the past 12 months, how important was the information provided through the home energy reports, tips emails, or program website in your decision to take those actions? [SCALE: 0 (Not at all important) - 10 (Very important)]

26. In the past [MONTHS], have you installed any energy-efficient equipment/appliances or made any energy efficiency improvements?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q26 = 1]

27. What energy-efficient equipment or appliances have you installed? (Select all that apply) [RANDOMIZE ORDER, FIX OPTION 16 (OTHER) AT BOTTOM OF LIST]
    1. ENERGY STAR clothes dryer
    2. ENERGY STAR clothes washer
    3. ENERGY STAR refrigerator
    4. ENERGY STAR Freezer
    5. Energy-efficient pool pump (variable or multi-speed)
    6. Smart Thermostat (e.g., Nest, Lyric, Ecobee, Sensi)
    7. Energy-efficient windows or doors
    8. Replaced incandescent light bulbs with LED (Light emitting diode) lightbulbs
    9. Replaced incandescent light bulbs CFL (compact fluorescent) lightbulbs
    10. Low flow faucet aerators or showerheads
    11. ENERGY STAR heat pump water heater
    12. ENERGY STAR dehumidifier
    13. ENERGY STAR computer or computer monitor
    14. ENERGY STAR scanner or printer
    15. ENERGY STAR television
    16. Other (Specify)

[DISPLAY IF Q27 = 1, 2, 3]

28. Did you apply for a rebate from [UTILITY] for the [ANSWER Q27]?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q2828 = 2]

29. Why did you not apply for or receive a rebate for that equipment?
    1. I was not aware rebates were available.
    2. The rebate amount was too low
    3. I forgot
    4. Other (Specify)
    98. Don't know

[DISPLAY IF Q26 = 1]

30. Thinking about the energy-efficient equipment you installed over the past 12 months, how important was the information provided through the home energy reports, tips emails or program website in your decision to install that equipment? [SCALE: 0 (Not at all important) - 10 (Very important)]

AWARENESS OF HOME ENERGY ADVISOR AND REBATES

31. Prior to this survey, were you aware that [UTILITY] provided an online tool called Ohio Home Energy Analyzer to help customers understand and manage their household energy use? Keep in mind this is different from the program website.
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q31 = 1]

32. How did you learn of the Ohio Home Energy Analyzer online tool?
    2. [UTILITY] email
    3. Found it while browsing [UTILITY] website
    4. Friend, family, or colleague
    5. Some other way (Please specify)
    98. Don't know

[DISPLAY IF Q31 = 1]

33. Have you logged onto the Ohio Home Energy Analyzer online tool in the past six months?
    1. Yes
    2. No
    98. Don't know

34. Prior to this survey, were you aware that [UTILITY] offers discounts and rebates on energy-efficient equipment for your home?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q34 = 1]

35. Which of the following types of energy-efficient equipment rebates or discounts were you aware of? (Select all that apply) [RANDOMIZE ORDER, FIX OPTION 9 (OTHER) AT BOTTOM OF LIST]
    1. LED lightbulbs discounts at select area retailers
    2. ENERGY STAR clothes washers and dryers
    3. ENERGY STAR refrigerator and freezer
    4. Smart Thermostat (e.g., Nest, Lyric, Ecobee, Sensi)
    5. ENERGY STAR certified dehumidifier
    6. ENERGY STAR certified computer or computer monitor
    7. ENERGY STAR certified scanner or printer
    8. ENERGY STAR certified television
    9. Another [UTILITY] rebate or discount (Please describe)

36. How did you learn of the rebates and discounts that [UTILITY] provides? [RANDOMIZE ORDER, FIX OPTION 9 (OTHER) AT BOTTOM OF LIST]
    1. [DISPLAY IF GROUP = PARTICIPANT] Home Energy Report

2. Email from [UTILITY]
3. Internet search
4. [UTILTIY] website
5. Print advertisement
6. Service provider or contractor
7. Friend, family, or colleague
8. Recorded phone message
9. Other (Please specify)
98. Don't know

SATISFACTION

37. Using the scale below, how satisfied or dissatisfied are you with the following: [SCALE: 1 = Very dissatisfied, 2 = Somewhat dissatisfied, 3 = Neither satisfied nor dissatisfied, 4 = Somewhat satisfied, 5 = Very satisfied, 98 = Don't know] [RANDOMIZE ORDER]
    a. The information provided through the Home Energy Report
    b. The information provided through the program website and energy savings tips emails

[DISPLAY Q388 IF ANY IN Q377= 1 OR 2]

38. Why are you dissatisfied?

HOME CHARACTERISTICS

Finally, the following questions relate to your home's characteristics.

