

Low-Income Program Evaluation, Measurement and Verification Report 2018

Prepared for the FirstEnergy Ohio Companies:

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

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Table of Contents

1.	Executive Summary	1-1
2.	Introduction and Purpose of Study.....	2-1
3.	Description of Program	3-1
4.	Methodology	4-1
5.	Detailed Impact Evaluation Findings.....	5-1
6.	Detailed Process Evaluation Findings.....	6-1
7.	Conclusions and Recommendations	7-1
8.	Appendix A: Required Savings Table	A-1
9.	Appendix B: Surveys and Interview Guides	B-1
10.	Appendix C: Agency Survey	C-1

List of Figures

Figure 6-1:	Snapshot of Job Monitoring Form.....	6-3
Figure 6-2:	Snapshot of Community Connections Reminder Sheet.....	6-4
Figure 6-3:	Are Agency Staff Well-Trained to Deliver Program Offerings	6-7
Figure 6-4:	Satisfaction with OPAE Communication	6-8
Figure 6-5:	Satisfaction with the Companies' Communication	6-9
Figure 6-6:	2018 Program Satisfaction.....	6-10
Figure 6-7:	Usefulness of Energy Savings Tips and Information	6-15
Figure 6-8:	Satisfaction with Aspects of Audit Experience	6-15
Figure 6-9:	Overall Program Satisfaction	6-16

List of Tables

Table 1-1:	Program Participation by Utility	1-1
Table 1-2:	Impact Evaluation Results	1-1
Table 2-1:	Community Connections Program Research Questions.....	2-1
Table 3-1:	Annual kWh & kW Ex-Ante Estimates per Unit, Non-lighting.....	3-2
Table 3-2:	Annual kWh & kW Ex-Ante Estimates per Unit, Lighting	3-4
Table 4-1:	Ex-Post Stratified Sampling Plan	4-3
Table 4-2:	Values Used to Calculate kWh Savings per LED Measure.....	4-5
Table 4-3:	Baseline and Efficient Wattages for LEDs	4-5
Table 4-4:	Values Used to Calculate kW Reduction per LED Measure	4-6
Table 4-5:	TRM Deemed Values for kWh & kW	4-6
Table 4-6:	TRM Deemed Values for kWh & kW	4-7
Table 4-7:	Deemed Savings Values for Smart Power Strips.....	4-7
Table 4-8:	Deemed Savings Values for Water Heater Wraps.....	4-8
Table 4-9:	Inputs for kWh and kW savings calculations: Low-Flow Showerheads...	4-8
Table 4-10:	Inputs for kWh and kW savings calculations: Low-Flow Aerators	4-9
Table 4-11:	Inputs for kWh Savings and kW Reduction: Attic and Wall Insulation...	4-10
Table 4-12:	Inputs for kWh and kW Reduction: Central Air Conditioners.....	4-11
Table 4-13:	Inputs for: kWh and kW Savings: Reduction of Air Infiltration	4-12
Table 4-14:	Inputs for kWh & kW Savings: Hot Water Pipe Insulation	4-13
Table 4-15:	Effective Useful Life Non-Lighting Measures	4-13
Table 4-16:	Effective Useful Life Lighting Measures	4-15
Table 4-17:	Community Connections Program Research Questions.....	4-16
Table 5-1:	Number of Participants	5-1
Table 5-2:	Quantities of Lighting Measures	5-1
Table 5-3:	Quantities Health & Safety and Education Measures	5-2
Table 5-4:	Annual kWh Savings by Measure (Non-Lighting)	5-2
Table 5-5:	Annual kWh Savings by Measure (Lighting)	5-4
Table 5-6:	Peak Demand kW Reductions by Measure (Non-Lighting).....	5-4
Table 5-7:	Peak Demand kW Reductions by Measure (Lighting)	5-6
Table 6-1:	Respondents' Roles.....	6-6
Table 6-2:	Sources of Program Awareness	6-11

Table 6-3:	Measures Installed.....	6-11
Table 6-4:	Satisfaction with Energy Savings Measures	6-12
Table 6-5:	Appliance Testing	6-12
Table 6-6:	Energy-Savings Topics Discussed with Residents	6-14
Table A-1:	Impact Evaluation Results (kWh).....	A-1
Table A-2:	Impact Evaluation Results (kW).....	A-1
Table A-3:	Ex-Post Lifetime Energy Savings (kWh)	A-1

1 Executive Summary

During 2018, the Ohio operating companies, The Cleveland Electric Illuminating Company (“CEI”), Ohio Edison Company (“OE”), and The Toledo Edison Company (“TE”) (collectively “Companies”) continued the Low-Income Program (also known as the “Community Connections program”). The program was targeted to low-income residential customers, either directly or through landlords of such customers. The program was administered by Ohio Partners for Affordable Energy (“OPAE”), which worked with subcontractors to deliver weatherization services, energy efficient solutions, and customer education to participating low-income customers. For each participating customer, a walk-through audit of the residence was conducted to determine whether it was feasible and appropriate to install one or more weatherization or energy efficiency measures.

A total of 4,323 low-income households received energy efficiency services through the Low-Income Program in 2018. The numbers of participants in each service territory are shown in Table 1-1¹:

Table 1-1: Program Participation by Utility

Utility	Number of Participants
CEI	1,654
OE	1,735
TE	934
Total	4,323

Estimates of the gross energy savings (kWh) and peak demand reductions (kW) for the program in the three service territories are reported in Table 1-2.

Table 1-2: Impact Evaluation Results²

Utility	Ex-Ante kWh Savings	Ex-Ante Peak kW Savings	Ex-Post kWh Savings	Ex-Post Peak kW Savings	kWh Realization Rate	kW Realization Rate
CEI	2,138,038	302.07	2,158,511	290.23	101%	96%
OE	3,410,226	475.57	3,404,801	454.87	100%	96%
TE	1,642,326	230.92	1,677,898	223.65	102%	97%
Total	7,190,589	1,008.56	7,241,210	968.75	101%	96%

¹ Unique project numbers were used to tally participant count. Some projects may span calendar years, in which case the Companies’ tracking and reporting system only counts the participant in the year savings first appear for the project.

² All savings in this report are calculated at the retail level and do not include line losses.

The gross ex-post kWh savings total shown in Table 1-2 reflects a realization rate of 101 percent, as determined by the ratio of verified total kWh savings to expected gross kWh savings. The gross ex-post kW savings total shown in Table 1-2 reflect a realization rate of 96 percent. The replacement of refrigerators and freezers with ENERGY STAR® models and the installation of energy efficient lighting accounted for 64 percent of the verified total kWh savings.

1.1 Program Operations Conclusions

The following section summarizes the conclusions from program staff interviews³ and community agency surveys.

- Communication between the Companies, OPAE, and agencies was highlighted as a strength of the program. The communication structure creates an environment where needs are identified and addressed in a timely manner. In both the community agency survey and program staff interviews it was noted that communication is effective and supports program administration. All survey respondents that interacted with OPAE and/or staff at the Companies indicated they were satisfied with the promptness and thoroughness of the communication. Though respondents reported high levels of satisfaction with OPAE and the Companies' staff last year as well, this year's responses indicated even greater satisfaction.
- The Community Connections QA/QC procedures have not significantly changed in 2018 and no concerns were indicated. This year, OPAE staff continued to conduct site visits for monitoring of the program and visited about 70% of the agencies. During these visits, staff accompanied auditors to assess field visits and reviewed case files. ADM was also responsible for conducting on-site visits for the purposes of measure verification and identifying missed opportunities. Results are communicated to program staff who resolve issues with agencies as necessary.
- Though staff indicated there were minor changes and/or additions to the program, they stated that there were no major, significant changes to the design, implementation, or goals of the Community Connections program in 2018. Minor changes/additions in 2018 included adding mini split systems as an eligible measure, adding AL01 code for air sealing to capture energy savings, adding

³ ADM interviewed the Companies' program manager and two OPAE staff members. Program staff at the individual EDC's were not interviewed during 2017. Company program staff (or representatives) coordinate program administration, tracking and reporting with OPAE. OPAE staff oversees delivery and Agency performance. Agency staff (or representatives) manage enrollment, coordination of delivery, tracking/reporting data entry, and follow-up with customers. Auditors perform and deliver audits, education and delivery of basic measures.

educational material, and developing an energy education notebook for use by auditors with customers.

- The annual Weatherize Ohio Conference was well attended by community agencies. It is the primary event where program information and training are disseminated to agency operations and administrative staff. Agency feedback suggests there is room to improve their staffs' home auditing and electrical and roof repair skills.
- "Weatherization Month" (October) also serves as a potential outreach opportunity for the program. During this month, community agencies host open houses and the media, local politicians and the community are invited to them to learn more about services they offer, including the Community Connections Program.

1.2 Participant Survey Conclusions

The following section summarizes the key findings from the survey of program participants.

- The vast majority (94%) of program participants surveyed reported high levels of satisfaction with the Community Connections Program. Less than half of participants reported they did not communicate with staff. However, of those that did speak with staff, 84% were either "very satisfied" or "satisfied" with their communication.
- Nearly all participants indicated they were very satisfied with the audit experience the time of the audit was convenient, and the auditor showed up on time or within 15 minutes of the schedule appointment time.
- The participant survey represents program participants who installed baseload measures such as LEDs, ENERGY STAR certified refrigerators and freezers, as well as other measures such as smart power strips. Overall, most participants were very satisfied with the measures installed. Sources of dissatisfaction include respondents not feeling LEDs were bright enough, respondents having issues with the refrigerator delivery company, refrigerators breaking post-installation, refrigerators not running as efficiently as respondents thought they should, and new refrigerators being smaller than their previous refrigerators.
- After the auditor's visit took place, most respondents indicated they knew more about how to save energy in their home and found the information very useful. However, there are opportunities for auditors and program representatives to provide energy education to program participants. Respondents indicated that auditors related information on various energy saving topics. Some topics were not reported to be discussed as frequently. Topics that were not as frequently

discussed with residents include changing behaviors to save energy, the high cost of electric space heaters, and removing unnecessary appliances.

1.3 Recommendations

ADM offers the following recommendations for continued improvement of the Community Connections Program.

- Continue conducting annual in-person, site visits to agency offices. Feedback suggests that despite a few issues, program-related communication was strong in 2018. We recommend building on the success of past program years and continuing to strive for effective communication between the Companies, OPAE, and program participants. From our experience evaluating other low-income programs around the country, we can attest to the importance of strong relationships with program partners, such as community agencies and advocacy groups that work with low-income customers.
- Provide additional training opportunities and resources for agency staff as they continue their efforts to diversify the measure types installed. The program should consider additional sessions on energy efficiency technologies that are either not frequently installed or are new to the program (e.g. faucet aerators, energy saving showerheads, water heater pipe insulation, or mini split systems).
- Provide additional training for agency *field staff* to enhance their professional acumen related to home audits, installing shell measures, and electrical and roof repairs. Although they might not ultimately be responsible for installation of the measures or conducting repairs, they could benefit from better understanding how to identify energy savings opportunities that may result from measures they are less familiar with. If the Weatherize Ohio Conference is not the appropriate venue, the program could provide regional training workshops or coordinate with resources that are in closer proximity to agency offices.

2 Introduction and Purpose of Study

Under contract with the Companies, ADM performed measurement and verification (M&V) activities to confirm the energy savings and demand reduction realized through the energy efficiency programs that the Companies implemented in Ohio in 2018. 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 during 2018. Additionally, this report presents the results of the process evaluation of the program focusing on participant and program staff perspectives.

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

- How many energy efficient measures were installed through the program?
- What are the average annual kWh savings per installed measure?
- What is the average kW reduction per installed measure?

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 low-income customers. Table 2-1 provides a summary of the research questions and corresponding data collection activities.

Table 2-1: Community Connections 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 Agency survey
Is the program being administered effectively in terms of program oversight, communication, staffing, training and/or reporting?	Program staff interview Agency survey
Is the program being implemented effectively in terms of the participation processes, application tools and marketing and outreach?	Agency survey 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 Agency survey Participant survey

3 Description of Program

The Low-Income Program provides weatherization measures, energy efficient products, and services, as well as client education to low-income customers who receive electric service from the Companies.

The Low-Income Program for 2018 was a continuation of the program that began in 2003. In the state of Ohio there is a collaborative effort that leverages federal, state, utility, and other funding sources to provide weatherization and energy saving products and services to low-income customers. OPAE, a trade association that also does low-income advocacy work, administers the Low-Income Program and serves as the coordinator between utilities and the local agencies that perform the work. The program targets residential customers at or below 200% of Federal Poverty Guidelines and/or landlords of residents eligible for one of the following:

- Low Income Home Energy Assistance Program (LIHEAP), a federally-funded energy payment assistance program known in Ohio as HEAP
- Percentage Income Payment Program (PIPP), an energy payment assistance program
- Home Weatherization Assistance Program (HWAP), a federally-funded energy assistance program designed to increase the energy efficiency of dwellings owned or occupied by income-eligible Ohioans

OPAE allocates weatherization and energy efficient products and services funding to counties based upon the number of LIHEAP applications received.

In general, OPAE and local agencies do not market the program in the traditional sense. Rather, prioritized customers are identified and offered the services. Many agencies operate with a substantial on-going backlog of eligible customers.

Participation in the program is straightforward for customers. Most local agencies interviewed had on-staff inspectors who visit the customer's home. Auditors meter the customer's refrigerators and separate freezers to monitor the electrical use and they are replaced if the meter reads a certain kWh per hour based on unit size and type (i.e. chest, upright, etc.). The auditor talks with the client to understand energy use in the home and to provide energy conservation education. As part of the discussion, the auditor identifies which lights in the home are used more than 1 hour per day. Light bulbs are replaced with LEDs for the fixtures that meet the minimum use criteria. The local agencies determine how best to leverage all funds (federal, state, utility, and other) available to the customer by considering what improvement and replacement equipment the customer needs. Other non-lighting measures that are administered through the program include installation of insulation, air infiltration reduction (blower door test), and water heater measures (water heater pipe wraps, low flow shower heads, and faucet aerators). Health and safety

measures include roof repairs/replacement, electric wiring repairs and upgrades, stove replacement, and well pump replacement.

In addition, the cost to provide health & safety measures is not to exceed 15% of the Eligible Measures billed to the Companies during the 2017-2019 Program Years as part of the Community Connections Program. OPAE further distributes this allotment at 15 percent of the agency's total job spending per year. The Companies also added a seasonal allowance spreadsheet to the program, which allows agencies to determine what shell or electric heating/cooling reducing measures the customer is eligible for based on their electric consumption. Table 3-1 and Table 3-2 below detail the ex-ante savings per measure for the program year 2018.