39. What type of fuel is used to heat water for your home?
    1. Natural gas
    2. Electricity
    3. Propane
    4. Other (Please specify)
    98. Don't know

40. What type of fuel is used to heat your home?
    1. Natural gas
    2. Electricity
    3. Propane
    4. Other (Please specify)
    98. Don't know

41. What is the approximate square footage of the living space of your home? Your best guess is ok.
    1. ____ square feet

98. Don’t know

42. Including yourself, how many people currently live in your home year-round?
    1. ____ people
    98. Don’t know

43. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

    1. _____ Record Number [1-97]
    98. Don’t know
    99. Refused

44. What is your approximate total household income? [READ CATEGORIES]
    1. Less than $10,000
    2. $10,000 to $29,999
    3. $30,000 to $49,999
    4. $50,000 to $69,999
    5. $70,000 to $89,999
    6. $90,000 to $99,999
    7. $100,000 to $149,999
    8. $150,000 or more
    98. Don’t know
    99. Refused

45. Do you have any other comments you would like to provide about your experience with this program, or energy efficiency in general?

46. Thank you for your time in answering questions regarding the Home Energy Reports Program in Ohio. We have finished with the questions we have for this survey. We would like to mail you a $5.00 Walmart gift card for your participation. To do that I’ll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.
    First name:
    Last name:
    Mailing Address:
    City:
    State:

Zip Code:

14.2 Behavioral Control Group Survey

Introduction for phone administration

Hello. My name is _____. You have been randomly selected to participate in this survey about your experience saving energy with [UTILITY]. You will receive a $5 Walmart gift card for participating in this survey. Is now a good time to talk with you? This will only take a few minutes.

1. Yes [PROCEED WITH INTERVIEW]
2. No [THANK AND TERMINATE]
3. Refused [THANK AND TERMINATE]

ENERGY EFFICIENCY ATTIDUDES, KNOWLEDGE, AND INTENT

1. Overall, on a scale of “1 to 10” where “1” means not at all knowledgeable and “10” means “Very Knowledgeable,” how knowledgeable are you about ways to save energy in your home? [SCALE: 1 (Not at all knowledgeable) – 10 (Very knowledgeable, 98 = DON’T KNOW, 99 = REFUSED]

2. How would you rate your household's efforts to save energy in your home? Using a scale of 1 to 10, with 1 meaning "you have not done much" and 10 meaning "you have done almost everything you can" to lower your monthly gas bill in your home.
   [SCALE: 1 (You have not done much) – 10 (You have done almost everything you can), 98 = DON’T KNOW, 99 = REFUSED]

3. Using the following scale, please rate the extent to which you agree or disagree with the following statements.
   [SCALE: 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Neither agree nor disagree, 4 = Somewhat agree, 5 = Strongly agree, 98 = Don’t know]
   [RANDOMIZE ORDER]
   a. I understand how my actions affect my energy use
   b. I know of steps I could take to reduce my household energy use
   c. I think that saving energy is important
   d. I am concerned about my household’s energy costs
   e. I intend to take steps to reduce my household’s energy use in the next six months
   f. I don’t think there is anything else I could do to reduce my household’s energy use

ENERGY EFFICIENCY BEHAVIORS

4. In the past 12 have you taken any actions to reduce your energy use?
   1. Yes
   2. No
   98. Don't know

[DISPLAY IF Q21 = 1]

5. Have you taken any of the following actions to save energy in the past six months? [SCALE: 1 = Have done this, 2 = Have not done this] [RANDOMIZE ORDER]
   a. Cleaned or replaced air conditioner filter
   b. Lowered the winter heating temperature setting on my thermostat (so that the heater ran less)
   c. Increased the summer cooling temperature setting on my thermostat (so that the air conditioner ran less)
   d. Used a ceiling fan instead of my air conditioner to keep cool
   e. Unplugged kitchen appliances when not in use
   f. Cleaned refrigerator coils
   g. Sealed windows or doors to reduce air leakage
   h. Lowered the temperature on the water heater
   i. Closed blinds on windows to reduce heating from the sun
   k. Air dried laundry instead of using the clothes dryer
   l. Fixed leaky faucets
   m. Used the microwave instead of the oven to cook food
   n. Ran the dishwasher with full loads
   o. Took shorter showers
   p. Turned off lights when leaving a room

[DISPLAY IF Q21 = 1]

6. Did you take any additional actions not listed?
   1. Yes
   2. No

[DISPLAY IF Q23 = 1]

7. What additional actions have you taken?

8. In the past 12 months, have you installed any energy-efficient equipment/appliances or made any energy efficiency improvements?
   1. Yes
   2. No
   98. Don't know

[DISPLAY IF Q26 = 1]