Table 3-1: Annual kWh & kW Ex-Ante Estimates per Unit, Non-lighting

Energy Efficiency Measures: Non-Lighting	kWh	kW	Source
Air Sealing - CFM Reduction	Varies by Project	Varies by Project	Ohio TRM
Central AC replacement	Varies by Project	Varies by Project	Ohio TRM
Ductless Mini-Split	Varies by Project	Varies by Project	PA TRM
Hot water pipe insulation	Varies by Project	Varies by Project	Ohio TRM
HVAC Tune Up	Varies by Project	Varies by Project	Ohio TRM
Install 11-15 cu. ft. chest freezer	1,131	0.192	Ohio TRM
Install 14-16 cu. ft. refrigerator w/top freezer	1,251	0.192	Ohio TRM
Install 16-18 cu. ft. upright freezer	1,131	0.175	Ohio TRM
Install 16-20 cu. ft. chest freezer	1,131	0.192	Ohio TRM
Install 17-19 cu. ft. refrigerator w/top freezer	1,251	0.192	Ohio TRM
Install 19-21 cu. ft. upright freezer	1,131	0.192	Ohio TRM
Install 19-22 cu. ft. refrigerator w/bottom freezer	1,251	0.192	Ohio TRM
Install 20-22 cu. ft. refrigerator w/top freezer	1,251	0.192	Ohio TRM
Install 20-23 cu. ft. side by side refrigerator	1,251	0.192	Ohio TRM
Install 24-26 cu. ft. side by side refrigerator	1,251	0.192	Ohio TRM
Install 5-10 cu. ft. chest freezer	1,131	0.175	Ohio TRM
Install 9-15 cu. ft. upright freezer	1,131	0.175	Ohio TRM
Install faucet aerator w/o shut- off valve	30.9	0.004	Ohio TRM
Install faucet aerator w/shut-off valve	30.9	0.004	Ohio TRM
Install low flow showerhead	220	0.028	Ohio TRM
Install R-11 foundation wall insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-11 sidewall insulation - brick veneer (difficult)	Varies by Project	Varies by Project	Ohio TRM

Energy Efficiency Measures: Non-Lighting	kWh	kW	Source
Install R-11 sidewall insulation - framed siding (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-19 attic insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-19 blown cellulose-sloped ceiling	Varies by Project	Varies by Project	Ohio TRM
Install R-19 fiberglass batt insulation	Varies by Project	Varies by Project	Ohio TRM
Install R-27 attic insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-27 blown cellulose-floored attic	Varies by Project	Varies by Project	Ohio TRM
Install R-27 blown cellulose-sloped ceiling	Varies by Project	Varies by Project	Ohio TRM
Install R-38 attic insulation	Varies by Project	Varies by Project	Ohio TRM
Install R-49 attic insulation	Varies by Project	Varies by Project	Ohio TRM
Insulate <52 gallon water heater	79	0.009	Ohio TRM
Insulate > or - 52 gallon water heater	79	0.009	Ohio TRM
Lower DHW tank temperature	123	0.010	PA TRM
Retirement of additional freezer	1244	0.200	Ohio TRM
Retirement of additional refrigerator	1376	0.220	Ohio TRM
Seal ducts with tape, mastic	0	0.000	Ohio TRM
Smart Strip Power Strip - 5 outlet	57	0.006	Ohio TRM
Smart Strip Power Strip - 6 Outlet	103	0.012	Ohio TRM
Smart Strip Power Strip - 7 outlet	103	0.012	Ohio TRM
Smart Strip Power Strip - 10 outlet	103	0.012	Ohio TRM

Table 3-2: Annual kWh & kW Ex-Ante Estimates per Unit, Lighting

Energy Efficiency Measures: Lighting	kWh	kW	Source
Install .03 nightlight	11.40	0.0000	PA TRM
Install .5 watt nightlight	11.40	0.0000	PA TRM
Install 10-12 Watt Flood LED	61.77	0.0062	PA TRM
Install 11-13 Watt LED	39.23	0.0040	PA TRM
Install 14-16 Watt LED	55.96	0.0056	PA TRM
Install 16-20 watt spiral CFL	52.71	0.0063	Ohio TRM
Install 3-Way LED	48.67	0.0049	PA TRM
Install 4-6 Watt Mini-Candelabra LED	32.64	0.0033	PA TRM
Install 5-7 Watt Candelabra LED	44.68	0.0045	PA TRM
Install 5-7 Watt Globe LED	42.98	0.0043	PA TRM
Install 7-10 Watt LED	33.50	0.0034	PA TRM
Install 8-10 Watt Flood LED	51.68	0.0052	PA TRM
Install 9-15 watt spiral CFL	38.07	0.0046	Ohio TRM

The following Health and Safety measures were also installed through the program:

- Electric repair/upgrade
- Roof repair/replacement
- Energy Education Consultations
- Well-Pump Replacement

4 Methodology

This chapter provides a description of the methodology applied by ADM in the evaluation of the 2018 Low Income Program. The chapter is divided into two sections: impact evaluation methodology and process evaluation methodology.

4.1 Impact Evaluation Methodology

The primary deemed savings and/or engineering algorithm source for determining program impacts was the 2010 Ohio TRM⁴ (“OHIO TRM”). The Pennsylvania TRM version 5⁵ (“PA TRM”) was used as a secondary calculation source for all measures not listed in the Ohio TRM.

Per Ohio RC §4928.662, for all measure types listed in the Ohio TRM; all installation rates, deemed savings, and hours of use were calculated per the Ohio 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 detailed in the following sections.

⁴ 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.

⁵ PA 2016 Technical Reference Manual.

http://www.puc.pa.gov/filing_resources/issues_laws_regulations/act_129_information/technical_reference_manual.aspx

4.2 Verification of quantity of Measures Installed

A first aspect of conducting measurements of program activity is to verify the number of program participants and measures installed in the home. ADM completed the following steps in the verification effort:

- Validated program tracking data provided in the Vision DSM SSRS reporting system by checking for duplicate or erroneous entries;
- Conducted verification telephone surveys with a statistically valid sample of program participants. The focus of these surveys was to verify that customers listed in the program tracking database participated and the reported measure installations were accurate. The survey was also used to describe LED installation practices among lighting customers as well as to describe customer experiences with the contractors who performed the measure installations and the health and safety repairs; and,
- Completed on-site verification visits for a sample of customer homes. During these visits, ADM performed a visual verification and recorded the installation rates for all reported measures.

4.3 Sampling Strategy

For the evaluation surveying effort, a random sample was selected to ensure that 90 percent confidence with ± 10 percent relative precision or better would be achieved for each utility.

For the calculation of sample size, a coefficient of variation of 0.5 was assumed.⁶ With this assumption, a minimum sample size of 68 participants per utility was required, as shown in the following formula:

$$n_0 = \left(\frac{Z * CV}{RP} \right)^2 = \left(\frac{1.645 * 0.5}{0.10} \right)^2 = 68$$

Equation 4-1: Minimum Sample Size Formula for 90 Percent Confidence Level

⁶ The coefficient of variation, $cv(y)$, is a measure of variation for the variable to be estimated. Its value depends on the mean and standard deviation of the distribution of values for the variable (i.e., $cv(y) = sd(y)/mean(y)$). Essentially, cv is a metric of how wide the distribution of values for the variable of interest is. Using a $cv = 0.5$ is recommended by the Uniform Methods Project Evaluation Protocol for Refrigerator Recycling Programs.

Where:

- n_0 = minimum sample size
 Z = Z-statistic value (1.645 for the 90% confidence level)
 CV = Coefficient of Variation (assumed to be 0.5)
 RP = Relative Precision (0.10)

ADM conducted phone surveys with 210 participants across the three service territories. Specifically, 70 surveys were completed with customers from each of the three operating companies. The instrument for the survey is provided in Appendix B.

For the evaluation's site verification visits, ADM utilized the Dalenius-Hodges' stratification methodology to achieve the required sampling precision. ADM's stratified sampling plan utilized five strata per Operating Company. Strata boundaries per Operating Company were designed to minimize the coefficient of variance (CV) for all strata. The sample design used for selecting program projects allows estimates of savings to be determined with $\pm 10\%$ precision at a 90% confidence interval for the program. Forty-eight homes were visited, and precision goals were accomplished for each EDC.

Table 4-1: Ex-Post Stratified Sampling Plan

Utility	Strata	Count of Gross kWh	Avg. of Gross kWh	Std. Dev of Gross kWh	Sum of Gross kWh	CV	Sample	Utility Precision
CEI	5	40	3,443	418	137,718	0.12	2	5.65%
	4	173	2,548	210	440,858	0.08	4	
	3	458	1,765	179	808,313	0.10	5	
	2	437	1,214	214	530,665	0.18	5	
	1	563	392	173	220,485	0.44	5	
OE	5	2	85,694	32,730	171,387	0.38	2	8.02%
	4	37	6,489	3,742	240,102	0.58	2	
	3	98	3,730	313	365,565	0.08	2	
	2	328	2,707	320	887,932	0.12	6	
	1	822	1,725	231	1,418,132	0.13	7	
TE	5	494	662	430	327,108	0.65	4	5.91%
	4	69	3,523	942	243,069	0.27	3	
	3	101	2,564	218	258,961	0.08	2	
	2	337	1,847	198	622,419	0.11	9	
	1	184	1,257	165	231,199	0.13	5	
Total					6,948,698		65	

4.4 Calculating Gross Annual kWh and kW Savings

Engineering and Deemed savings calculations were performed for a census of program measures. Detailed methodology descriptions are outlined in the sections below.

The following measures were installed through the Low-Income Program in 2018:

- LEDs
- Refrigerator replacement
- Freezer replacement
- Central air conditioning replacement
- Attic and Wall Insulation
- Water Heater Pipe Wraps
- Low Flow Showerhead
- Faucet Aerators
- Smart Power Strips
- Ductless Mini-Split Heat Pump

4.4.1 LEDs

The kWh savings per measure were calculated per procedures set out in the PA TRM with applicable inputs utilized from the Ohio TRM. The calculations and inputs are shown respectively in Equation 4-2 and

Table 4-2.

$$\Delta kWh = \frac{Watts_{base} - Watts_{EE}}{1000 \frac{W}{kW}} \times Hours \times WHFe \times ISR$$

Equation 4-2: LED Calculations for kWh Savings

Table 4-2: Values Used to Calculate kWh Savings per LED Measure

Variable	Description	Value	Source
Watts base	The deemed wattage of existing bulb	Varies	FE OH EE Products Upstream Data
Watts EE	The wattage of the new bulb	Varies	FE OH EE Products Upstream Data
ISR	In Service Rate (i.e., the percentage of units provided by the program that are actually installed as estimated by the lighting verification survey)	80%	Participant surveys and site visits
Hours	Average hours of use per year	1,040	OH TRM
WHFe	Waste Heat Factor for energy - to account for cooling savings from efficient lighting	1.07	OH TRM

The installed wattages for the LED measures are reported by rated lamp wattage range as shown in Table 4-3. To calculate the energy savings, a specific efficient wattage is needed. ADM used the reported efficient wattages from the 2017 and 2018 Ohio EE Products Lighting program to calculate an ex-post weighted average wattage for each lamp category. The 2016 Pennsylvania EE Products upstream lighting data was used to calculate the ex-ante weighted average wattage. Table 4-3 shows the ex-post lamp wattage for the energy efficient installed lamps and the baseline wattage mapped utilizing the PA TRM lamp categories.

Table 4-3: Baseline and Efficient Wattages for LEDs

Lamp Category	Energy Efficient Lamp Wattage	Baseline Lamp Wattage
Install 7-10 watt LED	8.85	46.54
Install 11-13 Watt LED	11.67	55.81
Install 14-16 Watt LED	15.13	78.11
Install 3-Way LED	17.23	72.00
Install 4-6 watt Mini-candelabra LED	4.38	41.11
Install 5-7 watt candelabra LED	5.99	56.27
Install 5-7 watt globe LED	5.75	54.11
Install 8-10 watt Flood LED	8.71	66.86
Install 10-12 watt Flood LED	10.75	80.26
Install 5-7 watt LED	5.94	33.32

The kW savings were calculated per procedures set out in the PA TRM with applicable inputs utilized from the Ohio TRM. The calculations and inputs are shown, respectively, in Equation 4-3 and Table 4-4

$$\Delta kW = \frac{Watts_{base} - Watts_{EE}}{1000 \frac{W}{kW}} \times CF \times WHFd \times ISR$$

Equation 4-3: LED Calculations for Summer Peak Demand Reduction

Table 4-4: Values Used to Calculate kW Reduction per LED Measure

Variable	Description	Value	Source
Watts base	Deemed wattage of existing bulb	Varies	PA TRM
Watts EE	Wattage of new bulb	Varies	Participant Data
ISR	In Service Rate (i.e., the percentage of units provided by the program that are actually installed)	80%	Participant surveys and site visits
WHF _d	Waste Heat Factor for Demand (to account for cooling savings from efficient lighting)	1.21	OH TRM
CF	Summer Peak Demand Coincidence Factor	0.11	OH TRM

LED Nightlights kWh was calculated using Equation 4-4 from the PA TRM algorithm as follows:

$$\Delta kWh = \frac{Watts_{base} - Watts_{EE}}{1000 \frac{W}{kW}} \times NL_{hours} * 365 \times ISR$$

Equation 4-4: LED Nightlights Calculation of kWh Savings

Where:

Wattsbase = Wattage of baseline nightlight

WattsEE = Wattage of LED nightlight

NLhours = Average hours of use per day per nightlight

ISR = In-service rate

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

4.4.2 Refrigerator Replacement

The procedures for calculating annual kWh savings and peak demand savings for replacement of a refrigerator for a low-income household are reported in the Ohio TRM. The deemed values for kWh and kW are shown in Table 4-5 below.

Table 4-5: TRM Deemed Values for kWh & kW

	Per Unit Savings
kWh Savings per Unit <i>Remaining life of existing unit (8 years)</i>	1,251
Average Summer Coincident Peak kW Savings per Unit. <i>Remaining life of existing unit (8 years)</i>	0.192

4.4.3 Freezer Replacements

The Ohio TRM does not include procedures for calculating annual kWh or kW savings for early replacement freezers installed in low income households. However, procedures are presented to calculate savings for freezer replacement in households that are not low-income. ADM calculated ratios between the “time of sale” deemed kWh and kW savings values for refrigerators and the “time of sale” deemed kWh and kW saving values for freezers. These calculated ratios were applied to the early replacement refrigerator deemed savings to estimate early replacement savings for freezers installed in low-income households.⁷ The resulting savings values are reported in Table 4-6.

Table 4-6: TRM Deemed Values for kWh & kW

	Per Unit Savings
kWh Savings per Unit <i>Remaining life of existing unit (8 years)</i>	1,131
Average Summer Coincident Peak kW Savings per Unit. <i>Remaining life of existing unit (8 years)</i>	0.175

4.4.4 Smart Power Strips

Energy and demand savings are deemed based on the plug size (5-plug or 7-plug) of the smart power strip purchased. Table 4-7 shows the deemed savings values specified in the OHIO TRM for the installation of Smart Strips.

Table 4-7: Deemed Savings Values for Smart Power Strips

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

The deemed savings values for 5 & 7-plug smart power strips were applied to determine ex-post savings.

4.4.5 Water Heater Wraps

Program-level energy (kWh) and peak demand (kW) savings from installing water heater wraps were calculated using the deemed savings values for this measure in the TRM.

Table 4-8 shows the deemed savings values specified in the TRM for Water Heater Wraps.

⁷ For freezer kWh savings, calculation is $(1,244/1,376)*1,251 = 1,131$ kWh. For freezer kW savings, calculation is $(0.20/0.22)*0.192 = 0.175$ kW

Table 4-8: Deemed Savings Values for Water Heater Wraps

	Per Unit kWh/kW
Average Annual kWh Savings per Unit	79
Average Summer Coincident Peak kW Savings per Unit	0.009

4.4.6 Low-Flow Showerheads

For low-flow showerheads, kWh and kW savings per measure were calculated per procedures set out in the Ohio TRM:

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

Equation 4-5: Low-Flow Showerhead Calculations for kWh Savings

$$\Delta kW = \frac{\Delta kWh}{hours} * CF$$

Equation 4-6: Low-Flow Showerhead Calculations for Summer Peak Demand Savings

Table 4-9: Inputs for kWh and kW savings calculations: Low-Flow Showerheads

Variable	Description	Value	Source
ISR	In Service Rate	100%	OH TRM – Direct Install
GPMbase	Gallons per minute of baseline showerhead	2.87	OH TRM
GPMlow	Gallons per minute of low flow showerhead	1.6	The assumption of average flow
kWh/GPMreduced	Assumed kWh savings per GPM reduction	173	OH TRM
Hours	Average number of hours per year spent using shower	29	OH TRM
CF	Summer Peak Coincidence Factor	0.00371	OH TRM

The inputs in the table above produced annual energy savings of 219.7 kWh and summer coincident peak demand savings of 0.0281 kW per showerhead.

4.4.7 Faucet Aerators

For faucet aerators, kWh and kW savings per measure were calculated per procedures set out in the OH TRM:

$$\Delta kWh = ISR * (((GPM_{base} - GPM_{low}) * 77^8$$

Equation 4-7: Faucet Aerator Calculations for kWh Savings

⁸ The OH TRM (page 89 and 90) provides deemed values in the equation below which results in 77.

$((\#people * gals/day * days/year * DR / (F/home)) * 8.3 * (Tft - Tmains) / 1,000,000) / DHW$ Recovery Efficiency/0.003412

$$\Delta kW = \frac{\Delta kWh}{hours} * CF$$

Equation 4-8: Faucet Aerator Calculations for Summer Peak Demand Savings

Table 4-10: Inputs for kWh and kW savings calculations: Low-Flow Aerators

Variable	Description	Value	Source
ISR	In Service Rate	100%	OH TRM – Direct Install
GPMbase	Gallons per minute of baseline faucet aerator	2.2	OH TRM
GPMlow	Gallons per minute faucet aerator	1.6	Assumption of average flow
CF	Summer Peak Coincidence Factor	0.0026	OH TRM

From the equations and variables above, the annual energy savings values are 24.5 kWh per unit, and the summer coincident peak demand savings are 0.0031 kW per unit.

4.4.8 Attic/Wall Insulation

For attic/wall insulation measures kWh & kW savings per measure were calculated per procedures set out in the OH TRM:

$$\Delta kWh (Cooling) = \frac{\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}} \right) * CDH * DUA * Area}{\frac{1,000}{Eff_{Cool}}}$$

Equation 4-9: Attic/Wall Insulation Calculations for Cooling kWh Savings

$$\Delta kWh (Electric Heating) = \frac{\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}} \right) * HDD * 24 * Area}{\frac{1,000,000}{Eff_{Heat}}} * 293.1$$

Equation 4-10: Attic/Wall Insulation Calculations for Heating kWh Savings

$$\Delta kW (Cooling) = \frac{kWh Savings (Cooling)}{FLH_{Cool} * CF}$$

Equation 4-11: Attic/Wall Insulation Calculations for Summer Peak Demand Reduction

Table 4-11: Inputs for kWh Savings and kW Reduction: Attic and Wall Insulation

Variable	Description	Value	Source
Rexist	R-value existing	Varies	Community Connections (CC) System ⁹
Rnew	R-value new	Varies	CC System
CDH	Cooling Degree Hours	Varies	OH TRM: Location Dependent
HDD	Heating Degree Days	Varies	OH TRM: Location Dependent
DUA	Discretionary Use Adjustment ¹⁰	0.75	OH TRM
Area	Square footage of insulated area	Varies	CC System
Eff Cool	Efficiency of Air Conditioning equipment	Varies	CC System
Eff Heat	Efficiency of heating equipment	Varies	CC System
FLH Cool	Full Load Cooling Hours	Varies	OH TRM: Location Dependent
CF	Summer Peak Coincidence Factor	0.5	OH TRM
COP	Coefficient of Performance	2.26	OH TRM

4.4.9 Central AC Replacement

For Central AC Replacement, kWh & kW savings per measure were calculated per procedures set out in the OH TRM,¹¹

$$\Delta kWh = \frac{\left(\frac{1}{SEER_{exist}} - \frac{1}{SEER_{new}} \right) * FLH_{cool} * BtuH}{1,000}$$

Equation 4-12: Central AC Replacement Calculations for kWh Savings

$$\Delta kW = \frac{\left(\frac{1}{EER_{exist}} - \frac{1}{EER_{new}} \right) * BtuH}{1,000} * CF$$

Equation 4-13: Central AC Replacement Calculations for Summer Peak Demand Reduction

⁹ The Community Connections System is a data management system operated by the Company and its partners; the system tracks completed energy improvement activities and contains site-specific information, equipment specification details, as well as other supporting documentation about energy improvement projects implemented in low-income residences.

¹⁰ To account for the fact that people do not always operate their air conditioning system when the outside temperature is greater than 75°F.

¹¹ The TRM calculation for lifetime savings for this measure uses existing equipment to calculate savings for the first five years and baseline (or code) equipment for the next 13 years. Since a conservative measure life of 8 years is being applied to most measures in the low-income program, only existing equipment baseline calculation was used.

Table 4-12: Inputs for kWh and kW Reduction: Central Air Conditioners

Variable	Description	Value	Source
FLHcool	Full load cooling hours	Varies	OH TRM, Location Dependent
Btuh	Size of equipment in Btuh (1 ton = 12,000 Btuh)	Varies	CC System
SEERexist	SEER efficiency of existing unit	10	OH TRM
SEERee	SEER efficiency of ENERGY STAR unit	Varies	tCC System
EERexist	EER efficiency of existing unit (if unknown, SEER exist * 0.9)	9	OH TRM
EERee	EER efficiency of ENERGY STAR unit	Varies	Captured in the CC System
CF	Summer Peak Coincidence Factor	0.5	OH TRM

4.4.10 Air Infiltration Reduction

For Air Filtration Reduction kWh and kW cooling savings per measure were calculated per procedures set out in the OH TRM:

$$\Delta kWh (Cooling) = \frac{\left(\frac{CFM50_{exist} - CFM50_{new}}{Nfactor_{cool}} \right) * 60 * CDH * 0.0135}{\frac{1,000}{Eff_{cool}}}$$

Equation 4-14: Air Infiltration Reduction Calculations for Cooling kWh Savings

$$\Delta kWh (Electric Heating) = \frac{\left(\frac{CFM50_{exist} - CFM50_{new}}{Nfactor_{heat}} \right) * 60 * 24 * HDD * 0.018}{\frac{1,000,000}{Eff_{heat}}} * 293.1$$

Equation 4-15: Air Infiltration Reduction Calculations for Heating kWh Savings

$$\Delta kW (Cooling) = \frac{kWh Savings (Cooling)}{FLH_{cool} * CF}$$

Equation 4-16: Air Infiltration Reduction Calculations for Summer Peak Demand Reduction

Table 4-13: Inputs for: kWh and kW Savings: Reduction of Air Infiltration

Variable	Description	Value	Source/Description
CFM50exist	Existing Cubic Feet per Minute at 50 Pascal pressure differential - measured by the blower door before air sealing	Varies	Captured in the CC System
CFM50new	New Cubic Feet per Minute at 50 Pascal pressure differential – measured by the blower door after air sealing	Varies	Captured in the CC System
N-factorCool	Conversion factor – convert 50-Pascal air flows to natural airflow	29.4	OH TRM
N-factorHeat	Conversion factor - convert 50-Pascal air flows to natural airflow	17.8	OH TRM
CDH	Cooling Degree Hours	Varies	OH TRM, Dependent on Location
HDD	Heating Degree Days	Varies	OH TRM, Dependent on Location
DUA	Discretionary Use Adjustment – to account for the fact that people do not always operate their air conditioning system when the outside temperature is greater than 75°F	0.75	OH TRM
EffCool	Efficiency of Air Conditioning equipment	Varies	Captured in the CC System
EffHeat	Efficiency of Heating equipment	Varies	Captured in the CC System
FLHCool	Full Load Hours – Cooling	Varies	OH TRM, Dependent on Location
CF	Summer Peak Coincidence Factor	0.5	OH TRM
COP	Coefficient of Performance	2.26	OH TRM

4.4.11 Hot Water Pipe Insulation

For Domestic Hot Water Pipe Insulation kWh and kW savings per measure were calculated per procedures set out in the OH TRM,

$$\Delta kWh = \frac{\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) * L * C * \Delta T * 8,760}{\frac{\eta_{DHW}}{3,413}}$$

Equation 4-17: Hot Water Pipe Insulation Calculations for kWh Savings

$$\Delta kW = \frac{kWh \text{ Savings}}{8,760}$$

Equation 4-18: Hot Water Pipe Insulation Calculations for Summer Peak Demand Reduction

Table 4-14: Inputs for kWh & kW Savings: Hot Water Pipe Insulation

Variable	Description	Value	Source
Rexist	R-value existing – existing effective whole-assembly thermal resistance value	Varies	Captured in the CC System
Rnew	R-value new – new total effective whole-assembly thermal resistance value	Varies	Captured in the CC System
L	Length of pipe from water heating source covered by pipe wrap (ft)	Varies	Captured in the CC System
C	Circumference of pipe (ft) (Diameter (in) * π * 0.083)	Varies	Captured in the CC System
ΔT	Average temperature difference between supplied water and outside air temperature (°F)	65	OH TRM
edh	Recovery efficiency of electric hot water heater	0.98	OH TRM

4.5 Calculation of Lifetime kWh Savings per Measure

Lifetime kWh savings were calculated by multiplying annual kWh savings for each measure by a deemed effective useful life. The useful life for each measure is detailed in Table 4-15 and Table 4-16.

Table 4-15: Effective Useful Life Non-Lighting Measures

Energy Efficiency Measures: Non-Lighting	EUL
Air Sealing - CFM Reduction	15
Central AC replacement	18
Ductless Mini-Split	18
Hot water pipe insulation	15
HVAC Tune Up	5
Install 11-15 cu. ft. chest freezer	17
Install 14-16 cu. ft. refrigerator w/top freezer	17
Install 16-18 cu. ft. upright freezer	17
Install 16-20 cu. ft. chest freezer	17
Install 17-19 cu. ft. refrigerator w/top freezer	17
Install 19-21 cu. ft. upright freezer	17
Install 19-22 cu. ft. refrigerator w/bottom freezer	17
Install 20-22 cu. ft. refrigerator w/top freezer	17
Install 20-23 cu. ft. side by side refrigerator	17
Install 24-26 cu. ft. side by side refrigerator	17
Install 5-10 cu. ft. chest freezer	17

<i>Energy Efficiency Measures: Non-Lighting</i>	EUL
Install 9-15 cu. ft. upright freezer	17
Install faucet aerator w/o shut- off valve	5
Install faucet aerator w/shut-off valve	5
Install low flow showerhead	5
Install R-11 foundation wall insulation (difficult)	25
Install R-11 sidewall insulation - brick veneer (difficult)	25
Install R-11 sidewall insulation - framed siding (difficult)	25
Install R-19 attic insulation (difficult)	25
Install R-19 blown cellulose-sloped ceiling	25
Install R-19 fiberglass batt insulation	25
Install R-27 attic insulation (difficult)	25
Install R-27 blown cellulose-floored attic	25
Install R-27 blown cellulose-sloped ceiling	25
Install R-38 attic insulation	25
Install R-49 attic insulation	25
Insulate <52 gallon water heater	5
Insulate > or - 52 gallon water heater	5
Lower DHW tank temperature	2
Retirement of additional freezer	8
Retirement of additional refrigerator	8
Seal ducts with tape, mastic	20
Smart Strip Power Strip - 5 outlet	4
Smart Strip Power Strip - 6 Outlet	4
Smart Strip Power Strip - 7 outlet	4
Smart Strip Power Strip - 10 outlet	4

Table 4-16: Effective Useful Life Lighting Measures

Energy Efficiency Measures: Lighting	EUL
Install .03 nightlight	8.00
Install .5 watt nightlight	8.00
Install 10-12 Watt Flood LED	13.60
Install 11-13 Watt LED	13.60
Install 14-16 Watt LED	13.60
Install 16-20 watt spiral CFL	9.18
Install 3-Way LED	13.60
Install 4-6 Watt Mini-Candelabra LED	13.60
Install 5-7 Watt Candelabra LED	13.60
Install 5-7 Watt Globe LED	13.60
Install 7-10 Watt LED	13.60
Install 8-10 Watt Flood LED	13.60
Install 9-15 watt spiral CFL	9.18

4.6 Process Evaluation Methodology

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 low-income customers.

Table 4-17 provides a summary of the research questions and corresponding data collection activities.

Table 4-17: Community Connections 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 Agency survey
Is the program being administered effectively in terms of program oversight, communication, staffing, training and/or reporting?	Program staff interview Agency survey
Is the program being implemented effectively in terms of the participation processes, application tools and marketing and outreach?	Agency survey 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 Agency survey Participant survey

To address these researchable issues, ADM reviewed program documentation, administered participant surveys and completed in-depth interviews with the Companies' program staff and implementation partners. ADM began the process evaluation in October 2018 with the development of data collection instruments and a review of program documentation. Process evaluation data collection and analysis occurred October 2018 through January 2019.

- **Program Documentation Review:** Program materials are an important data source for the process evaluation. We began by requesting all available documentation from the Companies and OPAE 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 three key program staff at the Companies and OPAE. The objective of these interviews is to check-in with staff to elicit feedback and suggestions for program improvements.
- **Agency Survey:** ADM administered an online survey to participating community agencies; thirteen of the twenty-one agencies (62%) responded. The respondents accounted for 53% of total program kWh savings and 44% of total projects.¹² The survey addressed issues related to program design, operations, and opportunities for improvements.
- **Participant Survey:** ADM contracted with Burnett Group to administer phone surveys to residents who received measures or services from the program. In total, 210 customers completed the survey; 70 from each EDC. Survey topics covered

¹² Program activity data downloaded on 1/08/2018.

measure installation rates as well as customer experiences with the program, installation crew, and agency staff.

5 Detailed Impact Evaluation Findings

The number of low-income households that received energy efficiency services through the Low-Income Program in 2018 in the service territories of the Companies are shown in Table 5-1 below.

Table 5-1: Number of Participants¹³

Utility	Number of Participants
CEI	1,654
OE	1,735
TE	934
Total	4,323

5.1 Impact Evaluation Results

Table 5-2 shows the quantities of energy efficient lighting measures that were installed for these participants through the Low-Income Program.

Table 5-2: Quantities of Lighting Measures

¹³ Unique project numbers were used to tally participant count. Some projects may span calendar years, in which case the Companies' tracking and reporting system only counts the participant in the year savings first appear for the project

Lighting Measure	CEI	OE	TE	Total
Install .03 nightlight	0	96	0	96
Install .5 watt nightlight	0	313	1	314
Install 10-12 Watt Flood LED	412	536	29	977
Install 11-13 Watt LED	4,305	1,781	3,246	9,332
Install 14-16 Watt LED	1,507	3,030	2,681	7,218
Install 16-20 watt spiral CFL	8	-5	0	3
Install 3-Way LED	84	857	148	1,089
Install 4-6 Watt Mini-Candelabra LED	308	1,516	82	1,906
Install 5-7 Watt Candelabra LED	2,386	2,040	381	4,807
Install 5-7 Watt Globe LED	1,538	1,869	50	3,457
Install 7-10 Watt LED	9,273	15,324	7,982	32,579
Install 8-10 Watt Flood LED	30	105	0	135
Install 9-15 watt spiral CFL	0	-10	0	-10
Total	6,316	6,608	6,105	61,903

Table 5-3 shows the number of health and safety measures and the number of energy education consultations that were conducted under the Low-Income Program in 2018.

Table 5-3: Quantities Health & Safety and Education Measures

Measure Category	CEI	OE	TE	Total Companies
Carbon Monoxide Detector	2	325	324	651
Electrical Repairs	85	10	28	123
Roof Repairs	0	2	0	2
Replace Electric Stove	0	23	1	24
Replace Well-Pump	0	4	1	5
Total Health & Safety and Education Measures	87	364	354	805

Table 5-4 through Table 5-7 below detail the ex-post savings values and realization rates calculated per measure during program year 2018.

Table 5-4: Annual kWh Savings by Measure (Non-Lighting)

Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Air Sealing – CFM Reduction	22,200	43,994	198%

Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Central AC replacement	0	0	
Ductless Mini-Split	1,150	1,150	100%
Hot water pipe insulation	2,576	2,577	100%
HVAC Tune Up	57	305	534%
Install 11-15 cu. Ft. chest freezer	59,943	59,943	100%
Install 14-16 cu. Ft. refrigerator w/top freezer	566,703	566,703	100%
Install 16-18 cu. Ft. upright freezer	205,842	205,840	100%
Install 16-20 cu. Ft. chest freezer	6,786	6,786	100%
Install 17-19 cu. Ft. refrigerator w/top freezer	1,479,933	1,479,933	100%
Install 19-21 cu. Ft. upright freezer	58,812	58,812	100%
Install 19-22 cu. Ft. refrigerator w/bottom freezer	140,112	140,112	100%
Install 20-22 cu. Ft. refrigerator w/top freezer	780,624	780,624	100%
Install 20-23 cu. Ft. side by side refrigerator	480,384	480,384	100%
Install 24-26 cu. Ft. side by side refrigerator	419,085	419,085	100%
Install 5-10 cu. Ft. chest freezer	265,785	265,783	100%
Install 9-15 cu. Ft. upright freezer	151,554	151,553	100%
Install faucet aerator w/o shut- off valve	1,483	1,176	79%
Install faucet aerator w/shut-off valve	803	637	79%
Install low flow showerhead	10,326	10,326	100%
Install R-11 foundation wall insulation (difficult)	8	8	100%
Install R-11 sidewall insulation – brick veneer (difficult)	15	15	100%
Install R-11 sidewall insulation – framed siding (difficult)	19,234	19,237	100%
Install R-19 attic insulation (difficult)	10,303	9,560	93%
Install R-19 blown cellulose-sloped ceiling	4,858	4,812	99%
Install R-19 fiberglass batt insulation	8,209	8,166	99%
Install R-27 attic insulation (difficult)	18,275	17,167	94%
Install R-27 blown cellulose-floored attic	7	7	100%
Install R-27 blown cellulose-sloped ceiling	4,029	3,049	76%
Install R-38 attic insulation	20,779	16,343	79%
Install R-49 attic insulation	4,959	4,909	99%
Insulate <52 gallon water heater	1,027	1,022	100%
Insulate > or – 52 gallon water heater	79	79	100%
Lower DHW tank temperature	246	332	135%

Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Retirement of additional freezer	3,732	3,393	91%
Retirement of additional refrigerator	9,632	8,757	91%
Seal ducts with tape, mastic	0	0	
Smart Strip Power Strip - 5 outlet	113	113	100%
Smart Strip Power Strip - 6 Outlet	4,729	4,729	100%
Smart Strip Power Strip - 7 outlet	51,811	51,811	100%
Smart Strip Power Strip – 10 outlet	206	206	100%
Total	4,816,408	4,829,436	100%

Table 5-5: Annual kWh Savings by Measure (Lighting)

Measure	Ex-Ante kWh	Ex-Post kWh	Realization Rate
Install .03 nightlight	1,094	1,172	107%
Install .5 watt nightlight	3,580	3,576	100%
Install 10-12 Watt Flood LED	52,599	60,351	115%
Install 11-13 Watt LED	330,324	366,090	111%
Install 14-16 Watt LED	317,643	403,931	127%
Install 16-20 watt spiral CFL	158	168	106%
Install 3-Way LED	92,536	53,004	57%
Install 4-6 Watt Mini-Candelabra LED	76,184	62,220	82%
Install 5-7 Watt Candelabra LED	236,056	214,771	91%
Install 5-7 Watt Globe LED	124,078	148,567	120%
Install 7-10 Watt LED	1,132,857	1,091,352	96%
Install 8-10 Watt Flood LED	7,454	6,977	94%
Install 9-15 watt spiral CFL	-381	-404	106% ¹⁴
Total	2,374,182	2,411,774	102%

Table 5-6: Peak Demand kW Reductions by Measure (Non-Lighting)

Measure	Ex-Ante kW	Ex-Post kW	Realization Rate
Air Sealing - CFM Reduction	0.33	0.46	138%
Central AC replacement	0.00	0.00	

¹⁴ Line item accounts for corrections and credits for this CFL measures due to program design update.

Measure	Ex-Ante kW	Ex-Post kW	Realization Rate
Ductless Mini-Split	4.27	4.27	100%
Hot water pipe insulation	0.29	0.29	100%
HVAC Tune Up	0.03	0.03	100%
Install 11-15 cu. ft. chest freezer	9.28	9.27	100%
Install 14-16 cu. ft. refrigerator w/top freezer	86.98	87.15	100%
Install 16-18 cu. ft. upright freezer	31.85	31.83	100%
Install 16-20 cu. ft. chest freezer	1.05	1.05	100%
Install 17-19 cu. ft. refrigerator w/top freezer	227.14	227.60	100%
Install 19-21 cu. ft. upright freezer	9.10	9.09	100%
Install 19-22 cu. ft. refrigerator w/bottom freezer	21.50	21.55	100%
Install 20-22 cu. ft. refrigerator w/top freezer	119.81	120.05	100%
Install 20-23 cu. ft. side by side refrigerator	73.73	73.88	100%
Install 24-26 cu. ft. side by side refrigerator	64.32	64.45	100%
Install 5-10 cu. ft. chest freezer	41.12	41.10	100%
Install 9-15 cu. ft. upright freezer	23.45	23.44	100%
Install faucet aerator w/o shut- off valve	0.19	0.15	78%
Install faucet aerator w/shut-off valve	0.10	0.08	78%
Install low flow showerhead	1.32	1.32	100%
Install R-11 foundation wall insulation (difficult)	0.01	0.01	111%
Install R-11 sidewall insulation - brick veneer (difficult)	0.02	0.02	100%
Install R-11 sidewall insulation - framed siding (difficult)	0.10	0.22	220%
Install R-19 attic insulation (difficult)	0.02	0.01	25%
Install R-19 blown cellulose-sloped ceiling	0.00	0.00	
Install R-19 fiberglass batt insulation	0.04	0.04	100%
Install R-27 attic insulation (difficult)	0.11	0.15	136%
Install R-27 blown cellulose-floored attic	0.01	0.01	100%
Install R-27 blown cellulose-sloped ceiling	0.00	0.01	
Install R-38 attic insulation	0.05	0.12	222%
Install R-49 attic insulation	0.00	0.00	
Insulate <52 gallon water heater	0.12	0.12	100%
Insulate > or - 52 gallon water heater	0.01	0.01	100%
Lower DHW tank temperature	0.02	0.03	135%
Retirement of additional freezer	0.60	0.52	87%

Measure	Ex-Ante kW	Ex-Post kW	Realization Rate
Retirement of additional refrigerator	1.54	1.35	87%
Seal ducts with tape, mastic	0.00	0.00	
Smart Strip Power Strip - 5 outlet	0.01	0.01	101%
Smart Strip Power Strip - 6 Outlet	0.55	0.53	96%
Smart Strip Power Strip - 7 outlet	6.05	5.81	96%
Smart Strip Power Strip - 10 outlet	0.02	0.02	96%
Total	725.15	726.05	100%

Table 5-7: Peak Demand kW Reductions by Measure (Lighting)

Measure	Ex-Ante kW	Ex-Post kW	Realization Rate
Install 0.03 nightlight	0.00	0.00	
Install 0.5 watt nightlight	0.00	0.00	
Install 10-12 Watt Flood LED	6.29	6.09	97%
Install 11-13 Watt LED	39.51	36.91	93%
Install 14-16 Watt LED	38.00	40.73	107%
Install 16-20 watt spiral CFL	0.02	0.02	106%
Install 3-Way LED	11.07	5.34	48%
Install 4-6 Watt Mini-Candelabra LED	9.11	6.27	69%
Install 5-7 Watt Candelabra LED	28.24	21.66	77%
Install 5-7 Watt Globe LED	14.84	14.98	101%
Install 7-10 Watt LED	135.50	110.04	81%
Install 8-10 Watt Flood LED	0.89	0.70	79%
Install 9-15 watt spiral CFL	-0.05	-0.05	106% ¹⁵
Total	283.42	242.70	86%

The gross ex-post kWh savings reflect a realization rate of 101 percent, as determined by the ratio of verified total kWh savings to expected gross kWh savings. The gross ex-post kW savings total reflects a realization rate of 96 percent. The replacement of refrigerators and freezers with ENERGY STAR® models and the installation of energy efficient lighting accounted for 64 percent of the verified total kWh savings & 71 percent of total kW savings. LED lighting measures make up 33 percent of kWh savings and 24 percent of kW savings.

¹⁵ Ibid.

Verified ex-post savings for LED measures were higher for kWh and lower for kW savings than ex-ante estimates. The variance in savings was attributed to the baseline wattage, efficient wattages, and in-service rates (ISR).

The ex-ante wattages for the LED measures were reported by rated lamp wattage range. To calculate the energy savings, a specific efficient wattage is needed. The ex-post calculation used the reported efficient wattages from the 2017 and 2018 Ohio EE Products Lighting program to calculate an ex-post weighted average wattage for each lamp category. The 2016 Pennsylvania EE Products upstream lighting data was used to calculate the ex-ante weighted average wattage. Table 4-3 shows the ex-post lamp wattage for the energy efficient installed lamps and the baseline wattage mapped utilizing the PA TRM lamp categories.

The evaluation survey efforts and on-site verification visits determined the ISR of LEDs to be 80%. The PA TRM installation rate used in the ex-ante calculation was 92%.

Because of the structure of the TRM mapping from the efficient lighting condition to the baseline case, the delta watts variable used in ex post savings calculation was greater than the delta watts variable in ex-ante calculations. Due to the nature of savings algorithm the delta watts variable had a greater impact on the kWh saving calculation than the kW savings calculation.

The combination of the differences in calculation factors resulted in an ex-post kWh savings realization rate of 101 percent and kW savings realization rate of 96 percent.

6 Detailed Process Evaluation Findings

The following section provides detailed findings from the process evaluation of the Community Connections Program.

6.1 Program Operations Perspective

The following section provides an overview of the Community Connections Program's operations constructed through in-depth discussions with three key program staff with the Companies and OPAE, and a survey of 13 participating community agencies. The interviews and survey covered topics such as; staff roles and responsibilities, 2018 program operations and changes, satisfaction, and suggestions for improving program delivery.

6.1.1 Staff interviews

6.1.1.1 Staff Roles and Responsibilities

ADM evaluators conducted in-depth interviews with the Companies' program implementation manager and the Ohio Partners for Affordable Energy (OPAE) director assistant/monitor. The program implementation manager oversees the day-to-day activities of the Community Connections Program and is the point person for the Companies. The OPAE director assistant is responsible for direct communication with their partner agencies and conducting field monitoring visits. No staff were added in 2018 nor were there any changes to the responsibilities of FE or OPAE staff.

6.1.1.2 2018 Program Changes and Highlights

There were no significant changes to the design, implementation, or goals of the Community Connections program in 2018.

Staff indicated there were minor changes and/or additions to Community Connections Program in 2018:

- Program eligible measures added (mini split systems and smart thermostats in the future);
- Added AL01 code for air sealing to capture energy savings¹⁶;
- Procedures drafted for the multifamily master meter;
- Educational material and coloring book added;

¹⁶ FE indicated they were not getting savings associated with air sealings, and by adding the AL01 code allowed them to capture all those acquired readings to capture savings.

- Developing an energy education notebook to be used by auditors with customers;
- Testing the new program tracking system (LEEN) which will be launched in the first quarter of 2019¹⁷; and
- Increased agency monitoring to ensure spending goals are met.

The Companies' and OPAE staff indicated the Community Connections Program is on track to meet its energy savings and spending budget for 2018. Staff indicated that many projects were driven by and in conjunction with the Home Weatherization Assistance Program (HWAP). The Community Connections program did not add any additional agencies in 2018 and staff did not believe there was a need. The Companies and OPAE believe the income requirements (200% of Federal Poverty Level) are appropriate and there are no plans to change in the upcoming program year.

It was also highlighted that program participation and the number of projects has remained consistent in 2018 compared to previous program years. When asked if there are difficult populations, regions, or market segments that are harder to reach, OPAE indicated seniors. It was noted that seniors may have preconceived notions about assistance programs and are reluctant to participate. OPAE indicated participants are satisfied with the program and have not heard any immediate concerns. OPAE did express some concern about the lack of understanding of energy savings among customers who are not willing to change behaviors.

6.1.1.3 On-Site Monitoring Visits

In 2018, there were 13 total on-site monitoring agency visits (hereafter, "visits"). There are two OPAE staff members who are responsible for agency monitoring visits, with one person handling the northern region of the state and the other person who visits the south. OPAE staff attempt to visit all agencies (18) once per year. However, territory size is a challenge for the two dedicated OPAE staff who are charged with monitoring. The Companies' will attend the visits approximately three to four times per year. During a visit, OPAE staff accompany the agency auditor to assess three to four field visits and conduct eight to ten case file reviews. During the field visit, a checklist/form is used as a standardized instrument to assess compliance with the Community Connections operations and procedures (see Figure 6-1). Case file review occurs in the agency office and a similar instrument is used to comply a list of compliance issues and/or needed follow-up.

Figure 6-1: Snapshot of Job Monitoring Form

Agency			Utility Company		
Customer Name			Own or Rent		Auditor
Address			Heat Source		Monitor Dora Tharp
City			Water Heater		Cooling
Job Number		Visit/Review Date			Appt. Time

INSTALLED MEASURES	QTY	CONFIRMED	DOCUMENTS	ON FILE	UPLOADED
			Income Documentation		
			C-4		
			C-4 Attachment if applicable		
			Seasonal Allowance Spreadsheet		
			Customer Release Form		
			Property Owner Release Form		
			Property Owner Appliance form		
			Appliance(s) Invoice		
			Appliance(s) Metering Form(s)		
			Bid Sheets if applicable		
			Utility Bill		
			Bulb location sheet		

Were all the bulbs installed?	
Bulb sheet match installed bulbs?	
Were all appliances hauled away?	
Did staff clean up after themselves?	
Did the program meet your expectations?	

Comments:

OPAE staff also have an opportunity to receive participant feedback during visits from customers about their experiences with the Community Connections Program. In addition, some agencies administer surveys post-participation.

After visits are complete, OPAE de-briefs with agency staff to present the findings from their field and case file review assessments. This gives OPAE and the agency an opportunity to discuss compliance issues and address any questions that arise from the findings. A final visit report is generated from OPAE to the respective agency. OPAE staff indicated the reports “do not come as surprise” to agency staff, as most issues and needs are addressed during the sit-down meeting. OPAE provides follow-up technical assistance and training post visit when needed. Staff mentioned that there is a challenge to the community agencies who must comply with numerous rules and regulations because they receive funds from multiple sources¹⁸.

6.1.1.4 Communications and Quality Assurance/Quality Control

In 2018, the communication between the Companies, OPAE, and agencies remained consistent and was highlighted as a strength of the program. The communication structure creates an environment where needs are identified and addressed in a timely manner. It was noted that communication is effective and supports program administration. In addition, auxiliary communication between OPAE and the community agencies is consistent and positive. The Companies send out quarterly newsletters regarding programmatic activities.

¹⁸ OPAE staff indicated the need to stay current with Home Weatherization Assistance Program (HWAP) to provide support to community agencies who must follow changing rules and/or procedures.

OPAE stills provide monthly reports to the Companies. Report contents have remained the same with some minor display changes. The Companies staff believes they are adequate and did not provide any suggested improvements. It was suggested by OPAE to review and revise the Community Connections Program operations manual, as some items are outdated and/or no longer applicable.

The Community Connections QA/QC procedures have not significantly changed in 2018 and no concerns were indicated. OPAE periodically sends a procedure sheet reminder to the agencies, which are adjusted based on the findings from the visits (see Figure 6-2).

Figure 6-2: Snapshot of Community Connections Reminder Sheet

-
- First Energy – Community Connections Reminders*
-
1. If you are entering a debit memo, include an explanation in the notes section.
 2. Before requesting approval from First Energy, the job must be entered into the CC system and all required documents uploaded.
 3. Instruct your data entry staff to double check previous client names AND addresses. This may prevent billing measures for a customer served prior to the 5-year term.
 4. If returning to a premise after five (5) years (from the job finish date), **a new job number must be created** regardless of who lives at the property. **DO NOT** use the same old job number.
 5. Refer to First Energy Procedures as well as First Energy's Community Connections Program Newsletters for guidance. If you do not have these copies, contact your Assistant Program Director/Monitor for copies.
 6. Shell measures such as air sealing and insulation are to be installed only in centrally cooled or electrically heated homes.
 7. When charging any air sealing to Community Connections, **include code AL01 – Air sealing, CFM reduction \$10.00.**
 8. When in doubt, call your Assistant Program Director/Monitor.

During “Weatherization Month” (October), the community agencies host open houses. The media, local politicians and the community are invited to the open houses to learn more about the services they offer. This acts as a potential outreach opportunity and place for ratepayers to learn about the program. OPAE staff attends some of these to also provide information about the program. The Companies and OPAE indicated there are education materials that are used by auditors and contractors with program participants.

OPAE staff and many community agencies attended the Weatherize Ohio conference¹⁹ in 2018. OPAE indicated the conference participation is beneficial and noted that it is also important for field staff to attend. Emerging topics²⁰ presenting at small workshops and peer networking opportunities were the highlight of the conference.

6.1.1.5 Future Challenges

The Companies' indicated they are satisfied with OPAE as the program administrator, stating they are "easy to work with, receptive to change, and working to make process improvements". OPAE had similar remarks about the Companies. Below are the noted strengths of the Community Connections Program:

- Strong coordination between the Companies, OPAE and agencies;
- Adequate and appropriate services for Ohio customers, including air sealing and health and safety improvements;
- Satisfaction among program participants and partners; and
- Positive working relationship between OPAE and the Companies.

The Companies and OPAE did not anticipate any significant changes to the program for the upcoming year but did discuss potential challenges to the program in the future (e.g., increasing measure costs, fixed budgets, and increasing energy savings goals). The Community Connections Program has experienced about 1/3 of their energy savings from lighting. It was discussed that a future challenge may be transitioning from lighting to other costlier measures, which could impact the budget because lighting is typically less expensive. OPAE indicated they would like to see the program expand the number of eligible measures in the future. When asked which measures, it was suggested to research advantageous options for the program.

The Community Connections Program currently serves customers every five years. While neither the Companies nor OPAE indicated there is a diminishing customer pool, they have discussed strategies if this becomes a future problem. One such strategy would be to revisit past participants' homes to assess if there are new program measures that could be installed.

6.1.2 Agency survey

¹⁹ Weatherize Ohio is an annual conference that is sponsored by the state, OH utilities, and Columbia Gas.

²⁰ Emerging topics included: How to deal with drug use discovered in a customer's home; Office etiquette: dealing with discrimination.

ADM administered an online survey to participating community agencies in December 2018. The survey was designed to elicit feedback from agency staff about their experience and overall satisfaction with the Community Connections Program.

6.1.2.1 Respondent's Roles

In total, 13 agencies and 16 staff members responded to the online survey. Most respondents were program directors, program coordinators, or program managers (81%). We also heard from two office administrators and one technician. Table 6-1 provides a summary of the respondents' roles.

Table 6-1: Respondents' Roles

	Response	N=16	Percent of Respondents
What is your role with regards to the Community Connections Program?	Director	7	44%
	Program Coordinator	3	19%
	Program Manager	3	19%
	Office Administrator	2	13%
	Technician	1	6%

6.1.2.2 Program Changes

Staff provided feedback about changes they made in the past two years. Two of the agencies made changes to how they are allocating funds to residents. One agency is using more funds to leverage the program with their other programs. Another respondent stated that their agency began installing carbon monoxide detectors. One out of the sixteen survey respondents indicated their organization has altered the way they are testing and installing appliances by changing appliance vendors and auditors.

All respondents reported using the Seasonal Allowance Worksheet. Most survey respondents (82%) indicated that the tool was satisfactory and did not have any suggestions for improving it. No respondents indicated their organizations were planning to make changes to the program in 2019.

6.1.2.3 Marketing and Outreach

Nearly all agency staff that responded to the survey reported marketing the program to residents (88%). Most frequently reported outreach methods included Facebook, agency websites, brochures or fliers, and agency newsletters. Multiple respondents also reported marketing the program at community events.

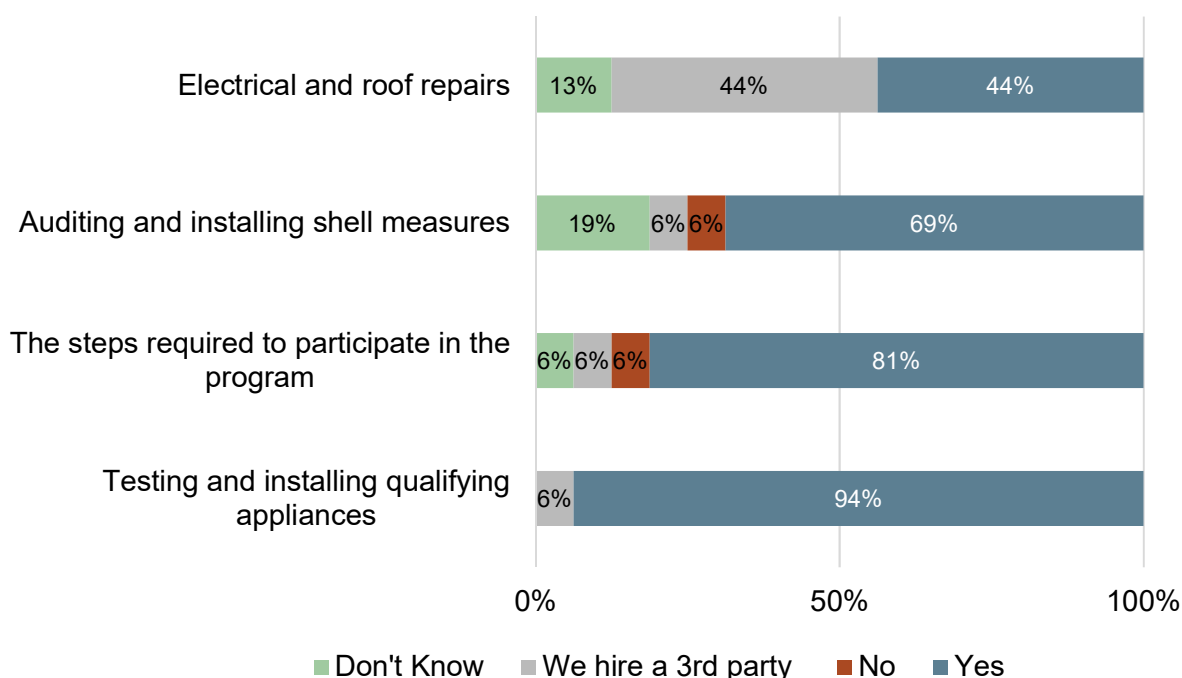
6.1.2.4 Training and Events

Each year OPAE hosts *Weatherize Ohio*, a conference that brings together various stakeholders responsible for administering and implementing energy efficiency programs, to low income residents, throughout the state of Ohio. Agency staff are invited to attend the conference to learn about new technologies and program offerings for their clients.

Of the sixteen respondents to this year's survey, twelve (75%) indicated they attended the conference. Respondents were asked for suggestions regarding improving the format of the events. Fifteen of the sixteen respondents (94%) indicated they had no suggestions. One respondent suggested making the training two days and keeping the Quality Control Inspector (QCI) trainings, as they felt that it helps staff with Building Performance Institute (BPI) requirements.

We also asked agencies if they felt that their staff is well-trained in several program areas, Figure 6-3 displays the results. The results are similar to last year's evaluation. Most respondents (81%) indicated their staff is well-trained in the steps necessary to participate in the Community Connections Program as well as testing and installing qualifying appliances (94%). Sixty-nine percent indicated their staff is well-trained in-home audits and installing shell measures. Far fewer (44%) felt their staff was well-trained in electrical and roof repairs, however 44% of respondents indicated they typically hire a 3rd party for that work.

Figure 6-3: Are Agency Staff Well-Trained to Deliver Program Offerings



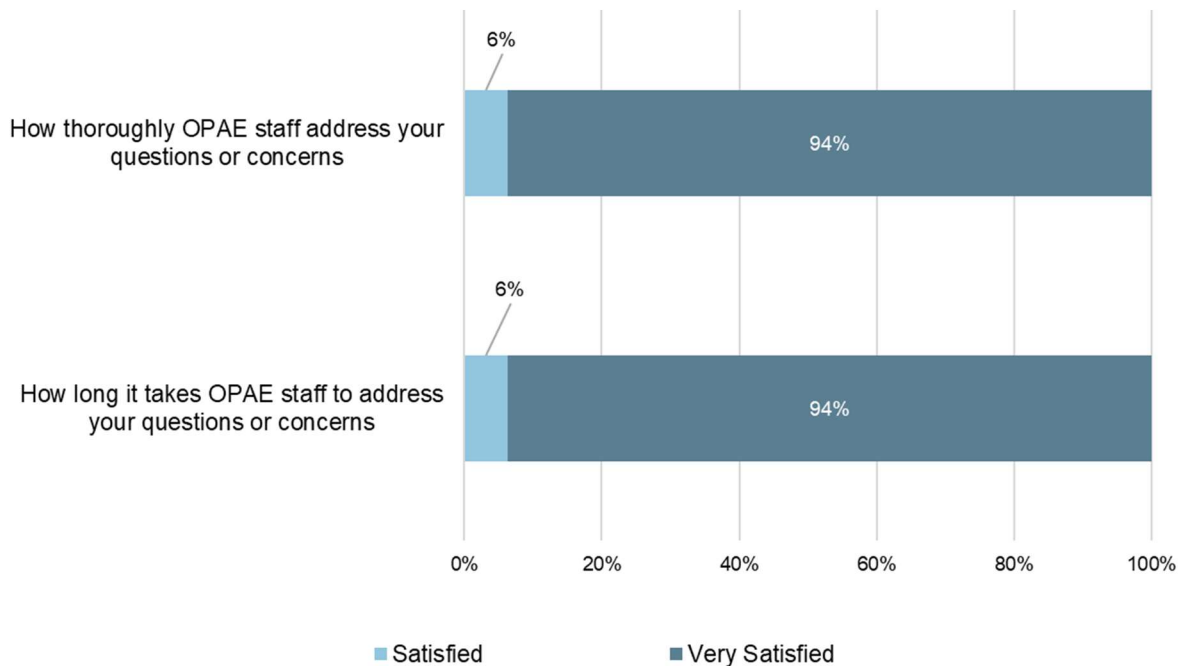
Respondents offered feedback regarding ways the program could better support the training needs of their organizations. Fifteen of the sixteen respondents (94%) indicated they did not need additional training and reiterated their satisfaction with the current level of support they receive. One respondent suggested additional training for their agency's auditors could be helpful and potentially improve the Program.

6.1.2.5 Communication with Program Staff

All survey respondents indicated that they have had direct communication with OPAE staff. The majority of respondents characterized OPAE staff as “very knowledgeable” (88%) about the issues they discuss with them.

Respondents rated their satisfaction with how long it takes for OPAE staff to address their questions or concerns and how thoroughly they are addressed. Survey results are displayed in Figure 6-4. All respondents were either “very satisfied” or “satisfied”.

Figure 6-4: Satisfaction with OPAE Communication

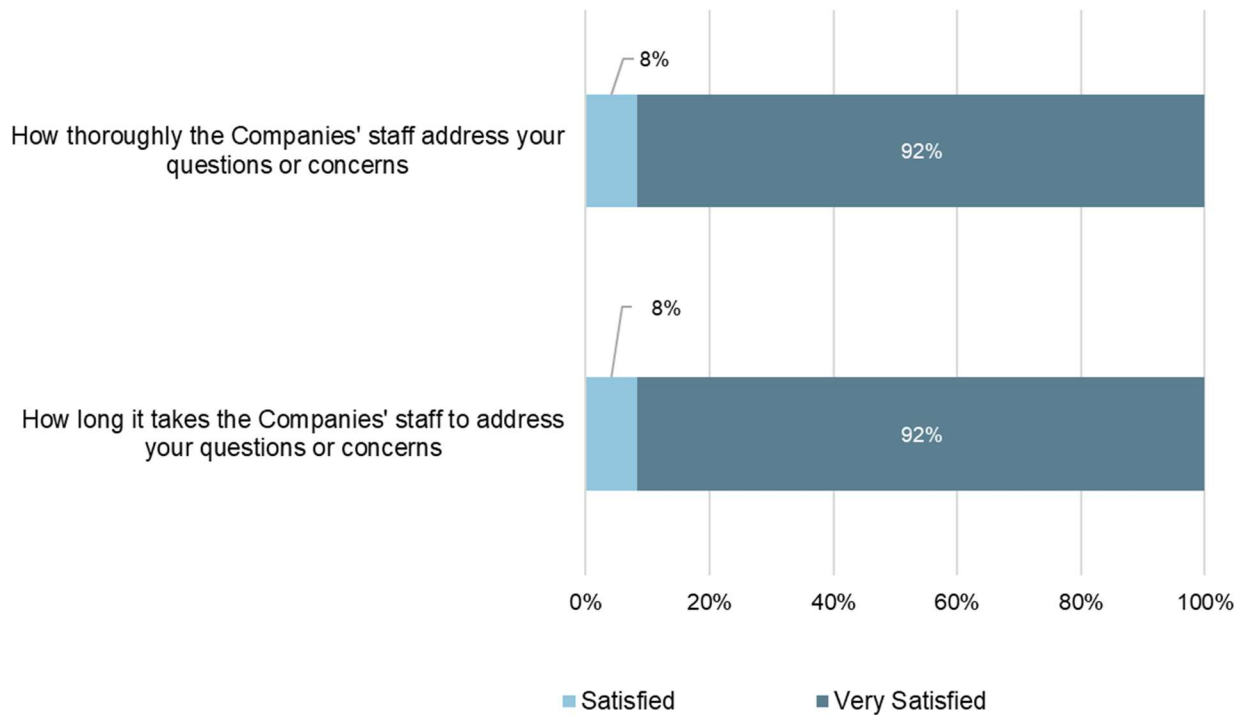


Agencies also provided feedback about their communication with the Companies’ staff. Twelve survey respondents (75%) indicated they had direct communication with the Companies’ staff. All respondents that interacted with the Companies’ staff characterized them as either “very knowledgeable” (92%) or “fairly knowledgeable” (8%).

The respondents went on to rate their overall satisfaction with how long it takes for the Companies’ staff to address their questions or concerns and how thoroughly they are addressed. The results are displayed in

Figure 6-5. All respondents were either “very satisfied” or “satisfied” with the Companies’ communication. Respondents have generally reported high levels of satisfaction with program staff in past evaluations as well.

Figure 6-5: Satisfaction with the Companies' Communication

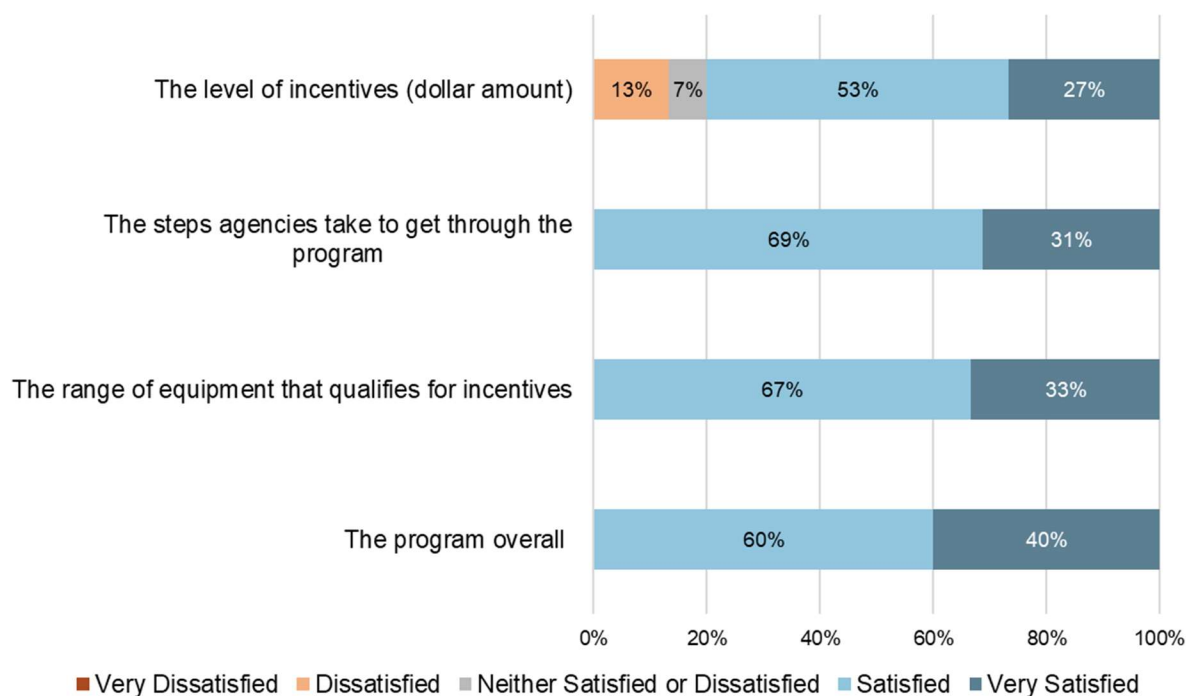


6.1.2.6 Program Satisfaction

Agency staff also rated their level of satisfaction with various aspects of the Community Connections Program, as displayed in

Figure 6-6. Feedback reflects relative high levels of satisfaction with the program overall.

Figure 6-6: 2018 Program Satisfaction



6.1.3 Participant Survey Results

This section summarizes feedback received from a sample (210 responses, 70 from each EDC) of Community Connections Program participants. The survey collected data on program awareness, customer decision making, satisfaction, experiences with the program, and installed equipment.

6.1.3.1 Program Awareness

Program participants learned about the Community Connections Program from a variety of sources in 2018.

Table 6-2 summarizes the various sources of program awareness identified by survey respondents. The most frequently mentioned source of program awareness was word of mouth from a friend or family member; it was mentioned by 39% of respondents. Other common sources include community agencies (27%) and receiving an informational brochure (11%).

Table 6-2: Sources of Program Awareness

Program Awareness	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
From a friend/neighbor	27	39%	27	39%	28	40%	82	39%
Community agency	21	30%	21	30%	14	20%	56	27%
Received an information brochure	5	7%	7	10%	11	16%	23	11%
Other	9	13%	7	10%	4	6%	20	10%
Property owner/landlord	3	4%	7	10%	6	9%	16	8%
Internet	5	7%	0	0%	3	4%	8	4%
Contractor	0	0%	1	1%	4	6%	5	2%

6.1.3.2 Measures Installed

A range of energy saving equipment and services were available to program participants. Historically, most program funds were spent installing baseload equipment, such as appliances and lighting, as well as health and safety measures. In 2018, approximately 84% of respondents indicated receiving LED light bulbs, 69% received ENERGY STAR certified refrigerators and 13% received ENERGY STAR certified freezers. Other measures received include smart power strips, night lights, faucet aerators, energy savings showerheads, piping insulation, and air sealing / duct sealing. Table 6-3 displays a summary of the measures installed in the program.

Table 6-3: Measures Installed

Measures Installed	CEI		OE		TE		Total	
	n	Percent	N	Percent	n	Percent	n	Percent
LED light bulbs	59	84%	62	89%	55	79%	176	84%
ENERGY STAR certified Refrigerator	39	56%	45	64%	61	87%	145	69%
ENERGY STAR certified Freezer	10	14%	11	16%	7	10%	28	13%
Smart Power Strips	3	4%	10	14%	1	1%	14	7%
Night Lights	0	0%	5	7%	0	0%	5	2%
Faucet Aerators	2	3%	2	3%	0	0%	4	2%
Energy Saving Showerheads	1	1%	2	3%	0	0%	3	1%
Water heater pipe insulation	0	0%	2	3%	0	0%	2	1%
Air Sealing / Duct Sealing	0	0%	2	3%	0	0%	2	1%

Respondents provided feedback on their levels of satisfaction with the various equipment types. Table 6-4 summarizes the responses to most commonly received measures. Nearly all respondents (96%) indicated they were “very satisfied” (84%) or “satisfied” (12%) with the LEDs they received through the program. All of the survey respondents that received ENERGY STAR certified freezers were either “satisfied” (7%) or “very satisfied” (93%).

Fifteen respondents shared their level of satisfaction regarding the smart power strips they received through the program and only one respondent (7%) voiced dissatisfaction. See Table 6-4 for detail regarding respondent satisfaction for each measure.

When respondents were asked for specifics regarding their dissatisfaction, most written feedback was regarding refrigerators. Three respondents indicated that they had issues with the refrigerator delivery company. These issues included taking too long to deliver the new appliance and damaging the refrigerator and installation location. Other issues with refrigerators included refrigerators breaking post-installation, not running as efficiently as respondents thought they should, and new refrigerators being smaller than their previous refrigerator.

Table 6-4: Satisfaction with Energy Savings Measures

How satisfied were you with the measures provided to you by the program?	Response	Freezer		Refrigerator		LEDs		Power Strip	
		N	Percent	N	Percent	N	Percent	N	Percent
	Don't know	0	0%	0	0%	2	1%	1	7%
	Very dissatisfied	0	0%	6	4%	1	1%	1	7%
	Dissatisfied	0	0%	1	1%	2	1%	0	0%
	Neither satisfied nor dissatisfied	0	0%	0	0%	3	2%	0	0%
	Satisfied	2	7%	15	10%	21	12%	1	7%
	Very satisfied	26	93%	124	85%	151	84%	12	80%

6.1.3.3 Audit Experience

Each home that receives energy saving equipment or services through the program, first receives a home energy audit, typically performed by an agency staff member or contractor hired by the community agency. Most participants surveyed reported satisfaction with the logistics of scheduling the audit; nearly all respondents (99%) noted the home visit time was convenient and that the auditor arrived on time or within 15 minutes of the scheduled appointment. Additionally, 96% of respondents reported they were either “satisfied” (6%) or “very satisfied” (90%) with scheduling the visit.

As part of the program participation process, the auditor is required to perform diagnostic testing on energy using appliances in the home. Most of the survey respondents (90%) verified appliance testing occurred. The most common appliance tested were refrigerators and freezers, as reported by 94% and 35% of respondents respectively. Participants also reported having their furnace/heat pumps tested, as well as their water heater and air conditioner. Several respondents reported having other appliances tested such as stoves, clothes washers, clothes dryers, gas furnaces, and toilets. Table 6-5 summarizes the responses.

Table 6-5: Appliance Testing

Appliance Testing	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
Appliances Tested								
Yes	63	90%	62	89%	65	93%	190	90%
No	3	4%	4	6%	3	4%	10	5%
Don't know	1	1%	4	6%	2	3%	7	3%
Refused to Answer	3	4%	0	0%	0	0%	3	1%
Which appliances were tested								
Refrigerator	59	94%	56	90%	63	97%	178	94%
Freezer	25	40%	22	35%	20	31%	67	35%
Electric heat pump / Furnace	4	6%	3	5%	7	11%	14	7%
Other	3	5%	6	10%	5	8%	14	7%
Electric water heater	1	2%	5	8%	4	6%	10	5%
Central air conditioner	1	2%	5	8%	1	2%	7	4%
Don't know/recall	3	5%	4	6%	0	0%	7	4%
Wall air conditioner	1	2%	1	2%	1	2%	3	2%

Note: Percentages do not sum to 100% because respondents could choose more than one response.

In addition to testing the appliances, the auditor provides each resident with information and tips regarding home energy use and conservation. Eighty-seven percent of respondents indicated they spoke with the auditor about ways to save energy in their home.

Table 6-6 summarizes the various energy savings topics auditors discussed with participants. The least discussed topics discussed with residents were changing behaviors to save energy, the high cost of electric space heaters, and removing unnecessary appliances.

Table 6-6: Energy-Savings Topics Discussed with Residents

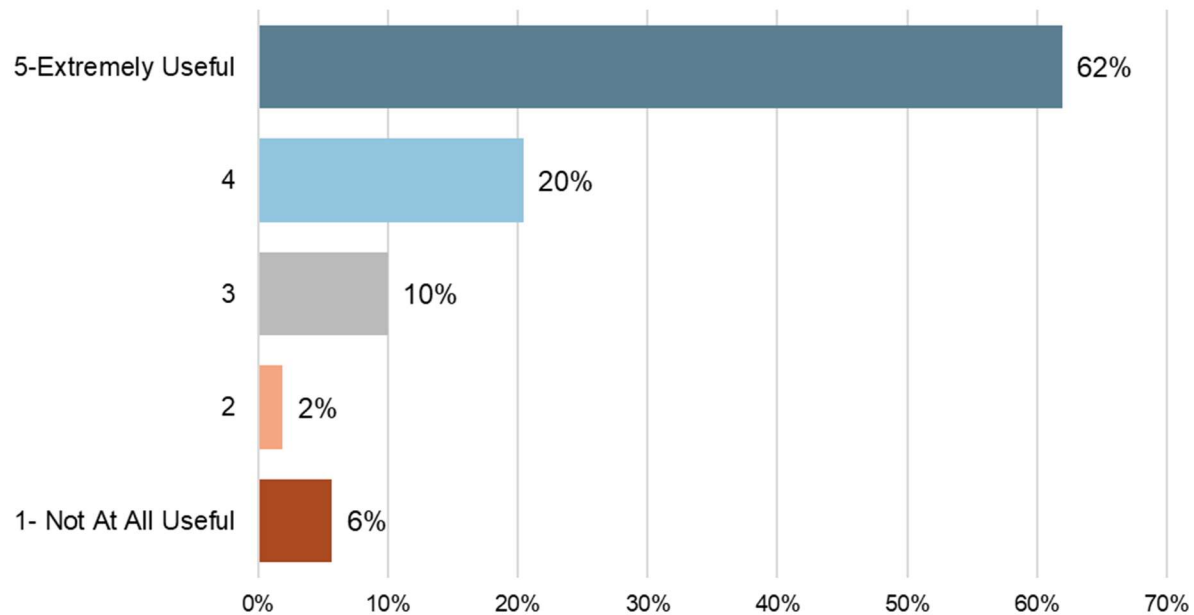
Energy-savings topics discussed with residents	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
Benefit of using LEDs	58	92%	59	95%	54	83%	171	93%
Turning off lights when not in the room	55	87%	55	89%	50	77%	160	87%
Costs associated with the use of appliances	47	75%	53	85%	42	65%	142	78%
Cleaning furnace filters	48	76%	48	77%	42	65%	138	75%
Benefit of using smart power strips	39	62%	41	66%	39	60%	119	65%
Adjusting Thermostat	38	60%	42	68%	38	58%	118	64%
Turning off electronics when not in use	39	62%	39	63%	37	57%	115	63%
Benefits of using cold wash cycle	40	63%	41	66%	30	46%	111	61%
Removing unnecessary appliances	34	54%	40	65%	30	46%	104	57%
High cost of electric space heater use	22	35%	28	45%	22	34%	72	39%
Changing behaviors to save energy	14	22%	11	18%	13	20%	38	21%
Don't Know	1	2%	0	0%	0	0%	1	1%

Note: Percentages do not sum to 100% because respondents could choose more than one response.

The most common energy savings topics discussed with residents were the benefits of using LEDs, the cost savings associated with turning off lights and electronics when not in use, as well as the benefits of cleaning furnace filters. After the auditor's visit took place, 92% of survey respondents indicated they knew more about how to save energy in their home, while 75% reported changing their habits to use less energy. The survey asked participants to provide a rating on a scale of 1 – 5, where 1 was not at all useful and 5 is extremely useful, stating how useful the information they received from their auditor was. Overall, 82% of survey respondents who received information on home energy savings rated its usefulness as a 4 or 5.

Figure 6-7 displays the results.

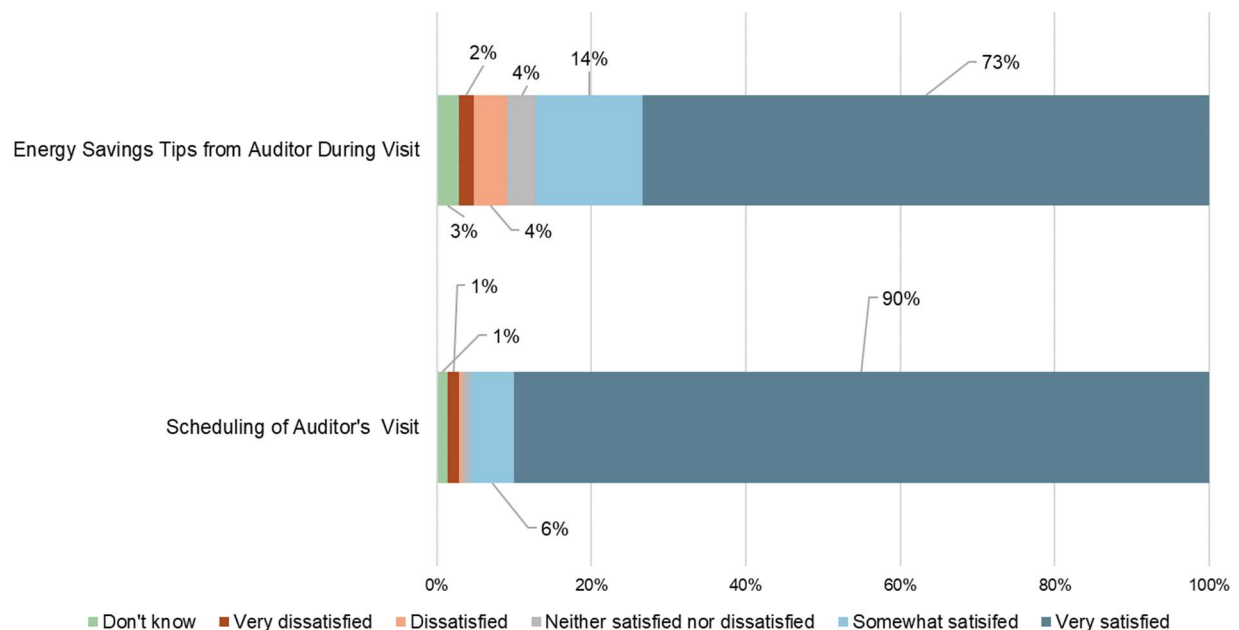
Figure 6-7: Usefulness of Energy Savings Tips and Information



Respondents also rated their overall satisfaction with the energy savings tips and information they received as well as the scheduling of the auditor's visit.

Figure 6-8 below displays the results. Overall, survey respondents were very satisfied with the audit experience and energy savings tip and information they received through the Community Connections Program.

Figure 6-8: Satisfaction with Aspects of Audit Experience



6.1.3.4 Agency Staff Communication

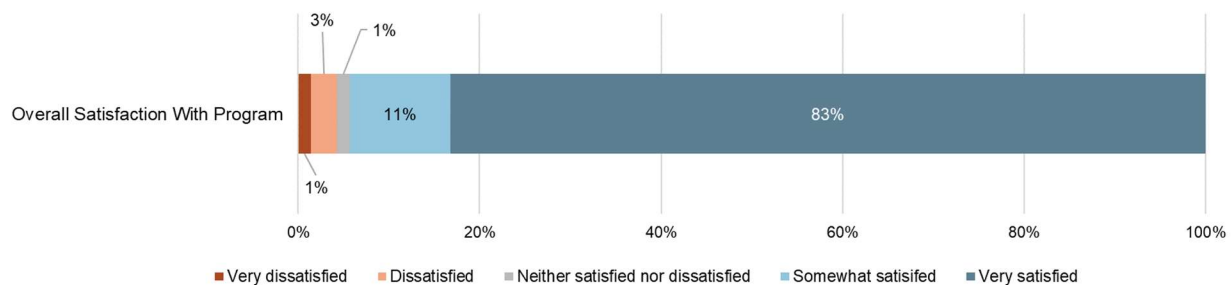
Participants have several reasons to communicate with agency staff including program enrollment, scheduling of the audit and follow up regarding the resolution of any issues that occurred during or after insulation. Over half (61%) of survey respondents indicated they never spoke to agency staff; 39% indicated they did speak with staff.

Of those that did speak with staff, 84% were either “very satisfied” or “satisfied” with their communication. Thirteen percent of respondents were either “dissatisfied” or “very dissatisfied.” Sources of dissatisfaction include the instances where staff were hard to reach or did not follow up on reported equipment issues. Also, customers indicated there were miscommunications or long wait times to participate in the program.

6.1.3.5 Program Satisfaction

Respondents commented on whether they have noticed savings on their electric bill. Fifty-one percent said that they have noticed savings. The vast majority (94%) of program participant surveyed reported satisfaction with the Community Connections Program; 83% and 11% of participants stated they “very satisfied” and “somewhat satisfied” with the program overall respectively. Only four percent indicated they were “very dissatisfied” (1%) or “dissatisfied” (3%) with the program. Figure 6-9 displays the results.

Figure 6-9: Overall Program Satisfaction



7 Conclusions and Recommendations

7.1 Program Operations Conclusions

The following section summarizes the conclusions from program staff interviews and community agency surveys.

- Communication between the Companies, OPAE, and agencies was highlighted as a strength of the program. The communication structure creates an environment where needs are identified and addressed in a timely manner. In both the community agency survey and program staff interviews it was noted that communication is effective and supports program administration. All survey respondents that interacted with OPAE and/or staff at the Companies indicated they were satisfied with the promptness and thoroughness of the communication. Though respondents reported high levels of satisfaction with OPAE and the Companies' staff last year as well, this year's responses indicated even greater satisfaction.
- The Community Connections QA/QC procedures have not significantly changed in 2018 and no concerns were indicated. This year, OPAE staff continued to conduct site visits for monitoring of the program and visited about 70% of the agencies. During these visits, staff accompanied auditors to assess field visits and reviewed case files. ADM is also responsible for conducting on-site visits for the purposes of measure verification and identifying missed opportunities. Results are communicated to program staff who resolve issues with agencies as necessary.
- Though staff indicated there were minor changes and/or additions to the program, they stated that there were no major, significant changes to the design, implementation, or goals of the Community Connections program in 2018. Minor changes/additions in 2018 included adding mini split systems as an eligible measure, adding AL01 code for air sealing to capture energy savings, adding educational material, and developing an energy education notebook for use by auditors with customers.
- The annual Weatherize Ohio Conference was well attended by community agencies. It is the primary event where program information and training are disseminated to agency operations and administrative staff. Agency feedback suggests there is room to improve their staffs' home auditing and electrical and roof repair skills.
- "Weatherization Month" (October) also serves as a potential outreach opportunity for the program. During this month, community agencies host open houses and

the media, local politicians and the community are invited to them to learn more about services they offer, including the Community Connections Program.

7.2 Participant Survey Conclusions

The following section summarizes the key findings from the survey of program participants.

- The vast majority (94%) of program participant surveyed reported high levels of satisfaction with the Community Connections Program. Less than half of participants reported they did not communicate with staff. However, of those that did speak with staff, 84% were either “very satisfied” or “satisfied” with their communication compared to 90% overall satisfaction with communication last year. Sources of dissatisfaction include the instances where staff were hard to reach or did not follow up on reported equipment issues. Also, customers indicated there were miscommunications or long wait times to participate in the program.
- Nearly all participants indicated they were very satisfied with the audit experience the time of the audit was convenient, and the auditor showed up on time or within 15 minutes of the schedule appointment time.
- The participant survey represents program participants who installed baseload measures such as LEDs, ENERGY STAR certified refrigerators and freezers, as well as other measures such as smart power strips. Overall, most participants were very satisfied with the measures installed. Sources of dissatisfaction include respondents not feeling LEDs were bright enough, respondents having issues with the refrigerator delivery company, refrigerators breaking post-installation, refrigerators not running as efficiently as respondents thought they should, and new refrigerators being smaller than their previous refrigerators.
- After the auditor’s visit took place, most respondents indicated they knew more about how to save energy in their home and found the information very useful. However, there are opportunities for auditors and program representatives to provide energy education to program participants. Respondents indicated that auditors related information on various energy saving topics. Some topics were not reported to be discussed as frequently. Topics that were not as frequently discussed with residents include changing behaviors to save energy, the high cost of electric space heaters, and removing unnecessary appliances.

7.3 Recommendations

ADM offers the following recommendations for continued improvement of the Community Connections program.

- Continue conducting annual in-person, site visits to agency offices. Feedback suggests that despite a few issues, program-related communication was strong in 2018. We recommend building on the success of past program years and continuing to strive for effective communication between the Companies, OPAE, and program participants. From our experience evaluating other low-income programs around the country, we can attest to the importance of strong relationships with program partners, such as community agencies and advocacy groups that work with low-income customers.
- Provide additional training opportunities and resources for agency staff as they continue their efforts to diversify the measure types installed. The program should consider additional sessions on energy efficiency technologies that are either not frequently installed or are new to the program (e.g. faucet aerators, energy saving showerheads, water heater pipe insulation, or mini split systems).
- Provide additional training for agency *field staff* to enhance their professional acumen related to home audits, installing shell measures, and electrical and roof repairs. Although they might not ultimately be responsible for installation of the measures or conducting repairs, they could benefit from better understanding how to identify energy savings opportunities that may result from measures they are less familiar with. If the Weatherize Ohio Conference is not the appropriate venue, the program could provide regional training workshops or coordinate with resources that are in closer proximity to agency offices.

Appendix A: Required Savings Table

This appendix provides a summary of all the relevant savings associated with the program.

Table A-1: Impact Evaluation Results (kWh)

Utility	Ex-Ante kWh	Ex-Post kWh	Realization Rate
CEI	2,138,038	2,158,511	101%
OE	3,410,226	3,404,801	100%
TE	1,642,326	1,677,898	102%
Total	7,190,589	7,241,210	101%

Table A-2: Impact Evaluation Results (kW)

Utility	Ex-Ante kW	Ex-Post kW	Realization Rate
CEI	302.07	290.23	96%
OE	475.57	454.87	96%
TE	230.92	223.65	97%
Total	1,008.56	968.75	96%

Table A-3: Ex-Post Lifetime Energy Savings (kWh)

Utility	Annual kWh Savings	Annual kW Savings	Lifetime kWh Savings
CEI	2,158,511	290.23	33,919,803
OE	3,404,801	454.87	53,833,974
TE	1,677,898	223.65	26,677,855
Total	7,241,210	968.75	114,431,632

Appendix B: Surveys and Interview Guides

2018 Community Connections Program Participant Telephone Survey

Survey Variables [DO NOT DISPLAY]

Variable	Description
CUSTOMER NAME	First and last name
UTILITY	Customer's EDC
LED BULBS	1 installed, 0 not installed
ES REFRIGERATOR	1 installed, 0 not installed
ES FREEZER	1 installed, 0 not installed
SHOWERHEADS	1 installed, 0 not installed
AERATORS	1 installed, 0 not installed
ELECTRICAL REPAIRS	1 installed, 0 not installed
ROOF REPAIRS	1 installed, 0 not installed
PIPE INSULATION	1 installed, 0 not installed
AIR SEALING	1 installed, 0 not installed
WATER HEATER	1 installed, 0 not installed
ATTIC INSULATION	1 installed, 0 not installed
WALL INSULATION	1 installed, 0 not installed
NIGHT LIGHTS	1 installed, 0 not installed
AC	1 installed, 0 not installed
POWER STRIPS	1 installed, 0 not installed
HEAT PUMP	1 installed, 0 not installed
# of LED	LED quantity from tracking data
# of REFRIGERATORS	Refrigerator quantity from tracking data
# of FREEZERS	Freezer quantity from tracking data
# of Showerheads	Showerhead quantity from tracking data
# of Aerators	Aerator quantity from tracking data
# of Nightlights	Nightlight quantity from tracking data
# of Power Strips	Power strip quantity from tracking data

Introduction for phone administration

Hello, my name is _____. I am calling on behalf of [UTILITY]. We are speaking with homeowners and tenants who participated in [UTILITY]'s Community Connections "Weatherization" Program. The survey will take approximately 15 minutes and you will receive an email for an electronic \$10 gift card of your choice for participating in this survey. Are you the person most familiar with this program?

1. Yes
 2. No [if not available, ask for another adult familiar with household's participation in community connections program]
-
1. Through this program you would have received energy-efficient light bulbs, or you might have had your refrigerator or freezer replaced with an ENERGY STAR certified refrigerator or freezer; you may also have received some home weatherization measures. Do you recall participating in this program?
 1. Yes [SKIP TO Q0]
 2. No
 98. Don't know
 99. Refused [THANK AND TERMINATE]
 2. You may have received some of these services as part of another program. It is possible you worked with an energy auditor or inspector from the Ohio Home Weatherization Assistance Program (HWAP), the Electric Partnership Program (EPP), the Warm Choice or House Warming Program, the Home Energy Assistance Program (HEAP), or another Program? Do you recall participating in Community Connections or any of these other programs?
 1. Yes [SKIP TO Q0]
 2. No
 98. Don't know
 99. Refused [THANK AND TERMINATE]

[ASK Intro. Q3 IF Intro. Q2 = 2]

3. Is it possible that someone else in your household would be familiar with the items you received through this program?
 1. Yes
 2. No [THANK AND TERMINATE]
 98. Don't know [THANK AND TERMINATE]
 99. Refused [THANK AND TERMINATE]

[ASK Intro. Q4 IF Intro. Q3 = 1]

4. May I speak with that person?
 1. Yes [RECYCLE THROUGH 2 & 3 WITH NEW RESPONDENT]
 2. No [THANK AND TERMINATE]
 98. Don't know [THANK AND TERMINATE]
 99. Refused [THANK AND TERMINATE]

1. I would like to start by asking you about how you first learned about the Community Connections Program?
 1. Received an information brochure
 2. From a friend/neighbor
 3. Property owner/landlord
 4. Community agency
 5. Contractor
 6. Internet
 7. Other: _____
2. Our records indicate that you received the following items from the Community Connections Program. Please tell me if you received these items or not.

**[READ ITEMS THAT WERE RECEIVED ACCORDING TO RECORDS
RECORD ANSWER INDICATED BY RESPONDENT]**

	Yes	No	DK	NA
a. LED light bulbs	1	2	98	99
b. ENERGY STAR certified Refrigerator	1	2	98	99
c. ENERGY STAR certified Freezer	1	2	98	99
d. Energy Saving Showerheads	1	2	98	99
e. Faucet Aerators	1	2	98	99
f. Electrical Repairs or Upgrades	1	2	98	99
g. Roof Repairs or Replacement	1	2	98	99
h. Water heater pipe insulation	1	2	98	99
i. Air Sealing (such as caulk or foam / Duct Sealing	1	2	98	99
j. Water Heater	1	2	98	99
k. Attic Insulation	1	2	98	99
l. Wall Insulation	1	2	98	99
m. Night Lights	1	2	98	99
n. Central AC Replacement	1	2	98	99
o. Smart Power Strips	1	2	98	99
p. Heat Pump / Electric Furnace	1	2	98	99

[ASK Q3-Q5 IF Q2 = 1 or Q2m = 1]

3. I'd like to ask you a few questions about your awareness of different types of light bulbs.
4. Before this call today, had you ever heard of light emitting diode light bulbs, or LEDs?
 1. Yes 01
 2. No 02 [READ E2]
 98. Don't know 98 [READ E2]
 99. Refused 99 [READ E2]

[Prompt if necessary: Here is a quick description: LED light bulbs are a newer light bulb technology that fit in regular light bulb sockets, but have various different appearances. LED bulbs are typically a lot heavier than incandescent bulbs. They use less energy and last much longer than typical incandescent light bulbs.]

5. Do you believe you could correctly identify a typical LED light bulb if they were placed in front of you?
 1. Yes
 2. No
 98. Don't know
 99. Refused

LEDs

[ASK Q6-Q13 IF Q2a= 1]

6. You indicated that you received LEDs from the program. Our records indicate you received [# OF LEDs]. To the best of your knowledge, is that number correct or did you receive a different number of LEDs?
 1. Number of LEDs in record is correct
 2. Received a different number of LEDs
 98. Don't know
 99. Refused

[ASK Q7 IF Q6 = 2]

7. What is the correct number of LEDs that you received?
_____ Number of LEDs received

[ASK Q8 IF Q6 = 1]

8. Of the [# OF LEDs] LED bulbs you received, how many [READ LIST; ENTER NUMBER FOR EACH]
- Are currently installed?
 - Were installed and removed?
 - Were never installed?

[ASK Q9 IF Q7>0]

9. Of the [ANSWER Q7] LED bulbs you received, how many [READ LIST; ENTER NUMBER FOR EACH]
- Are currently installed?
 - Were installed and removed?
 - Were never installed?

[ASK Q10 IF Q8b OR Q9b > 0]

10. Why were some LEDs removed? (SELECT ALL THAT APPLY)
- LED broke or burned out
 - LED not working as needed (e.g., lights too dim)
 - Using them in another home or at work
 - Storing them for later use
 - Gave them away
 - Returned them to the program
 - Other (specify)

[ASK Q11 IF Q8c OR Q9c > 0]

11. Why were some of the LEDs never installed? [RECORD VERBATIM RESPONSE]

12. To the best of your recollection, how many of the LEDs received through the program are currently installed in each of the following room locations?

Room Location	Code	# LEDs Installed
Bedrooms	1	
Bathrooms	2	
Living Room	3	
Kitchen	4	
Entry Way	5	
Dining Room	6	
Garage	7	
Basement	8	
Den	9	
Stairway	10	
Office	11	
Other (specify)	12	

Note: Total should not exceed number in Q6

a) Specify other room location:

13. What type of lighting equipment did the LEDs replace? [SELECT ONE]

1. Regular incandescent
2. CLF
3. Other LEDs
4. Both incandescent light bulbs and CFLs
5. Other (specify)
98. Don't Know
99. Refused

Specify if other _____

LED Nightlights

[ASK Q14 - Q21 IF Q2m= 1]

14. You indicated that you received LED nightlights from the program. Our records indicate you received [# OF LED NIGHTLIGHTS]. To the best of your knowledge, is that number correct or did you receive a different number of nightlights?

1. Yes, that is the correct number of LED nightlights
2. No, received a different number of LED nightlights
98. Don't know
99. Refused

15. What is the correct number of LED nightlights that you received?

_____ Number of LED nightlights received

[SHOW Q16 IF Q14 = 1]

16. Of the [Number of LEDs] nightlights you received, how many... [READ LIST;
ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q17 IF Q14 = 2]

17. Of the [Answer to Q15] nightlights you received, how many... [READ LIST;
ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q18 IF Q16b or Q17b > 0]

18. Why were some LED nightlights removed? [SELECT ALL THAT APPLY]

- 1. Nightlights broke or burned out
- 2. Nightlights not working as needed (e.g., lights too dim)
- 3. Using them in another home or at work
- 4. Storing them for later use
- 5. Gave them away
- 6. Returned them to the program
- 97. Other (specify)
- 98. Don't know
- 99. Refused

[SHOW Q19 IF Q16c or Q17c > 0]

19. Why were some of the LED nightlights never installed?

- 1. Open ended: _____ [RECORD VERBATIM RESPONSE]
- 98. Don't know
- 99. Refused

20. To the best of your recollection, how many of the nightlights received through the program -- that are currently installed -- are installed in each of the following room locations?

Room Location	# of LED Nightlights Installed
1. Bedrooms	
2. Bathrooms	
3. Living Room	
4. Kitchen	
5. Entry Way	
6. Dining Room	
7. Garage	
8. Basement	
9. Den	
10. Stairway	
11. Office	
98. Other (Please specify)	

[Note: Total should not exceed number in Q14]

a) Specify other room location: _____

21. What type of lighting equipment did the LEDs replace? [SELECT ONE]

- 1. Regular incandescent
- 2. CFLs
- 3. Other LEDs
- 4. Both incandescent light bulbs and CFLs
- 97. Other (Please specify)
- 98. Don't know
- 99. Refused

REFRIGERATOR REPLACEMENT

[ASK Q22 IF Q2b = 1]

22. You indicated that your refrigerator was replaced. Can you tell me the door style configuration of the new refrigerator that was installed? Is it a... [READ

RESPONSE OPTIONS]

1. Top-freezer refrigerator model
2. Bottom-freezer refrigerator model
3. Side-by-Side refrigerator model
98. Don't know [PROMPT TO LOOK AT THE UNIT]
99. Refused

[ASK Q23 IF # of REFRIGERATORS > 1]

23. According to your records you had 2 refrigerators replaced, Was the door style configuration of the 2nd refrigerators also [ANSWER Q22]?

1. Yes
2. No
3. I didn't have a 2nd refrigerator replaced
98. Don't know [PROMPT TO LOOK AT THE UNIT]
99. Refused

FREEZER REPLACEMENT

[ASK Q24 IF Q2c = 1]

24. You indicated that your freezer was replaced. Can you tell me the type of new freezer that was installed? Is it an... [READ RESPONSE OPTIONS]

1. Upright freezer model
2. Chest freezer model
98. Don't know [PROMPT TO LOOK AT THE UNIT]
99. Refused

[ASK Q25 IF # of Freezers > 1]

25. According to your records you had 2 freezers replaced, Was the type of freezer also [ANSWER Q24]?

1. Yes
2. No
3. I didn't have a 2nd freezer replaced
98. Don't know [PROMPT TO LOOK AT THE UNIT]
99. Refused

Showerheads

[ASK Q26 - Q32 IF Q2d= 1]

26. You indicated that you received low flow showerheads from the program. Our records indicate you received [# OF SHOWERHEADS] To the best of your knowledge, is that number correct or did you receive a different number of showerheads?

1. Yes, that is the correct number of showerheads
2. No, received a different number of showerheads
98. Don't know
99. Refused

27. What is the correct number of Showerheads that you received?

_____ Number of Showerheads received

[SHOW Q28 IF Q26 = 1]

28. Of the [Number of Showerheads] showerheads you received, how many...

[READ LIST; ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q29 IF Q2614 = 2]

29. Of the [Answer to Q27] showerheads you received, how many... [READ LIST; ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q30 IF Q28b or Q29b > 0]

30. Why were some showerheads removed? [SELECT ALL THAT APPLY]

1. Showerheads broke
2. Showerheads not working as needed
3. Using them in another home or at work
4. Storing them for later use
5. Gave them away
6. Returned them to the program
97. Other (specify)
98. Don't know
99. Refused

[SHOW Q31 IF Q28c or Q29c > 0]

31. Why were some of the showerheads never installed?

1. Open ended: _____ [RECORD VERBATIM RESPONSE]
98. Don't know
99. Refused

32. To the best of your recollection, how many of the showerheads received through the program -- that are currently installed -- are installed in each of the following room locations?

Room Location	# of showerheads installed
1. Bathrooms	
99. Other (Please specify)	

[Note: Total should not exceed number in Q26]

a) Specify other room location: _____

Aerators

[ASK Q33 - Q39 IF Q2e= 1]

33. You indicated that you received low flow faucet aerators from the program. Our records indicate you received [# OF AERATORS] To the best of your knowledge, is that number correct or did you receive a different number of aerators?
1. Yes, that is the correct number of showerheads
 2. No, received a different number of showerheads
 98. Don't know
 99. Refused

34. What is the correct number of Aerators that you received?

_____ Number of Aerators received

[SHOW Q35 IF Q33 = 1]

35. Of the [Number of Aerator] aerators you received, how many... [READ LIST; ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q36 IF Q3314 = 2]

36. Of the [Answer to Q27] aerators you received, how many... [READ LIST; ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q37 IF Q35b or Q36b > 0]

37. Why were some aerators removed? [SELECT ALL THAT APPLY]

1. Aerator broke
2. Aerators not working as needed
3. Using them in another home or at work
4. Storing them for later use
5. Gave them away
6. Returned them to the program
97. Other (specify)
98. Don't know
99. Refused

[SHOW Q38 IF Q35c or Q36c > 0]

38. Why were some of the aerators never installed?

1. Open ended: _____ [RECORD VERBATIM RESPONSE]
98. Don't know
99. Refused

39. To the best of your recollection, how many of the aerators received through the program -- that are currently installed -- are installed in each of the following room locations?

Room Location	# of aerators installed
1. Bathrooms	
98. Other (Please specify)	

[Note: Total should not exceed number in Q33]

a) Specify other room location: _____

Power Strips

[ASK Q40 - Q46 IF Q20= 1]

40. You indicated that you received smart power strips from the program. Our records indicate you received [# OF POWER STRIPS] To the best of your knowledge, is that number correct or did you receive a different number of power strips?

1. Yes, that is the correct number of showerheads
2. No, received a different number of showerheads
98. Don't know
99. Refused

41. What is the correct number of power strips that you received?

_____ Number of power strips received

[SHOW Q42 IF Q40 = 1]

42. Of the [Number of Power Strips] power strips you received, how many... [READ LIST; ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q43 IF Q4014 = 2]

43. Of the [Answer to Q41] aerators you received, how many... [READ LIST; ENTER NUMBER FOR EACH]

- a. Are currently installed? _____
- b. Were installed and removed? _____
- c. Were never installed? _____

[SHOW Q44 IF Q42b or Q43b > 0]

44. Why were some power strips removed? [SELECT ALL THAT APPLY]

1. Power strips broke
2. Power strips not working as needed
3. Using them in another home or at work
4. Storing them for later use
5. Gave them away
6. Returned them to the program
97. Other (specify)
98. Don't know
99. Refused

[SHOW Q45 IF Q42c or Q43c > 0]

45. Why were some of the Power Strips never installed?

1. Open ended: _____ [RECORD VERBATIM RESPONSE]
98. Don't know
99. Refused

46. To the best of your recollection, how many of the power strips received through the program -- that are currently installed -- are installed in each of the following room locations?

Room Location	# of aerators installed
1. Bedrooms	
2. Bathrooms	
3. Living Room	
4. Kitchen	
5. Entry Way	
6. Dining Room	
7. Garage	
8. Basement	
9. Den	
10. Stairway	
11. Office	
98. Other (Please specify)	

[Note: Total should not exceed number in Q40]

a) Specify other room location: _____

HOME IMPROVEMENT RETROFITS

[ASK Q47-Q0 IF Q2i,k,l = 1]

47. Our records show that you had some home energy improvements such as insulation, or air sealing (such as caulking and foaming) installed by a participating agency or contractor. Is that correct?

Yes No DK

- a. Attic Insulation
- b. Wall Insulation (Side wall insulation)
- c. Duct Sealing / Air Sealing

48. On a scale of 1 to 5 where 1 is not at all important and 5 is extremely important, how important were the following 3 factors in your decision to receive the home energy improvements.

- | | | | | | |
|---------------------------------------|---|---|---|---|---|
| a. Wanted to improve home comfort | 1 | 2 | 3 | 4 | 5 |
| b. The improvements were free | 1 | 2 | 3 | 4 | 5 |
| c. Possibly reduce your electric bill | 1 | 2 | 3 | 4 | 5 |

49. Were there any other factors that were also important to your decision to receive the home energy improvements? [RECORD ANSWER VERBATUM]

AUDIT EXPERIENCE

I'd like to discuss your experience with the home audit/visit.

50. Was the home visit scheduled at a time convenient for you? (Select one)

- 1. Yes
- 2. No
- 98. Don't Know
- 99. Refused

51. Did the home energy auditor or inspector arrive at your home on time, or at least within 15 minutes of the scheduled appointment? (Select one)

- 1. Yes
- 2. No
- 98. Don't Know
- 99. Refused

52. Did the home energy auditor or inspector test, meter or evaluate appliances in your household to see how much energy they use? (Select one)

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[ASK Q53 IF Q52 = 1]

53. Which appliances were tested, metered or evaluated? (DO NOT READ; Select all that apply)

- 1. Refrigerator
- 2. Freezer
- 3. Wall air conditioner
- 4. Central air conditioner
- 5. Electric water heater
- 6. Electric heat pump / Furnace
- 7. Other (Specify)
- 98. Don't know/recall
- 99. Refused

ENERGY EDUCATION

54. When the auditor or inspector visited your home, did he/she talk with you about ways to use less electricity in your home or leave materials with you that described how you could save electricity?

- 1. Yes
- 2. No
- 98. Don't Know
- 99. Refused

[ASK Q55, 56, 58, & 59 IF Q54 = 1]

55. I'm going to read a list of electricity-saving topics. For each one, please tell me if this is something the auditor or inspector talked about with you... (mark topics 1-12 that receives a yes response)

1. The benefit of using LEDs instead of incandescent bulbs
2. The benefit of using smart power strips that save energy instead plugging directly into the wall or regular power strips
3. Costs associated with the use of appliances
4. Benefits of using cold wash cycle / layering clothes (if elec. hot water or elec. heated homes)
5. Removing unnecessary appliances (e.g. a second refrigerator, room air conditioner)
6. Turning off lights when not in the room
7. Change thermostat setting for A/C during the day/eve (note: excludes heat pumps)
8. Cleaning furnace filters
9. Changing other behaviors to save energy (SPECIFY BEHAVIORS)
10. Turning off TV and other electronics when not in use
11. High cost of electric space heater use
98. Don't know (Don't read this)
99. Refused (don't read this)

56. Did the auditor or inspector talk with you about any other ways to save electricity in your home? [SELECT ONE]

1. Yes
2. No

[Ask Q57 IF Q56=1]

57. What other ways were mentioned? [RECORD VERBATIM RESPONSE]

58. Because of the information you received from the auditor or inspector, do you feel you now know more about how to save electricity in your home? [SELECT ONE]

1. Yes, know more now
2. No, about the same as before
98. Don't know
99. Refused

59. Because of the information you received from the auditor or inspector, have you done anything in your home or changed any habits to use less electricity? (Select one)

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

[IF Q60 IF Q59 = 1]

60. What are the most important things you have done to use less electricity?

[RECORD VERBATIM RESPONSE]

61. On a scale of 1 to 5 where 1 is not at all useful and 5 is extremely useful, how useful was the energy education about saving electricity that you received from the auditor or inspector?

_____ [ENTER 1 TO 5]

62. Could the auditor or inspector have provided you with additional information about your bill, energy saving tips, or referrals to other agencies?

1. Yes, more information would have been helpful

2. No, what was provided was enough

98. Don't know

99. Refused

SATISFACTION

The final set of questions is about your satisfaction with the home improvements or items you received and other aspects of the program. For each, please tell me if you are very dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, or very satisfied.

[ASK Q63 IF Q2a = 1]

63. ...the LEDs you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q64 IF Q2m = 1]

64. ...the LED Nightlights you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q65 IF Q2b = 1]

65. ...the ENERGY STAR certified refrigerator you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q66 IF Q2c = 1]

66. ...the ENERGY STAR certified freezer you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q67 IF Q2d = 1]

67. ...the low flow showerheads you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q68 IF Q2e = 1]

68. ...the low flow faucet aerators you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q69 IF Q2o = 1]

69. ...the Smart Power Strips you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q70 IF Q2i,k,l = 1]

70. ...the home improvement items installed through the program? (which includes attic insulation, wall insulation, and/or duct sealing)

_____ [ENTER VDD N S VS DK]

[ASK Q71 IF Q2f = 1]

71. ...the electrical repairs or upgrade you received through the program?

_____ [ENTER VDD N S VS DK]

[ASK Q72 IF Q2g = 1]

72. ...the roof repairs or replacement you received through the program?

_____ [ENTER VDD N S VS DK]

73. ...the scheduling of the visit?

_____ [ENTER VDD N S VS DK]

74. ...the information about ways to use less electricity that you received through the audit visit?

_____ [ENTER VDD N S VS DK]

[ASK Q75 IF Q63 OR Q64 OR Q65 OR Q66 OR Q67 OR Q68 OR Q69 OR Q71 OR Q72 OR Q73 OR Q74 = VD or D]

75. Why weren't you satisfied with (type of product or service)?

[RECORD VERBATIM RESPONSE AND IDENTIFY ITEM(S) CUSTOMER IS DISSATISFIED WITH]

76. In the course of participating in the program, how often did you contact agency staff with questions about the items or services you could or did receive through this program?

- 1. Never
- 2. Once
- 3. 2 or 3 times
- 4. 4 times or more
- 98. Don't know
- 99. Refused

[ASK Q77 IF Q76 = 2,3,4]

77. And how satisfied were you with your communications with agency staff? Would you say you were?

_____ [ENTER VDD N S VS DK]

[ASK Q78 IF Q77 = VD or D]

78. Why were you dissatisfied?

79. Have you noticed any usage reduction or savings on your electric bill since the home improvements were completed or items installed?

- 1. Yes
- 2. No
- 3. Not sure
- 98. Don't know
- 99. Refused

[ASK Q80 IF Q79 = 1]

80. How satisfied are you with any usage reductions or savings you noticed on your electric bill? Would you say you are?

_____ [ENTER VDD N S VS DK]

81. How satisfied were you overall with the Community Connections Program? Would you say you are?

_____ [ENTER VD D N S VS DK]

82. Do you have any suggestions for improving the Program?

- 1. Yes
- 2. No

[ASK Q83 IF Q82 = 1]

83. What suggestions do you have for improving the Program? [RECORD VERBATIM RESPONSE]

CONCLUSION

We have finished all the questions for this survey. Thank you for your time in answering questions regarding the Community Connections “Weatherization” Program. We would like to send you a \$10 gift card of your choice for your participation. To do that, I’ll need your email address at this time.

84. Could you please provide your email address to where we can send your gift card?

a. [RECORD RESPONSE] [verify spelling]

99. Refused gift card [THANK AND TERMINATE SURVEY]

[ASK Q85 IF Q84 = 1]

85. To confirm, your email address is [REPEAT EMAIL ADDRESS FROM Q84]

a. Yes

b. No [RECORD CORRECT RESPONSE]

You should be receiving an email with the link to your gift card in 10 days or less. If you have any questions regarding this survey or would like to know the status of your gift card, please send an email to adm-surveys2018@admenenergy.com. Once again thank you for your participation on behalf of [UTILITY] . Have a great day!

Appendix C: Agency Survey

2018 FirstEnergy Ohio Community Connections Agency Survey
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VARIABLE	DESCRIPTION
AGENCY CONTACT	First and last name of agency contact
EMAIL	Email address

Email Introduction

Good Day [Contact Name],

We are collecting feedback from agencies that participated in the Community Connection Program from FirstEnergy's Ohio utilities. Please take a few minutes to complete this survey; we will use your response, in combination with other agencies' responses, to make recommendations on how the Community Connections Program could improve to better meet the needs of the low-income community.

If you are not the person most knowledgeable about your agency's involvement with the program, please forward this email to the appropriate person or reply directly to this email and let us know who to reach out to.

We really value your input!

Thank you in advance for your time

Kind Regards,

[ADM Contact] ADM Associates \ Contractor to FirstEnergy Ohio

Roles and Responsibilities [Do not display]

1. What is your role in regards to the Community Connections program?
 1. Director
 2. Program Manager
 3. Program Coordinator
 4. Technician
 5. Office Administrator
 6. Other: _____

Program Changes

2. Do you have suggestions regarding other energy-savings technologies that should be added to the program?
 1. Yes
 2. No
 98. Don't Know

[DISPLAY Q3 IF Q2 = 1]

3. What energy-savings technologies should be added to the program in the future?
4. In the last two years, has your organization changed the way you are allocating funds for residents?
 1. Yes
 2. No
 99. Don't Know

[DISPLAY Q5 IF Q4 = 1]

5. Could you please describe what changes were made and why?
6. In the last two years, has your organization implemented any changes in the way you are testing and installing appliances for residents?
 1. Yes
 2. No
 98. Don't Know

[DISPLAY Q7 IF Q6 = 1]

7. Could you please describe what changes were made and why?
8. Do you use the seasonal allowance worksheet?
 1. Yes
 2. No
 98. Don't Know

[DISPLAY Q9 IF Q8 = 1]

9. Do you have any suggestions for improving the tool or how it's used to make decisions regarding funding levels?
10. Is your agency planning on making changes to the way you implement the program, qualify residents, and/or allocating funds to residents?
 1. Yes
 2. No
 98. Don't Know

[DISPLAY Q11 IF Q10 = 1]

11. Could you please describe what changes are planned and why?

Marketing and Outreach

12. Does your agency market the program to residents?

1. Yes

2. No

99. Don't Know

[DISPLAY Q13 IF Q12 = 1]

13. What outreach methods and/or marketing channels are used?

14. Do you have any suggestions regarding ways the program could better support your outreach efforts?

Staff Communication

15. Currently Ohio Partners for Affordable Energy (OPAE) is responsible for implementing the Community Connections Program. Have you had direct communication with OPAE staff regarding this program?

1. Yes

2. No

98. Don't Know

[DISPLAY Q16 IF Q15 = 1]

16. On the scale provided, please indicate how knowledgeable OPAE staff are about the issues you discuss with them?

Not at all knowledgeable	Slightly knowledgeable	Somewhat knowledgeable	Fairly knowledgeable	5 – Very knowledgeable	Not sure
1	2	3	4	5	98

17. On the scale provided, please indicate how satisfied or dissatisfied you are with the following:

	Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied	Not sure
	1	2	3	4	5	98
a. how long it takes OPAE staff to address your questions or concerns						
b. how thoroughly OPAE staff address your question or concern	1	2	3	4	5	98

[DISPLAY Q18 IF Q17a or b = 1 or 2]

18. Please describe the ways in which you were not satisfied with OPAE staff:

19. Have you had direct communication with FirstEnergy staff regarding the Community Connections Program?

1. Yes

2. No

98. Don't Know

[DISPLAY Q20 IF Q19 = 1]

20. On the scale provided, please indicate how knowledgeable FirstEnergy staff are about the issues you discuss with them?

Not at all
knowledgeable
1

Slightly
knowledgeable
2

Somewhat
knowledgeable
3

Fairly
knowledgeable
4

5 – Very
knowledgeable
5

Not
sure
98

[DISPLAY Q21 IF Q19 = 1]

21. On the scale provided, please indicate how satisfied or dissatisfied you were with the following:

	Very Dissatisfied 1	Dissatisfied 2	Neither satisfied nor dissatisfied 3	Satisfied 4	Very Satisfied 5	Not sure 98
a. how long it took FirstEnergy staff to address your questions or concerns						
b. how thoroughly FirstEnergy staff addressed your question or concern	1	2	3	4	5	98

[DISPLAY Q22 IF Q21a or b = 1 or 2]

22. Please describe the ways in which you were not satisfied with FirstEnergy staff:

23. On the scale provided, please indicate how satisfied or dissatisfied you were with the following:

	Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied	Not sure
a. the steps agencies take to get through the program	1	2	3	4	5	98
b. the range of equipment that qualifies for incentives	1	2	3	4	5	98
c. the level of incentives (dollar amount)	1	2	3	4	5	98
d. the program, overall	1	2	3	4	5	98

24. Did your organization receive an in-person visit from program staff this year?

1. Yes

2. No

98. Don't Know

[DISPLAY Q25 IF Q24 = 1]

25. Please provide feedback regarding your experience with the in-person visit? What was discussed?

26. Do you think it was valuable to speak with program staff in person?

1. Yes

2. No

99. Don't Know

[DISPLAY Q27 IF Q26 = 1]

27. What was the most valuable aspect of the meeting?

[DISPLAY Q2826 IF Q = 2]

28. How could the meeting provide more value to your organization in the future?

29. Do you have any issues with regards to interpreting the program guidelines or determining what qualifies as an eligible measure?

3. Yes

4. No

98. Don't Know

[DISPLAY Q30 IF Q24 = 1]

30. Please explain what issues you have interpreting the program guidelines or determining what qualifies as an eligible measure and how the program could better support you.
31. Does your organization feel comfortable with the documentation requirements for all measure types including non-standard measures?
1. Yes
 2. No
 98. Don't Know

[DISPLAY Q32 IF Q31 = 2]

32. Do you have any suggestions regarding ways the program could improve the documentation requirements or better support your organization with providing accurate/complete documentation?

Training/Events

33. Has your organization participated in of the following events in 2018?
1. Weatherize Ohio Conference
 2. Program webinar
 3. Other: _____
 98. Don't know

[DISPLAY Q34 IF Q33 = 1,2 OR 3]

34. Do you have any suggestions for improving the format of the events or what information is presented?

35. Do you feel your agency staff are well-trained on the following:

	Yes	No	We hire a 3 rd party for that	Don't Know
a. testing and installing qualifying appliances	1	2	3	98
b. auditing and installing shell measures	1	2	3	98
c. electrical and roof repairs	1	2	3	98
d. the steps required to participate in the program	1	2	3	98

[DISPLAY Q36 IF Q35a, b, c, OR d = 2]

36. Could you provide feedback on ways the program could better support the training needs of your agency?

37. Do you have any suggestions for improving the community connections program or feedback you'd like to share with OPAE or FirstEnergy?

Thank you for taking the survey. Your response, in combination with other agencies' responses, will be used to improve the program in the future. Have a nice day.