9. What energy-efficient equipment or appliances have you installed? (Select all that apply) [RANDOMIZE ORDER, FIX OPTION 16 (OTHER) AT BOTTOM OF LIST]
    1. ENERGY STAR clothes dryer
    2. ENERGY STAR clothes washer
    3. ENERGY STAR refrigerator
    4. ENERGY STAR Freezer
    5. Energy-efficient pool pump (variable or multi-speed)
    6. Smart Thermostat (e.g., Nest, Lyric, Ecobee, Sensi)
    7. Energy-efficient windows or doors
    8. Replaced incandescent light bulbs with LED (Light emitting diode) lightbulbs
    9. Replaced incandescent light bulbs CFL (compact fluorescent) lightbulbs
    10. Low flow faucet aerators or showerheads
    11. ENERGY STAR heat pump water heater
    12. ENERGY STAR dehumidifier
    13. ENERGY STAR computer or computer monitor
    14. ENERGY STAR scanner or printer
    15. ENERGY STAR television
    16. Other (Specify)

[DISPLAY IF Q27 = 1, 2, 3]

10. Did you apply for a rebate from [UTILITY] for the [ANSWER Q9]?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q28 = 2]

11. Why did you not apply for or receive a rebate for that equipment?
    1. I was not aware rebates were available.
    2. The rebate amount was too low
    3. I forgot
    4. Other (Specify)
    98. Don't know

AWARENESS OF HOME ENERGY ADVISOR AND REBATES

12. Prior to this survey, were you aware that [UTILITY] provided an online tool called the Home Energy Analyzer to help customers understand and manage their household energy use? Keep in mind this is different from the program website.
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q31 = 1]

13. How did you learn of the Home Energy Analyzer online tool?
    2. [UTILITY] email
    3. Found it while browsing [UTILITY] website
    4. Friend, family, or colleague
    5. Some other way (Please specify)
    98. Don't know

[DISPLAY IF Q31 = 1]

14. Have you logged onto the Home Energy Analyzer online tool in the past six months?
    1. Yes
    2. No
    98. Don't know

15. Prior to this survey, were you aware that [UTILITY] offers discounts and rebates on energy-efficient equipment for your home?
    1. Yes
    2. No
    98. Don't know

[DISPLAY IF Q34 = 1]

16. Which of the following types of energy-efficient equipment rebates or discounts were you aware of? (Select all that apply) [RANDOMIZE ORDER, FIX OPTION 9 (OTHER) AT BOTTOM OF LIST]
    1. LED lightbulbs discounts at select area retailers
    2. ENERGY STAR clothes washers and dryers
    3. ENERGY STAR refrigerator and freezer
    4. Smart Thermostat (e.g., Nest, Lyric, Ecobee, Sensi)
    5. ENERGY STAR certified dehumidifier
    6. ENERGY STAR certified computer or computer monitor
    7. ENERGY STAR certified scanner or printer
    8. ENERGY STAR certified television
    9. Another [UTILITY] rebate or discount (Please describe)

17. How did you learn of the rebates and discounts that [UTILITY] provides? **[**RANDOMIZE ORDER, FIX OPTION 9 (OTHER) AT BOTTOM OF LIST]
    1. [DISPLAY IF GROUP = PARTICIPANT] Home Energy Report
    2. Email from [UTILITY]
    3. Internet search
    4. [UTILTIY] website
    5. Print advertisement
    6. Service provider or contractor
    7. Friend, family, or colleague
    8. Recorded phone message
    9. Other (Please specify)
    98. Don't know

HOME CHARACTERISTICS

Finally, the following questions relate to your home's characteristics.

18. What type of fuel is used to heat water for your home?
    1. Natural gas
    2. Electricity
    3. Propane
    4. Other (Please specify)
    98. Don't know

19. What type of fuel is used to heat your home?
    1. Natural gas
    2. Electricity
    3. Propane
    4. Other (Please specify)
    98. Don't know

20. What is the approximate square footage of the living space of your home? Your best guess is ok.
    1. ____ square feet
    98. Don't know

21. Including yourself, how many people currently live in your home year-round?
    1. ____ people
    98. Don't know

22. How many people are living or staying at this address?

    Include everyone who is living or staying here for more than 2 months. Include yourself if you are living or staying here for more than 2 months. Include anyone else staying here who does not have another place to stay, even if they are here for less than two months.

    Do not include anyone who is living somewhere else for more than two months, such as a college student living away or someone in the Armed Forces on deployment.

    1. _____ Record Number [1-97]
    98. Don't know
    99. Refused

23. What is your approximate total household income? [READ CATEGORIES]
    1. Less than $10,000

2. $10,000 to $29,999
3. $30,000 to $49,999
4. $50,000 to $69,999
5. $70,000 to $89,999
6. $90,000 to $99,999
7. $100,000 to $149,999
8. $150,000 or more
98. Don't know
99. Refused

24. Do you have any other comments you would like to provide about your experience with this program, or energy efficiency in general?

25. Thank you for your time in answering questions regarding saving energy in Ohio. We have finished with the questions we have for this survey. We would like to mail you a $5 Walmart gift card for your participation. To do that I'll need to verify your mailing information at this time. You can expect to receive the gift card in 4-6 weeks.

    First name:
    Last name:
    Mailing Address:
    City:
    State:
    Zip Code: