APPENDIX H – LOW INCOME EM&V REPORT

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

Low-Income Programs
Evaluation, Measurement & Verification Report 2019

Prepared for
FirstEnergy Ohio Companies:

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

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1. Executive Summary

During 2019, the First Energy Ohio utility companies, The Cleveland Electric Illuminating Company ("CEI"), Ohio Edison Company ("OE"), and The Toledo Edison Company ("TE") (collectively "Companies") continued their low-income programs: the Community Connections and Low-Income New Homes programs.

Community Connections targeted existing low-income residential customers, either directly or through their landlords. 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.

The Low-Income New Homes program provided energy efficient measures in fourteen homes built by Habitat for Humanity in the Companies' service areas.

Participation numbers for the evaluation year are reported in Table 1-1.

Table 1-1: 2019 Program Participants by Utility

Utility	Community Connections Participants	Low-Income New Homes	Total Participants
CEI	1,739	1	1,740
OE	1,494	10	1,504
TE	848	3	851
Total	**4,081**	**14**	**4,095**

Unique customer account numbers were used to tally participant counts.

1.1 Program Energy Savings (kWh) and Peak Demand Reductions (kW)

Table 1-2 includes energy savings and peak demand reduction realization rates for the Community Connections and Low-income New Homes programs. The Community Connections gross ex-post kWh savings total reflects a 98 percent realization rate determined by the ratio of verified total kWh savings to expected gross kWh savings and a gross ex-post peak demand reduction kW realization rate of 98 percent. For the New Homes program, the ex-ante and ex-post savings values were developed using the same methodology and resulted in a realization rate of 100 percent.

Table 1-2: Impact Analysis Results[1]

Utility	Ex-Ante Energy Savings (kWh)	Ex-Ante Peak Demand Reduction (kW)	Ex-Post Energy Savings (kWh)	Ex-Post Peak Demand Reduction (kW)	Energy Savings Realization Rate	Peak Demand Reduction Realization Rate
Community Connections						
CEI	3,957,314	571.30	3,848,650	559.33	97%	98%
OE	3,111,778	454.51	3,090,990	442.25	99%	97%
TE	1,312,878	181.05	1,288,107	177.40	98%	98%
Total	**8,381,971**	**1,206.85**	**8,227,747**	**1,178.99**	**98%**	**98%**
Low Income New Homes						
CEI	1,497	0.50	1,497	0.50	100%	100%
OE	18,551	6.95	18,551	6.95	100%	100%
TE	7,708	2.63	7,708	2.63	100%	100%
Total	**27,756**	**10.08**	**27,756**	**10.08**	**100%**	**100%**
Low Income Programs Combined						
CEI	3,958,811	571.80	3,850,147	559.83	97%	98%
OE	3,130,329	461.46	3,109,541	449.20	99%	97%
TE	1,320,586	183.68	1,295,815	180.03	98%	98%
Total	**8,409,727**	**1,216.93**	**8,255,503**	**1,189.07**	**98%**	**98%**

Table 1-3 summarizes Community Connections program savings by measure category.

Table 1-3: Community Connections Ex-Post Total Energy Savings (kWh) per Measure Category

Measure category	Energy Savings (kWh)	Peak Demand Reduction (kW)	% Total Energy Savings
Refrigerator	4,970,223	764.36	60.4%
LED Lighting	2,199,029	262.96	26.7%
Freezer	825,624	127.68	10.0%
Smart strip	109,934	9.84	1.3%
Air Sealing	42,559	0.54	0.52%
Attic insulation	26,777	0.07	0.33%
Low flow showerheads	14,061	1.80	0.17%
Refrigerator and Freezer Retirement	10,482	1.67	0.13%
Heat pump	10,168	1.85	0.12%
LED nightlights	7,985	-	0.10%
Faucet aerators	3,058	0.38	0.04%
Insulation	2,081	0.02	0.03%
AC replacements	1,859	3.05	0.02%
Water pipe insulation	1,655	0.19	0.02%
Ductless mini-split heat pump	1,150	4.27	0.014%
Replace other appliances	637	0.26	0.008%
Water heater wraps	300	0.03	0.004%
Lower water heater tank temperature	166	0.01	0.002%
Total	**8,227,747**	**1,178.99**	**100%**

1.2 Program Level Conclusions

The following section summarizes the conclusions for the Low-Income Programs evaluation.

1. The Community Connections low-income program exceeded 2019 projected program savings targets and customer participation levels as set in the Company's portfolio plan.
2. The program had the following realizations rates for 2019: 98 percent for kWh savings and 100 percent realization rate for peak demand reduction.

3. Nearly all (98.4%) kWh savings were generated from the following baseload measure categories: refrigerators (60.4%), LED lighting (26.7%), freezers (10%), and smart power strips (1.3%).
4. The Companies continue to partner effectively with Ohio Partners for Affordable Energy ("OPAE") to implement the Community Connections low-income program. Because OPAE manages multiple federal, state and local low-income energy program funds, the Companies benefit from:
    - Leveraging multiple funding streams to maximize the number of measures that can be installed in a single home and therefore maximizes benefits for customers and maximizing overall energy savings.
    - Lower program administration costs. By managing multiple funding streams, OPAE distributes overhead costs across funders.
    - Access to trained weatherization workforce. Weatherization programs are facing a shortage of a trained workforce. By partnering with OPAE, the Companies benefit from the small pool of trained weatherization professionals and ongoing field training provided by OPAE.
    - Partnerships with agencies that have long-standing, trusted relationships with difficult-to-reach customer base.
    - Established and effective communication between the Companies, OPAE, and the network of community agencies.
5. Program staff and agency partners indicate that the upgrade to the new LEEN data tracking system has been successfully implemented. The Company provided extensive LEEN system training and support to agencies. The LEEN system's key benefits over the old system are:
    - Better reporting system results in more accurate tracking data.
    - Agencies are better able to track their program funding and therefore they are better able to meet their performance goals.
    - OPAE is better able to monitor agencies and encourage consistent production.
6. Most Community Connections participants who responded to ADM's survey shared positive feedback and support for the program. Respondents reported high levels of overall satisfaction with the program and with installed measures. Most also noted that they learned new ways to save energy in their home.
7. The Companies have developed a partnership with Habitat for Humanity to provide energy efficient measures for the volunteer-built homes. This partnership has allowed Habitat for Humanity to build Energy Star certified homes in the Companies' service areas.

1.3 Recommendations

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

1. Continue to administer the program through OPAE and its member community agencies. The Companies gain multiple benefits from contracting with OPAE to manage the program in coordination with other low-income weatherization funding sources.
2. When determining which services and measures to include in the Community Connections program, consider other low-income weatherization programs' funding priorities and restrictions. Work with OPAE and agencies to identify and evaluate appropriate and effective measures that:
    - Reduce duplication of services and measures where cross-program funding exceeds total demand.
    - Identify services and measures cross-program funding gaps for which demand exceeds total cross-program funding.
3. Continue to attend Weatherize Ohio and regional weatherization meetings to strengthen partnerships with OPAE and agencies.

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 Community Connections and Low-Income New Homes programs that the Companies implemented in Ohio in 2019. 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 2019.

Additionally, this report presents the results of the process evaluation of the Community Connections program focusing on participant and program staff perspectives.

2.1 Purpose of Impact Analysis

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?

2.2 Purpose of Process Evaluation

ADM completed a process evaluation for the Community Connections program. The process evaluation researches and documents the program delivery mechanisms and collective experiences of program participants, partners and staff. ADM uses the collected 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 Programs

The Companies' low-income programs include Community Connections and Low-Income New Homes programs.

3.1 Community Connections

The Community Connections Program provides weatherization measures, health and safety measures, energy efficient solutions, and energy education to low-income customers that receive electric service from one of FirstEnergy Ohio's three Electric Distribution Utilities, The Cleveland Illuminating Company (CEI), Ohio Edison Company (OE), and The Toledo Edison Company (TE) (EDCs collectively "the Companies").

The program is administered by Ohio Partners for Affordable Energy (OPAE) which coordinates federal, state, and utility funding to local community action agencies that provide direct services to income qualify program participants.

By using "braided" funding streams, OPAE leverages multiple funding sources for program administration costs, and all funders benefit from coordinated services such as:

- Program application and eligibility processing.
- Home energy audits to identify qualifying measures.
- Ongoing weatherization workforce training.
- Standardized best practices and procedures.

Individual funding sources authorize specific expenses, and as such, a single home may benefit from a combination of funding sources. The Community Connections program primarily funds measures that reduce electricity demand, with an additional allocation of up to fifteen percent of program funding allowed for health and safety measures.

Community Connections funding can be used for energy efficiency measures in any home receiving electric service from the Companies. Weatherization measures can be installed in homes with electric heating or electric cooling; water heating measures can be installed in homes with electric water heaters.

Nearly all (98.4%) energy savings (kWh) were generated from the following baseload measure categories: refrigerators (60.8%), LED lighting (26.1%), freezers (10.1%), and smart power strips (1.5%).

Existing refrigerator and free-standing freezers are metered for energy efficiency and eligible low-efficiency appliances are replaced with ENERGY STAR models.

Lighting measures include different wattages of LEDs and LED nightlights are installed to replace non-LED bulbs that are in use for an hour or more per day.

Smart power strips are installed in high-impact applications such as home entertainment and computer systems.

Weatherization measures include installation of insulation and air infiltration reduction. Water heater measures include water heater wraps, water pipe insulation, low flow shower heads, and faucet aerators. Health and safety measures include roof repairs/replacement, electric wiring repairs and upgrades, and furnace repairs.

Table 3-1 and Table 3-2 list all measures installed through the Community Connections program along with the ex-ante savings used per measure during the evaluation period.

Table 3-1: Ex-Ante Annual Energy Saving and Peak Demand Reduction Estimates per Unit: Non-lighting

Energy Efficiency Measures: Non-Lighting	Energy Savings (kWh)	Peak Demand Reduction (kW)	Source
16 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
17 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
18 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
19 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
21 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
26 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
Install 14-16 cu. ft. refrigerator w/top freezer	1,251	0.19	Ohio TRM
Install 17-19 cu. ft. refrigerator w/top freezer	1,251	0.19	Ohio TRM
Install 19-22 cu. ft. refrigerator w/bottom freezer	1,251	0.19	Ohio TRM
Install 20-22 cu. ft. refrigerator w/top freezer	1,251	0.19	Ohio TRM
Install 20-23 cu. ft. side by side refrigerator	1,251	0.19	Ohio TRM
Install 24-26 cu. ft. side by side refrigerator	1,251	0.19	Ohio TRM
24 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
22 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
15 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
25 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
23 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
20 CU FT REFRIGERATOR	1,251	0.19	Ohio TRM
10 CU FT FREEZER	1,131	0.18	Ohio TRM
11 CU FT FREEZER	1,131	0.18	Ohio TRM
12 CU FT FREEZER	1,131	0.18	Ohio TRM
14 CU FT FREEZER	1,131	0.18	Ohio TRM
15 CU FT FREEZER	1,131	0.18	Ohio TRM
16 CU FT FREEZER	1,131	0.18	Ohio TRM
17 CU FT FREEZER	1,131	0.18	Ohio TRM

18 CU FT FREEZER	1,131	0.18	Ohio TRM
20 CU FT FREEZER	1,131	0.18	Ohio TRM
21 CU FT FREEZER	1,131	0.18	Ohio TRM
22 CU FT FREEZER	1,131	0.18	Ohio TRM
25 CU FT FREEZER	1,131	0.18	Ohio TRM
5 CU FT FREEZER	1,131	0.18	Ohio TRM
7 CU FT FREEZER	1,131	0.18	Ohio TRM
8 CU FT FREEZER	1,131	0.18	Ohio TRM
Install 11-15 cu. ft. chest freezer	1,131	0.18	Ohio TRM
Install 16-18 cu. ft. upright freezer	1,131	0.18	Ohio TRM
Install 16-20 cu. ft. chest freezer	1,131	0.18	Ohio TRM
Install 19-21 cu. ft. upright freezer	1,131	0.18	Ohio TRM
Install 5-10 cu. ft. chest freezer	1,131	0.18	Ohio TRM
Install 9-15 cu. ft. upright freezer	1,131	0.18	Ohio TRM
6 CU FT FREEZER	1,131	0.18	Ohio TRM
9 CU FT FREEZER	1,131	0.18	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
Attic Insulation	Varies	Varies	Ohio TRM
Air Sealing	Varies	Varies	Ohio TRM
Install low flow showerhead	220	0.03	Ohio TRM
Install showerhead – handheld	220	0.03	Ohio TRM
Air Source Heat Pump	Varies	Varies	Ohio TRM
Retirement of additional refrigerator	1,376	0.22	Ohio TRM
Retirement of additional freezer	1,244	0.20	Ohio TRM
Install faucet aerator w/o shut- off valve	31	0.004	Ohio TRM
Install faucet aerator w/shut-off valve	31	0.004	Ohio TRM
Wall Insulation – Generic	Varies	Varies	Ohio TRM
Central AC replacement	Varies	Varies	Ohio TRM
Ductless Mini-Split	1,150	4.27	PA TRM
Replace dehumidifier	152	0.34	PA TRM
Hot water pipe insulation	Varies	Varies	Ohio TRM
Insulate <52 gallon water heater	79	0.009	Ohio TRM
Lower DHW tank temperature	166	0.013	PA TRM
Replace room/window air conditioner	87	0.112	Ohio TRM

Table 3-2: Ex-Ante Annual Energy Saving and Peak Demand Reduction Estimates per Unit: Lighting

Energy Efficiency Measures: Lighting	Energy Savings (kWh)	Peak Demand Reduction (kW)	Source
Install 10-12 Watt Flood LED	71	0.003	PA TRM
Install 11-13 Watt LED	45	0.005	PA TRM
Install 14-16 Watt LED	64	0.008	PA TRM
Install 3-Way LED	56	0.007	PA TRM
Install 4-6 Watt Mini-Candelabra LED	38	0.004	PA TRM
Install 5-7 Watt Candelabra LED	51	0.006	PA TRM
Install 5-7 Watt Globe LED	50	0.006	PA TRM
Install 8-10 Watt Flood LED	60	0.007	PA TRM
LED - 10 Watt Globe	51	0.006	PA TRM
LED - 13-14 Watt Flood	53	0.006	PA TRM
LED - 17 Watt Flood	49	0.006	PA TRM
LED - 2.3 Watt Globe	23	0.003	PA TRM
LED - 3.7-4.8 Watt Candelabra, 150-299 Lumens	21	0.003	PA TRM
LED - 3.7-4.8 Watt Candelabra, 300-499 Lumens	25	0.003	PA TRM
LED - 3.7-4.8 Watt Candelabra, 500-699 Lumens	40	0.005	PA TRM
LED - 6-8 Watt Standard Bulb, 310-450 Lumens	18	0.002	PA TRM
LED - 6-8 Watt Standard Bulb, 450-799 Lumens	23	0.003	PA TRM
LED - 6-8 Watt Standard Bulb, 800-1099 Lumens	37	0.004	PA TRM
LED - 9-13 Watt Standard Bulb, 1100-1599 Lumens	43	0.005	PA TRM
LED - 9-13 Watt Standard Bulb, 450-799 Lumens	18	0.002	PA TRM
LED - 9-13 Watt Standard Bulb, 800-1099 Lumens	33	0.004	PA TRM
Install 7-10 Watt LED	39	0.005	PA TRM
Install 11-13 Watt Flood LED	45	0.005	PA TRM
Install 14-16 Watt Flood LED	64	0.008	PA TRM
Install .03 nightlight	12	0	PA TRM
Install .5 watt nightlight	11	0	PA TRM
LED Standard Bulb	Various	Various	Unknown

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

- Electric repair/upgrade
- Roof repair/replacement
- Energy Education Consultations
- Appliance Replacement

3.2 Low-Income New Homes

The Low-Income New Homes program is a partnership with Habitat for Humanity in which the Companies provide funding for energy efficient measures that qualify the homes as certified Energy Star homes. Fourteen homes in the Companies' service areas were included in the program during 2019. Table 3-3 includes the ex-ante energy savings and peak demand reduction values.

Table 3-3: Ex-Ante Annual Energy Saving and Peak Demand Reduction Estimates: Low-Income New Homes Program

Utility	Number of homes	Energy Savings (kWh)	Peak Demand Reduction (kW)
CEI	1	1,497	0.50
OE	10	18,550	6.95
TE	3	7,708	2.62
Total	**14**	**27,756**	**10.07**

4. Methodology

This chapter provides a description of the methodology applied by ADM in the evaluation of the 2019 Low-Income Programs. 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 Community Connections program impacts was the 2013 Ohio TRM[2] ("OHIO TRM"). The Pennsylvania TRM version 5[3] ("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 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.

ADM used a benchmark analysis to complete the impact evaluation of the Low-Income New Homes program.

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.

4.2 Verification of Quantity of Measures Installed

The Company transitioned to a new data tracking system during the program period. ADM evaluated data from both systems and completed the following steps in the verification effort for Community Connections:

- Validated program tracking data provided from the VisionDSM, SSRS, and the LEEN reporting systems 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 in the program and the reported measure installations were accurate. The survey collected data from customers about where in the home LEDs were installed, which measures they received were still installed, and asked them about their experiences with the contractors who installed measures and made health and safety repairs.
- 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.
- Verified premise addresses and reviewed supporting invoice documentation for energy-saving measure installations on Low-Income New Homes projects.

4.3 Sampling Strategy

For the Community Connections 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 evaluation's site verifications, ADM utilized the Dalenius-Hodges' stratification methodology to achieve the required sampling precision as calculated using Equation 4-1 and the variables included in Table 4-1.

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

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

Table 4-1: Variables in Minimum Sample Size Formula

Variable	Description
n_o	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)

Strata boundaries were designed to minimize the coefficient of variance (CV) for all strata. The sample design shown in Table 4-2 used for selecting program projects allows estimates of savings to be determined with ±10% precision at a 90% confidence interval for the program. ADM conducted 71 site visits and 9 desk audits, exceeding the sample size required to achieve desired confidence and precision.

Table 4-2: Ex-Post Stratified Sampling Plan

Utility	Strata	Number of program participants	Average Energy Savings (kWh)	Std. Dev Energy Savings (kWh)	Sum of Energy Savings (kWh)	CV	Sample Size	Contribution to Variance	Utility Precision
CEI	5	446	2,704	599	1,205,923	0.22	4	17,660,497,908	9.88%
	4	245	1,788	110	437,963	0.06	3	239,185,965	
	3	194	1,474	78	285,978	0.05	3	74,655,406	
	2	407	1,201	95	488,808	0.08	3	492,113,258	
	1	547	438	217	239,811	0.50	2	7,028,284,471	
OE	6	18	19,034	16,100	342,603	0.85	8	5,832,336,059	6.00%
	5	177	3,663	904	648,363	0.25	9	2,702,389,499	
	4	236	2,582	239	609,437	0.09	10	303,674,039	
	3	180	2,027	89	364,902	0.04	9	27,367,836	
	2	612	1,519	221	929,553	0.15	7	2,574,867,241	
	1	223	447	264	99,723	0.59	7	479,149,471	
TE	5	156	2,876	558	448,610	0.19	3	2,480,052,730	7.86%
	4	127	2,060	121	261,597	0.06	3	76,800,449	
	3	151	1,622	136	244,942	0.08	3	136,947,469	
	2	192	1,164	153	223,528	0.13	3	282,085,528	
	1	206	448	226	92,362	0.50	3	709,307,358	
Total					**6,924,103**		**80**	**41,099,714,686**	**4.82%**

ADM surveyed 356 program participants across the three service territories. The instrument for the survey is provided in Appendix B.

4.4 Calculating Gross Annual kWh and kW Savings

Engineering and deemed savings calculations were performed for a census of Community Connections program measures. A benchmarking analysis for the Low-Income New Homes program identified savings per home. Detailed methodology descriptions are outlined in the sections below.

4.5 Community Connections Measures

The following measures were installed through the Community Connections program in 2019:

- LED lighting measures
- Refrigerator replacement and retirement
- Freezer replacement and retirement
- Smart power strips
- Attic and wall insulation
- Air sealing
- Low flow showerheads
- Heat pumps
- Faucet aerators
- Central and room air conditioning replacement
- Ductless mini-split heat pump
- Dehumidifier replacement
- Water pipe insulation
- Water heater wrap
- Lower domestic hot water tank temperature

4.5.1 LED Lighting Measures

LED lighting measures included in the Community Connections program included 24 general and special use LED bulbs and LED nightlights.

The kWh savings per LED light bulb were calculated per procedures set out in the PA TRM with applicable inputs used from the Ohio TRM. The calculations and inputs are shown respectively in Equation 4-2, Equation 4-3 and Table 4-3.

Equation 4-2: Calculations for Energy Savings (kWh): LED Lighting Measures

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

Equation 4-3: Calculation for Peak Demand Reduction (kW): LED Lighting Measures

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

Table 4-3: Inputs for Energy Saving and Peak Demand Reduction Calculations: LED Measures

Variable	Description	Value	Source
$Watts_{base}$	The deemed wattage of existing bulb	Varies	FE OH EE Products Upstream Data, PA TRM
$Watts_{EE}$	The wattage of the new bulb	Varies	FE OH EE Products Upstream Data, PA TRM
$Hours$	Average hours of use per year	1,040	Participant survey PA TRM and OH TRM
$WHFe$	Waste Heat Factor for energy - to account for cooling savings from efficient lighting	1.07	OH TRM
$WHFd$	Waste Heat Factor for Demand (to account for cooling savings from efficient lighting)	1.21	OH TRM
ISR	In Service Rate (the percentage of units provided by the program that are actually installed as estimated by the lighting verification survey and site inspect)	88.85%	Participant surveys and site visits

Upstream lighting data from the 2018 and 2019 Energy Efficient Products Program were used to calculate the measure and baseline wattages for 24 bulb categories in the Community Connections program. The upstream lighting data contains details for more than 100,000 measures installed through the 2018 and 2019 programs. The average wattage of bulbs installed through the Community Connections program can be assumed to be approximately equal to the wattage of bulbs incentivized through the upstream lighting program.

The average measure wattage of each bulb category installed through the Community Connections program was calculated by assigning each bulb in the upstream lighting data to a corresponding bulb category. Brightness (lumens) and bulb type (general service, decorative, globe, etc.) was then used to determine the baseline wattage for each bulb,

per the PA TRM. The average measure and baseline wattage could then be calculated for each bulb category.

Six categories of bulbs installed through the Community Connections program were not present in the upstream lighting data. For these categories, the measure wattage was taken to be the mean wattage of the bulb category range, while the baseline wattage was calculated from the reported brightness of similar bulbs. Baseline and baseline bulb wattages are listed in Table 4-4.

No specification was provided for the measure listed as *LED Standard Bulb*, therefore a weighted average kWh savings of the other LED bulbs installed by the program during the evaluation period was used.

Table 4-4: Baseline and Efficient Wattages for LED Measure

Lamp Category	Energy Efficient Lamp Wattage	Baseline Lamp Wattage
Install 10-12 Watt Flood LED	10.51	60.42
Install 11-13 Watt LED	12.23	52.94
Install 11-13 Watt Flood LED	11.35	64.13
Install 14-16 Watt LED	15.31	68.41
Install 14-16 Watt Flood LED	14.41	65
Install 3-Way LED	19.36	100
Install 4-6 Watt Mini-Candelabra LED	4.62	53.53
Install 5-7 Watt Candelabra LED	5.12	53.72
Install 7-10 Watt LED	8.48	42.99
Install 5-7 Watt Globe LED	5.8	52.31
Install 8-10 Watt Flood LED	8.65	59.91
LED - 10 Watt Globe	10	72
LED - 13-14 Watt Flood	13.5	65
LED - 17 Watt Flood	16.93	65
LED - 2.3 Watt Globe	2.3	15
LED - 3.7-4.8 Watt Candelabra, 150-299 Lumens	4.25	25
LED - 3.7-4.8 Watt Candelabra, 300-499 Lumens	4.01	29
LED - 3.7-4.8 Watt Candelabra, 500-699 Lumens	4.5	43
LED - 6-8 Watt Standard Bulb, 310-450 Lumens	7	25
LED - 6-8 Watt Standard Bulb, 450-799 Lumens	6	29
LED - 6-8 Watt Standard Bulb, 800-1099 Lumens	7.25	43
LED - 9-13 Watt Standard Bulb, 1100-1599 Lumens	12.21	53
LED - 9-13 Watt Standard Bulb, 450-799 Lumens	9.5	29
LED - 9-13 Watt Standard Bulb, 800-1099 Lumens	9.32	43

The calculated savings values for LED bulb measures were applied to determine ex-post savings.

The kWh savings per LED nightlight was calculated per procedures set out in the PA TRM. The calculations and inputs are shown respectively in Equation 4-4 and Table 4-5.

There is no measurable peak kW reduction attributed to LED night lights.

Equation 4-4: Calculation for Energy Savings (kWh): LED Nightlights

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

Table 4-5: Inputs for Energy Saving and Peak Demand Reduction Calculations: LED Nightlights

Variable	Description	Value	Source
$Wattsbase$	Wattage of baseline nightlight	Varies	PA TRM
$WattsEE$	Wattage of LED nightlight	Varies	Participant Data
$NLhours$	Average hours of use per day per nightlight	0.11	OH TRM
ISR	In Service Rate (the percentage of units provided by the program that are actually installed)	80%	Participant surveys and site visits

The calculated savings values for LED nightlight measures were applied to determine ex-post savings.

4.5.2 Refrigerator Replacement and Retirement

The procedures for calculating annual kWh savings and peak kW 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 4-6 below.

Table 4-6: Deemed Energy Savings (kWh) and Peak Demand Reduction (kW) Savings: Refrigerator Replacement Measure

Measure	Per Unit Savings
kWh Savings per Unit Remaining life of existing unit (8 years)	1,251 kWh
Average Summer Coincident Peak kW Savings per Unit. Remaining life of existing unit (8 years)	0.19 kW

The deemed savings value for replacement refrigerators as used to determine ex-post savings.

The kWh savings per retired refrigerator (refrigerators that were removed from service without being replaced) was calculated using Equation 4-5 and Equation 4-6 using inputs from Table 4-7 from the OH TRM algorithm as follows:

Equation 4-5: Calculation for Energy Savings (kWh): Refrigerator Retirement

$$\Delta kWh = UECretired * ISAF$$

Equation 4-6: Calculations for Peak Demand Reduction (kW): Refrigerator Retirement

$$\Delta kW = (\Delta kWh/8760) * TAF * LSAF$$

Table 4-7: Inputs for Energy Saving and Peak Demand Reduction Calculations: Retired Refrigerators

Variable	Description	Value	Source
$UECretired$	Average in situ Unit Energy Consumption of retired unit, adjusted for part use	1,619	OH TRM
$ISAF$	In Situ Adjustment Factor	0.8537	OH TRM
TAF	Temperature Adjustment Factor	1.3	OH TRM
$LSAF$	Load Shape Adjustment Factor	1.074	OH TRM

The calculated value for retired refrigerators were applied to determine ex-post savings.

4.5.3 Freezer Replacement and Retirement

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. The resulting savings values are reported in Table 4-8.

Table 4-8: Deemed Energy Savings (kWh) and Peak Demand Reduction (kW) Savings: Freezer Replacement Measures

Measure	Per Unit Savings
kWh Savings per Unit *Remaining life of existing unit (8 years)*	1,131 kWh
Average peak demand reduction. Remaining life of existing unit (8 years)	0.18 kW

The deemed savings for replacement freezers was used to determine ex-post savings. The kWh savings per retired freezer removed from service without being replaced was calculated using Equation 4-7 and Equation 4-8 using inputs from Table 4-9.

Equation 4-7: Calculation for Energy Savings (kWh): Freezer Retirement

$$\Delta kWh = UECretired * ISAF$$

Equation 4-8: Calculations for Peak Demand Reduction (kW): Freezer Retirement

$$\Delta kW = (\Delta kWh/8760) * TAF * LSAF$$

Table 4-9: Inputs for Energy Saving and Peak Demand Reduction Calculations: Retired Freezers

Variable	Description	Value	Source
TAF	Temperature Adjustment Factor	1.3	OH TRM
$LSAF$	Load Shape Adjustment Factor	1.074	OH TRM
$UECretired$	Average Unit Energy Consumption of retired unit adjusted for part use	1,619	OH TRM
$ISAF$	In Situ Adjustment Factor	0.8537	OH TRM

The calculated value for retired freezers were applied to determine ex-post savings.

4.5.4 Smart Power Strips

Deemed savings values specified in the OHIO TRM for smart power strips are based on the number of included plugs. Deemed kWh and kW savings for 5- and 7-plug strips are shown in Table 4-10. For 6-plug and 10-plug strip measures, the deemed values for 5-plug, and 7-plug, respectively, were used. An In-Service Rate of 84 percent was determined from participant surveys and site visits.

Table 4-10: Deemed Energy Savings (kWh) and Peak Demand Reduction (kW) Savings: Smart Power Strips

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

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

4.5.5 Attic and Wall Insulation

For attic and wall insulation measures kWh and kW savings were calculated per procedures set out in the OH TRM as shown in Equation 4-9, Equation 4-10, and Equation 4-11 using inputs from Table 4-11.

Equation 4-9: Calculation for Cooling Energy Savings (kWh): Attic and Wall Insulation

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

Equation 4-10: Calculation for Heating Energy Savings (kWh): Attic and Wall Insulation

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

Equation 4-11: Calculations for Peak Demand Reduction (kW): Attic and Wall Insulation

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

Table 4-11: Inputs for Energy Saving and Peak Demand Reduction Calculations: Attic and Wall Insulation

Variable	Description	Value	Source
$Rexist$	R-value existing	Varies	Program tracking data
$Rnew$	R-value new	Varies	Program tracking data
CDH	Cooling Degree Hours	Varies	OH TRM: Location Dependent
HDD	Heating Degree Days	Varies	OH TRM: Location Dependent
DUA	Discretionary Use Adjustment	0.75	OH TRM
$Area$	Square footage of insulated area	Varies	Program tracking data
$EffCool$	Efficiency of Air Conditioning equipment	Varies	Program tracking data
$EffHeat$	Efficiency of heating equipment	Varies	Program tracking data
$FLHCool$	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

The calculated savings values for smart power strips were applied to determine ex-post savings.

4.5.6 Air Infiltration Reduction

Air Filtration Reduction kWh and kW cooling savings were calculated per procedures set out in the OH TRM as shown in Equation 4-12, Equation 4-13, Equation 4-14 using inputs from Table 4-12.

Equation 4-12: Calculation for Cooling Energy Savings (kWh): Air Infiltration

$$\Delta kWh\ (Cooling) = \frac{1.3 * \left(\frac{CFM50_{exist} - CFM50_{new}}{Nfactor_{cool}}\right) * 60 * CDH * 0.0135}{\frac{1{,}000}{Eff_{Cool}}}$$

Equation 4-13: Calculation for Heating Energy Savings (kWh): Air Infiltration

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

Equation 4-14: Calculations for Peak Demand Reduction (kW): Air Infiltration

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

Table 4-12: Inputs for Energy Saving and Peak Demand Reduction Calculations: Air Infiltration Reduction

Variable	Description	Value	Source
$CFM50_{exist}$	Existing Cubic Feet per Minute at 50 Pascal pressure differential - measured by the blower door before air sealing	Varies	Program tracking data
$CFM50_{new}$	New Cubic Feet per Minute at 50 Pascal pressure differential – measured by the blower door after air sealing	Varies	Program tracking data
$N\text{-}factor_{Cool}$	Conversion factor – convert 50-Pascal air flows to natural airflow	29.4	OH TRM
$N\text{-}factor_{Heat}$	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
Eff_{Cool}	Efficiency of Air Conditioning equipment	Varies	Program tracking data
Eff_{Heat}	Efficiency of Heating equipment	Varies	Program tracking data
FLH_{Cool}	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

The calculated savings values for air infiltration reduction measures were applied to determine ex-post savings.

4.5.7 Low-Flow Showerheads

For low-flow showerheads, kWh and kW savings were calculated per procedures set out in the Ohio TRM using Equation 4-15 and Equation 4-16 using inputs from Table 4-13:

Equation 4-15: Calculation for Energy Savings (kWh): Low-Flow Showerhead

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

Equation 4-16: Calculations for Peak Demand Reduction (kW): Low-Flow Showerhead

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

Table 4-13: Inputs for Energy Saving and Peak Demand Reduction Calculations: Low-Flow Showerheads

Variable	Description	Value	Source
ISR	In Service Rate	100%	OH TRM – for direct installation
$GPMbase$	Gallons per minute of baseline showerhead	2.87	OH TRM
$GPMlow$	Gallons per minute of low flow showerhead	1.6	As reported by The Company
$kWh/GPMreduced$	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 calculated savings value for low-flow showerhead measures were applied to determine ex-post savings.

4.5.8 Air Source Heat Pumps

Air source heat pumps kWh and kW savings were calculated per procedures set out in the Ohio TRM as shown in Equation 4-17 and Equation 4-18 using inputs from Table 4-14.

Equation 4-17: Calculation for Energy Savings (kWh): Air Source Heat Pumps

$$\Delta kWh = \frac{FLHcool * BtuH * \left(\frac{1}{SEERbase} - \frac{1}{SEERee}\right)}{1000} + \frac{FLHheat * BtuH * \left(\frac{1}{HSPFbase} - \frac{1}{HSPFee}\right)}{1000}$$

Equation 4-18: Calculations for Peak Demand Reduction (kW): Air Source Heat Pumps

$$\Delta kW = (BtuH * (1/EERbase - 1/EERee))/1000 * CF$$

Table 4-14: Inputs for Energy Saving and Peak Demand Reduction Calculations: Air Source Heat Pumps

Variable	Description	Value	Source
$FLHCool$	Full load cooling hours	Location dependent	OH TRM
$BtuH$	Size of equipment in BtuH	Site specific	Program tracking data
$SEERbase$	SEER Efficiency of baseline unit	13	OH TRM
$SEERee$	SEER Efficiency of ENERGY STAR unit	Actual installed	Program tracking data
$FLHheat$	Full load heating hours	Location dependent	OH TRM
$HSPFbase$	Heating Season Performance Factor for baseline unit	7.7	OH TRM
$HSPFee$	Heating Season Performance Factor for efficient unit	Actual installed	Program tracking data
$EERbase$	EER Efficiency of baseline unit	11	OH TRM
$EERee$	EER Efficiency of ENERGY STAR unit	Actual installed	Program tracking data
CF	Summer Peak Coincidence Factor	.5	PA TRM

The calculated savings value for low-flow showerhead measures were applied to determine ex-post savings.

4.5.9 Faucet Aerators

Faucet aerators kWh and kW savings were calculated per procedures set out in the OH TRM using Equation 4-19 and Equation 4-20 using inputs from Table 4-15.

Equation 4-19: Calculation for Energy Savings (kWh): Faucet Aerators

$$\Delta kWh = ISR * (GPM_{base} - GPM_{low}) * 97^{4}$$

Equation 4-20: Calculations for Peak Demand Reduction (kW): Faucet Aerators

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

Table 4-15: Inputs for Energy Saving and Peak Demand Reduction 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	1.5	Information provided by The Company
CF	Summer Peak Coincidence Factor	0.00262	OH TRM

From the equations and variables above, the annual energy savings values are 30.89 kWh per unit, and the summer coincident peak demand savings are 0.004 kW per unit. The calculated savings values were applied to determine ex-post savings.

4.5.10 Central and Room AC Replacement

Central AC Replacement kWh and kW savings were calculated per procedures set out in the OH TRM using Equation 4-21, Equation 4-22 using inputs from Table 4-16.

Equation 4-21: Calculation for Energy Savings (kWh): Central AC Replacement

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

Equation 4-22: Calculations for Peak Demand Reduction (kW): Central AC Replacement

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

Table 4-16: Inputs for Energy Saving and Peak Demand Reduction Calculations: 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	Program tracking data
SEERexist	SEER efficiency of existing unit	Varies	Program tracking data
SEERbase	SEER efficiency of baseline unit	13	OH TRM
SEERee	SEER efficiency of ENERGY STAR unit	Varies	Program tracking data
EERexist	EER efficiency of existing unit (if unknown, SEER exist * 0.9)	Varies	Program tracking data
EERee	EER efficiency of ENERGY STAR unit	Varies	Program tracking data
CF	Summer Peak Coincidence Factor	0.5	OH TRM

The calculated savings value for central AC replacement was applied to determine ex-post savings.

Room AC Replacement kWh and kW savings were calculated per procedures set out in the OH TRM using Equation 4-23 and Equation 4-24 using inputs from Table 4-17.

Equation 4-23: Calculation for Energy Savings (kWh): Room AC Replacement

$$\Delta kWh = (Hours * BtuH * (1/EERbase - 1/EERee))/1000$$

Equation 4-24: Calculations for Peak Demand Reduction (kW): Room AC Replacement

$$\Delta kW = BtuH * (1/EERbase - 1/EERee))/1000 * CF$$

Table 4-17: Inputs for Energy Saving and Peak Demand Reduction Calculations: Room Air Conditioners

Variable	Description	Value	Source
$Hours$	Full load cooling hours of room air conditioning unit	Varies	OH TRM, location dependent
$BtuH$	Size of equipment in BtuH	10,000	OH TRM
$EERexist$	EER efficiency of existing unit	7.7	OH TRM
$EERbase$	EER efficiency of existing unit (if unknown, SEER exist * 0.9)	9.8	OH TRM
$EERee$	EER efficiency of ENERGY STAR unit	10.8	OH TRM
CF	Summer Peak Coincidence Factor	0.3	OH TRM

The calculated savings value for room AC replacement was applied to determine ex-post savings.

4.5.11 Dehumidifier Replacement

Dehumidifier Replacements kWh and kW savings per measure were calculated per procedures set out in the PA TRM using Equation 4-25 and Equation 4-26 using inputs from Table 4-18.

Equation 4-25: Calculation for Energy Savings (kWh): Replacement Dehumidifier

$$\Delta\, kWh/yr = \left(\frac{CAPY \times 0.437\frac{liters}{pint}}{24\frac{hours}{day}}\right) \times HOU \times \left(\frac{1}{L/kWh_{base}} - \frac{1}{L/kWh_{ee}}\right)$$

Equation 4-26: Calculations for Peak Demand Reduction (kW): Replacement Dehumidifier

$$\Delta kW_{peak} = \frac{\Delta\, kWh/yr}{HOU} \times CF$$

Table 4-18 Inputs for Energy Saving and Peak Demand Reduction Calculations: Replacement Dehumidifier

Variable	Description	Value	Source
$CAPY$	Average capacity	63.244	2017 Energy Efficiency appliance program data
$.473$	Constant	.473	Convert pints to liters
24	Constant	24	Hours/day
HOU	Hours of use per year	1632	PA TRM
$L/kWhbase$	Baseline unit liters of water per kWh consumed	1.7	PA TRM
$L/kWhee$	ENERGY STAR qualified unit liters of water per kWh consumed	1.85	PA TRM
CF	Demand Coincidence Factor	.405	PA TRM

The calculated savings value for room dehumidifiers was applied to determine ex-post savings.

4.5.12 Hot Water Pipe Insulation

Domestic Hot Water Pipe Insulation kWh and kW savings per measure were calculated per procedures set out in the OH TRM using Equation 4-27 and Equation 4-28 using inputs from Table 4-19.

Equation 4-27: Calculation for Energy Savings (kWh): Hot Water Pipe Insulation

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

Equation 4-28: Calculations for Peak Demand Reduction (kW): Hot Water Pipe Insulation

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

Table 4-19 Inputs for Energy Saving and Peak Demand Reduction Calculations: Hot Water Pipe Insulation

Variable	Description	Value	Source
$Rexist$	R-value existing – existing effective whole-assembly thermal resistance value	Varies	Program tracking data
$Rnew$	R-value new – new total effective whole-assembly thermal resistance value	Varies	Program tracking data
L	Length of pipe from water heating source covered by pipe wrap (ft)	Varies	Program tracking data
C	Circumference of pipe (ft) (Diameter (in) * π * 0.083)	Varies	Program tracking data
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

The calculated savings value for hot water pipe insulation was applied to determine ex-post savings.

4.5.13 Water Heater Wraps

Water Heater Wrap kWh and kW savings per measure were calculated per procedures set out in the OH TRM using Equation 4-29 and Equation 4-30 using inputs from Table 4-20.

Equation 4-29: Calculation for Energy Savings (kWh): Water Heater Wrap

$$\Delta kWh = kWHbase * ((EFnew - EFbase)/EFnew)$$

Equation 4-30: Calculations for Peak Demand Reduction (kW): Water Heater Wrap

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

Table 4-20: Inputs for Energy Saving and Peak Demand Reduction Calculations: Water Heater Wrap

Variable	Description	Value	Source
kWh_{base}	Average kWh consumption of electric domestic hot water tank	4,395	OH TRM
$EFnew$	R-value new – new total effective whole-assembly thermal resistance value	.88	OH TRM
$EFbase$	Length of pipe from water heating source covered by pipe wrap (ft)	.86	OH TRM
$Constant$	Number of hours in a year (since savings are assumed to be constant over year).	8,760	OH TRM

The calculated savings value for water heater wraps was applied to determine ex-post savings.

4.5.14 Lower Domestic Water Heater Temperature

Savings generated by lowering domestic water heater temperature in kWh and kW savings were calculated per procedures set out in the PA TRM using Equation 4-31 and Equation 4-32 using inputs from Table 4-21.

Equation 4-31: Calculation for Energy Savings (kWh): Lower Domestic Water Heater

$$\Delta\, kWh/yr = \frac{A_{tank} \times \left(T_{hot\,i} - T_{hot\,f}\right) \times 8760\frac{hrs}{yr}}{R_{tank} \times \eta_{elec} \times 3412\frac{Btu}{kWh}}$$

$$+ \frac{V_{HW} \times \left(8.3\frac{lb}{gal}\right) \times \left(365\frac{days}{yr}\right) \times \left(1\frac{Btu}{°F \cdot lb}\right) \times \left(T_{hot\,i} - T_{hot\,f}\right)}{\left(3412\frac{Btu}{kWh}\right) \times EF_{WH}}$$

Equation 4-32: Calculations for Peak Demand Reduction (kW): Lower Domestic Water Heater

$$DkWpeak = ETDF \times \Delta\, kWh/yr$$

Table 4-21: Inputs for Energy Saving and Peak Demand Reduction Calculations: Lower Domestic Water Heater

Variable	Description	Value	Source
EF_{WH}	Energy Factor of water heater	2.0	PA TRM
R_{tank}	R value of water heater tank	8.3	PA TRM
A_{tank}	Surface Area of water heater tank	24.99	PA TRM
η_{elec}	Thermal efficiency of electric heater element	2.1	PA TRM
V_{HW}	Volume of hot water used per day by clothes washer, in gallons	7.32	PA TRM
T_{hot_i}	Temperature setpoint of water heater initially	130	PA TRM
T_{hot_f}	Temperature setpoint water heater after setback	119	PA TRM
$ETDF$	Energy to Demand Factor	0.00008047	PA TRM

The calculated savings value for lowering domestic water heater temperature was applied to determine ex-post savings.

4.5.15 Ductless Mini Split Heat Pump

Not all inputs were available to calculate kWh and kW savings from ductless mini-split heat pump installations; deemed savings values were also not available for this measure. Only one ductless mini-split unit was installed during the evaluation period. Therefore, ex-ante savings were used.

4.5.16 Additional Measures

The following measures were installed for which no energy savings are included in the program impact analysis:

- Electrical work such as installation of new outlets, switches, or service upgrades
- Health & safety measures such as installation of carbon monoxide detectors, roof repairs, etc.
- Shell measures such as installation of roof and foundation vents, continuous run fans, duct sealing
- Replace electric range
- Replace electric water heater

4.6 Low-Income New Homes Benchmarking Analysis

ADM completed a benchmarking analysis to identify savings generated in the Low-Income New Homes program by comparing each of the fourteen Habitat for Humanity homes in the program to a comparable home in the FirstEnergy Pennsylvania Residential New Construction Initiative program for which ADM completed a detailed analysis using REM/Rate new home energy efficiency modeling software. REM/Rate models home energy performance and provides a Home Energy Rating Systems (HERS®) Rating based on a variety of home attributes.

Ohio and Pennsylvania are both in IECC Climate Zone 5; therefore, baseline measures are the same for both states.

Building documents including invoices, drawings, and measure efficiency ratings were reviewed for homes in the program in order to identify comparable homes from the Pennsylvania analysis from which to assign appropriate savings. The following specifications were available for most homes:

- Building size and number of bedrooms.
- Cooling and heating types (Central AC, Natural Gas Heat, ASHP, GSHP) along with their efficiency ratings and capacities (e.g. SEER, AFUE, EAE).
- Attic and wall insulation specifications.

- Window specifications (U factor, SHGC).
- Home infiltration: Leakage to outside, total leakage.

ADM identified a new home from the Pennsylvania program with the closest fit of building specification for each Habitat for Humanity home and assigned the assessed energy savings to the Habitat for Humanity home. ADM was unable to identify comparable homes for two Habitat for Humanity homes; therefore, both homes were assigned the average energy savings (kWh) from the Pennsylvania New Homes program.

4.7 Calculation of Lifetime Energy Savings per Measure

Lifetime kWh savings were calculated for the Community Connections program by multiplying annual kWh savings for each measure by a deemed effective useful life. The useful life for each measure is listed in Table 4-22,Table 4-23 and Table 4-24.

Table 4-22: Effective Useful Life Non-Lighting Measures

Energy Efficiency Measures: Non-Lighting	EUL (Years)	Source
16 CU FT REFRIGERATOR	14	OH TRM
17 CU FT REFRIGERATOR	14	OH TRM
18 CU FT REFRIGERATOR	14	OH TRM
19 CU FT REFRIGERATOR	14	OH TRM
21 CU FT REFRIGERATOR	14	OH TRM
26 CU FT REFRIGERATOR	14	OH TRM
Install 14-16 cu. ft. refrigerator w/top freezer	14	OH TRM
Install 17-19 cu. ft. refrigerator w/top freezer	14	OH TRM
Install 19-22 cu. ft. refrigerator w/bottom freezer	14	OH TRM
Install 20-22 cu. ft. refrigerator w/top freezer	14	OH TRM
Install 20-23 cu. ft. side by side refrigerator	14	OH TRM
Install 24-26 cu. ft. side by side refrigerator	14	OH TRM
24 CU FT REFRIGERATOR	14	OH TRM
22 CU FT REFRIGERATOR	14	OH TRM
15 CU FT REFRIGERATOR	14	OH TRM
25 CU FT REFRIGERATOR	14	OH TRM
23 CU FT REFRIGERATOR	14	OH TRM
20 CU FT REFRIGERATOR	14	OH TRM
10 CU FT FREEZER	12	PA TRM
11 CU FT FREEZER	12	PA TRM
12 CU FT FREEZER	12	PA TRM
14 CU FT FREEZER	12	PA TRM

15 CU FT FREEZER	12	PA TRM
16 CU FT FREEZER	12	PA TRM
17 CU FT FREEZER	12	PA TRM
18 CU FT FREEZER	12	PA TRM
20 CU FT FREEZER	12	PA TRM
21 CU FT FREEZER	12	PA TRM
22 CU FT FREEZER	12	PA TRM
25 CU FT FREEZER	12	PA TRM
5 CU FT FREEZER	12	PA TRM
7 CU FT FREEZER	12	PA TRM
8 CU FT FREEZER	12	PA TRM
Install 11-15 cu. ft. chest freezer	12	PA TRM
Install 16-18 cu. ft. upright freezer	12	PA TRM
Install 16-20 cu. ft. chest freezer	12	PA TRM
Install 19-21 cu. ft. upright freezer	12	PA TRM
Install 5-10 cu. ft. chest freezer	12	PA TRM
Install 9-15 cu. ft. upright freezer	12	PA TRM
6 CU FT FREEZER	12	PA TRM
9 CU FT FREEZER	12	PA TRM
Smart Strip Power Strip - 5 outlet	4	OH TRM
Smart Strip Power Strip - 6 outlet	4	OH TRM
Smart Strip Power Strip - 7 outlet	4	OH TRM
Smart Strip Power Strip -10 outlet	4	OH TRM
Install R-38 attic insulation	25	OH TRM
Install R-19 attic insulation (difficult)	25	OH TRM
Attic Insulation – Generic	25	OH TRM
Air Sealing – Generic	15	OH TRM
Air Sealing - CFM Reduction	15	OH TRM
Install low flow showerhead	10	OH TRM
Install showerhead – handheld	10	OH TRM
Air Source Heat Pump	18	OH TRM
Retirement of additional refrigerator	8	OH TRM
Retirement of additional freezer	8	OH TRM
Install faucet aerator w/o shut- off valve	10	OH TRM
Install faucet aerator w/shut-off valve	10	OH TRM
Wall Insulation – Generic	25	OH TRM
Central AC replacement	18	OH TRM

Ductless Mini-Split	15	PA TRM
Replace dehumidifier	12	PA TRM
Hot water pipe insulation	15	OH TRM
Insulate <52 gallon water heater	5	OH TRM
Lower DHW tank temperature	4	PA TRM
Replace room/window air conditioner	12	OH TRM

Table 4-23: Effective Useful Life Lighting Measures

Energy Efficiency Measures: Lighting	EUL (Years)	Source
Install 10-12 Watt Flood LED	15	PA TRM
Install 11-13 Watt LED	15	PA TRM
Install 14-16 Watt LED	15	PA TRM
Install 3-Way LED	15	PA TRM
Install 4-6 Watt Mini-Candelabra LED	15	PA TRM
Install 5-7 Watt Candelabra LED	15	PA TRM
Install 5-7 Watt Globe LED	15	PA TRM
Install 8-10 Watt Flood LED	15	PA TRM
LED - 10 Watt Globe	15	PA TRM
LED - 13-14 Watt Flood	15	PA TRM
LED - 17 Watt Flood	15	PA TRM
LED - 2.3 Watt Globe	15	PA TRM
LED - 3.7-4.8 Watt Candelabra, 150-299 Lumens	15	PA TRM
LED - 3.7-4.8 Watt Candelabra, 300-499 Lumens	15	PA TRM
LED - 3.7-4.8 Watt Candelabra, 500-699 Lumens	15	PA TRM
LED - 6-8 Watt Standard Bulb, 310-450 Lumens	15	PA TRM
LED - 6-8 Watt Standard Bulb, 450-799 Lumens	15	PA TRM
LED - 6-8 Watt Standard Bulb, 800-1099 Lumens	15	PA TRM
LED - 9-13 Watt Standard Bulb, 1100-1599 Lumens	15	PA TRM
LED - 9-13 Watt Standard Bulb, 450-799 Lumens	15	PA TRM
LED - 9-13 Watt Standard Bulb, 800-1099 Lumens	15	PA TRM
Install 7-10 Watt LED	15	PA TRM
Install 11-13 Watt Flood LED	15	PA TRM
Install 14-16 Watt Flood LED	15	PA TRM
Install .03 nightlight	8	PA TRM
Install .5 watt nightlight	8	PA TRM

Table 4-24: Effective Useful Life New Homes

Energy Efficiency Measures	EUL (Years)	Source
Residential New Construction	25	OH TRM

4.8 Process Evaluation Methodology

ADM completed a process evaluation for the Community Connections program. No process evaluation was conducted for the Low-Income New Homes program. The process evaluation is designed to research and document the program delivery mechanisms and collective experiences of program participants, partners, and staff. ADM gathered information to assess if implementation strategies or program design could improve to better serve residential low-income customers. Table 4-24 provides a summary of the research questions and corresponding data collection activities.

Table 4-25: 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 answer these questions, ADM reviewed program documentation, administered participant surveys and completed in-depth interviews with program staff and implementation partners. ADM began the process evaluation August of 2019 with the development of data collection instruments and a review of program documentation. Data collection and analysis occurred October through December 2019.

Program Documentation Review: ADM reviewed online public program information as well as program documents provided by the Company.

Program Staff In-Depth Interviews: ADM conducted in-depth interviews with three key program staff at the Companies and OPAE. The objective of these interviews was to

investigate the 2019 program year and any changes to program design or implementation.

Agency Survey: ADM administered an online survey to participating community agencies; eleven of the nineteen agencies (58%) responded. The respondents accounted for about one-quarter of total program kWh savings and a third of total projects.[5] The survey addressed issues related to program design, operations, and opportunities for improvements.

Participant Survey: ADM contacted program participants to complete a mixed mode (online and telephone) survey of residents who received measures or services from the program. The survey was initially launched in September and October 2019 and was reopened in February 2020 to collect a sufficient sample size of responses from participants who receive certain measures.

In total, 356 customers completed the survey: 115 from the Illuminating Company, 134 from Toledo Edison, and 107 from Ohio Edison. Survey topics covered measure installation rates as well as customer experiences with the program, installation crew, and agency staff.

5. Detailed Impact Evaluation Findings

This chapter provides summarized and detailed data about energy savings and peak demand reduction that resulted from the programs during the evaluation period.

Summary results for both the Community Connections program and the Low-Income New Homes program are included in Table 5-1 and Table 5-2. Program specific results are in separate sections later in the chapter.

Table 5-1: 2019 Program Participants by Utility

Utility	Community Connections Participants	Low-Income New Homes	Total Participants
CEI	1,739	1	1,740
OE	1,494	10	1,504
TE	848	3	851
Total	**4,081**	**14**	**4,095**

Table 5-2: Impact Analysis Results

Utility	Ex-Ante Energy Savings (kWh)	Ex-Ante Peak Demand Reduction (kW)	Ex-Post Energy Savings (kWh)	Ex-Post Peak Demand Reduction (kW)	Energy Savings Realization Rate	Peak Demand Reduction Realization Rate
Community Connections						
CEI	3,957,314	571.30	3,848,650	559.33	97%	98%
OE	3,111,778	454.51	3,090,990	442.25	99%	97%
TE	1,312,878	181.05	1,288,107	177.40	98%	98%
Total	**8,381,971**	**1,206.85**	**8,227,747**	**1,178.99**	**98%**	**98%**
Low Income New Homes						
CEI	1,497	0.50	1,497	0.50	100%	100%
OE	18,551	6.95	18,551	6.95	100%	100%
TE	7,708	2.63	7,708	2.63	100%	100%
Total	**27,756**	**10.08**	**27,756**	**10.08**	**100%**	**100%**
Low Income Programs Combined						
CEI	3,958,811	571.80	3,850,147	559.83	97%	98%
OE	3,130,329	461.46	3,109,541	449.20	99%	97%
TE	1,320,586	183.68	1,295,815	180.03	98%	98%
Total	**8,409,727**	**1,216.93**	**8,255,503**	**1,189.07**	**98%**	**98%**

The total ex-post kWh savings total shown in the table reflects a 98 percent realization rate determined by the ratio of verified total kWh savings to expected gross kWh savings and a total ex-post kW peak demand reduction realization rate of 98 percent. The Low-Income New Homes program resulted in a 100 percent realization rate for both energy savings and peak demand reduction.

5.1 Community Connections Impact Evaluation Results

Table 5-3 summarizes Community Connections program ex-post savings by measure category.

Table 5-3: Total Ex-Post Energy Savings (kWh) per Measure Category

Measure category	Energy Savings (kWh)	Peak Demand Reduction (kW)	% Total Energy Savings
Refrigerator	4,970,223	764.36	60.4%
LED Lighting	2,199,029	262.96	26.7%
Freezer	825,624	127.68	10.0%
Smart strip	109,934	9.84	1.3%
Air Sealing	42,559	0.54	0.52%
Attic insulation	26,777	0.07	0.33%
Low flow showerheads	14,061	1.80	0.17%
Refrigerator and Freezer Retirement	10,482	1.67	0.13%
Heat pump	10,168	1.85	0.12%
LED nightlights	7,985	-	0.10%
Faucet aerators	3,058	0.38	0.04%
Insulation	2,081	0.02	0.03%
AC replacements	1,859	3.05	0.02%
Water pipe insulation	1,655	0.19	0.02%
Ductless mini-split heat pump	1,150	4.27	0.014%
Replace other appliances	637	0.26	0.008%
Water heater wraps	300	0.03	0.004%
Lower water heater tank temperature	166	0.01	0.002%
Total	**8,227,747**	**1,178.99**	**100%**

Table 5-4 and Table 5-5 show the quantities of energy efficient measures that were installed through the Community Connections program.

Table 5-4: Quantities of Installed Lighting Measures

Lighting Measure	CEI	OE	TE	Totals
Install 10-12 Watt Flood LED	1,490	306	122	1,918
Install 11-13 Watt Flood LED	1,526	1,513	1,666	4,705
Install 11-13 Watt LED	1,672	97	540	2,309
Install 14-16 Watt Flood LED	2,167	1,632	1,052	4,851
Install 14-16 Watt LED	751	293	174	1,218
Install 3-Way LED	165	617	431	1,213
Install 4-6 Watt Mini-Candelabra LED	379	1,032	5	1,416
Install 5-7 Watt Candelabra LED	1,895	1,079	1,382	4,356
Install 5-7 Watt Globe LED	1,047	1,170	43	2,260
Install 7-10 Watt LED	2,746	1,907	539	5,192
Install 8-10 Watt Flood LED	2,389	94	1	2,484
LED - 10 Watt Globe	10	11	-	21
LED - 13-14 Watt Flood	1	55	3	59
LED - 17 Watt Flood	-	24	-	24
LED - 2.3 Watt Globe	-	59	-	59
LED - 3.7-4.8 Watt Candelabra, 150-299 Lumens	70	120	53	243
LED - 3.7-4.8 Watt Candelabra, 300-499 Lumens	155	405	215	775
LED - 3.7-4.8 Watt Candelabra, 500-699 Lumens	15	9	67	91
LED - 6-8 Watt Standard Bulb, 310-450 Lumens	35	30	29	94
LED - 6-8 Watt Standard Bulb, 450-799 Lumens	92	54	12	158
LED - 6-8 Watt Standard Bulb, 800-1099 Lumens	9	100	-	109
LED - 9-13 Watt Standard Bulb, 1100-1599 Lumens	1,107	184	1,780	3,071
LED - 9-13 Watt Standard Bulb, 450-799 Lumens	2,736	3,529	185	6,450
LED - 9-13 Watt Standard Bulb, 800-1099 Lumens	1,960	5,701	3,432	11,093
LED Standard Bulb	116	187	91	394
Install .03 nightlight	-	36	-	36
Install .5 watt nightlight	-	312	-	312
TOTALS	**22,533**	**20,556**	**11,822**	**54,911**

Table 5-5: Quantities of Install Non-Lighting Measures

Measures	CEI	OE	TE	Totals
10 CU FT FREEZER	12	12	4	28
11 CU FT FREEZER		9	4	13
12 CU FT FREEZER		1		1
14 CU FT FREEZER	21	12		33
15 CU FT FREEZER	1	5	1	7
15 CU FT REFRIGERATOR	11	9	13	33
16 CU FT FREEZER		6	2	8
16 CU FT REFRIGERATOR	18	43	11	72
17 CU FT FREEZER	10	13	3	26
17 CU FT REFRIGERATOR		62	4	66
18 CU FT FREEZER		4	2	6
18 CU FT REFRIGERATOR	977	129	39	1,145
19 CU FT REFRIGERATOR	1	11	7	19
20 CU FT FREEZER	3	3		6
20 CU FT REFRIGERATOR	153	23	10	186
21 CU FT FREEZER		3	1	4
21 CU FT REFRIGERATOR	5	57	20	82
22 CU FT FREEZER			1	1
22 CU FT REFRIGERATOR	1	19	8	28
23 CU FT REFRIGERATOR	48	8	7	63
24 CU FT REFRIGERATOR	1	5		6
25 CU FT FREEZER			1	1
25 CU FT REFRIGERATOR		25	23	48
26 CU FT REFRIGERATOR	24	5		29
5 CU FT FREEZER	14	13		27
6 CU FT FREEZER	1			1
7 CU FT FREEZER	1	2	9	12
8 CU FT FREEZER	25	2		27
9 CU FT FREEZER	2			2
Air Sealing - CFM Reduction			2	2
Air Sealing - Generic		28	3	31
Air Source Heat Pump		10		10
Attic Insulation - Generic		26		26

Central AC replacement		1	2	3
Ductless Mini-Split		1		1
Hot water pipe insulation		71		71
Install 11-15 cu. ft. chest freezer	3	27	8	38
Install 14-16 cu. ft. refrigerator w/top freezer	84	339	39	462
Install 16-18 cu. ft. upright freezer	59	58	16	133
Install 16-20 cu. ft. chest freezer		8	1	9
Install 17-19 cu. ft. refrigerator w/top freezer	324	343	154	821
Install 19-21 cu. ft. upright freezer	10	16	3	29
Install 19-22 cu. ft. refrigerator w/bottom freezer	3	31	19	53
Install 20-22 cu. ft. refrigerator w/top freezer	169	174	54	397
Install 20-23 cu. ft. side by side refrigerator	100	87	44	231
Install 24-26 cu. ft. side by side refrigerator	97	106	29	232
Install 5-10 cu. ft. chest freezer	60	71	35	166
Install 9-15 cu. ft. upright freezer	110	36	6	152
Install faucet aerator w/o shut- off valve	8	41	3	52
Install faucet aerator w/shut-off valve	9	34	4	47
Install low flow showerhead	7	44	6	57
Install R-19 attic insulation (difficult)			1	1
Install R-38 attic insulation			1	1
Install showerhead - handheld	1	3	3	7
Insulate <52 gallon water heater		3		3
Lower DHW tank temperature		1		1
Replace dehumidifier		6		6
Replace room/window air conditioner		1		1
Retirement of additional freezer		3	1	4
Retirement of additional refrigerator	2	1	1	4
Smart Strip Power Strip - 5 outlet		2	18	20
Smart Strip Power Strip - 6 Outlet		2		2
Smart Strip Power Strip - 7 outlet	173	493	594	1,260
Smart Strip Power Strip - 10 outlet	1			1
Wall Insulation - Generic		2	1	3
Total	**2,549**	**2,550**	**1,218**	**6,317**

Table 5-6 shows the number of health and safety measures and the number of energy education consultations conducted under the Community Connections program in 2019.

Table 5-6: Quantities of Installed Education and Health & Safety Measures

Measures	CEI	OE	TE	Total
Supplemental Electric Conservation Client Ed	1,264	1,066	549	2,879
Install Carbon Monoxide detector	166	387	233	786
Replace Electric Range	0	24	2	26
Replace electric water heater	0	8	5	13
Electrical				
Baseload/electric water heat audit	418	187	489	1,094
Electric Specification (250.00 maximum)	57	1	0	58
Install 20 amp 240 volt a/c outlet	110	0	0	110
Install 20 amp duplex outlet	26	0	0	26
Install 30 amp, 240 volt dryer outlet	7	0	0	7
Install 50 amp, 240 volt range outlet	2	0	0	2
Install circuit with switch for ceiling fan	3	0	1	4
Install new wall switch 15 amp (single pole)	0	8	2	10
Install switch or outlet on 2nd floor (additional fee)	2	0	0	2
Replace 15 amp duplex outlet	3	0	0	3
Replace wall switch (single pole)	2	0	0	2
Replace/install 20 amp GFI outlet	91	0	0	91
Upgrade service entrance 100-200 amp	0	1	0	1
Upgrade service entrance 60 to 100 amp	55	2	0	57
Misc Time/Mat for elec wk approval not req	58	0	11	69
Misc Time/Mat for elec wk W/APPROVAL	1	0		1
Shell repairs				
Misc Time/Mat for roof wk w/approval	0	1	0	1
Misc time/material for roof work- approval not req	0	1	0	1
Install 12X18 gable vent	0	4	2	6
Install 8' or 9' roof vent	0	13	0	13
Install auto close foundation vent	0	4	0	4
Install continuous run vent fan w/o light	0	21	4	25
Install continuous run vent fan with light	0	11	0	11
Remove old shingles and install new shingles	0	3,250	0	3,250
Roof specifications (max. 250.)	0	2	0	2
Seal ducts with tape, mastic	0	1	0	1
Sheeting replacement>48 s.f.	0	93	0	93

Table 5-7 and Table 5-8 include ex-post energy savings and realization rates calculated for installed measures during program year 2019.

Table 5-7: Annual Energy Savings (kWh) by Measure: Non-Lighting

Measure	Ex-Ante Energy Savings (kWh)	Ex-Post Energy Savings (kWh)	Realization Rate
15 CU FT REFRIGERATOR	41,283	41,283	100%
16 CU FT REFRIGERATOR	90,072	90,072	100%
17 CU FT REFRIGERATOR	82,566	82,566	100%
18 CU FT REFRIGERATOR	1,432,395	1,432,395	100%
19 CU FT REFRIGERATOR	23,769	23,769	100%
20 CU FT REFRIGERATOR	232,686	232,686	100%
21 CU FT REFRIGERATOR	102,582	102,582	100%
22 CU FT REFRIGERATOR	35,028	35,028	100%
23 CU FT REFRIGERATOR	78,813	78,813	100%
24 CU FT REFRIGERATOR	7,506	7,506	100%
25 CU FT REFRIGERATOR	60,048	60,048	100%
26 CU FT REFRIGERATOR	36,279	36,279	100%
Install 14-16 cu. ft. refrigerator w/top freezer	577,962	577,962	100%
Install 17-19 cu. ft. refrigerator w/top freezer	1,027,071	1,027,071	100%
Install 19-22 cu. ft. refrigerator w/bottom freezer	66,303	66,303	100%
Install 20-22 cu. ft. refrigerator w/top freezer	496,647	496,647	100%
Install 20-23 cu. ft. side by side refrigerator	288,981	288,981	100%
Install 24-26 cu. ft. side by side refrigerator	290,232	290,232	100%
Retirement of additional refrigerator	5,504	5,505	100%
10 CU FT FREEZER	31,668	31,668	100%
11 CU FT FREEZER	14,703	14,703	100%
12 CU FT FREEZER	1,131	1,131	100%
14 CU FT FREEZER	37,323	37,323	100%
15 CU FT FREEZER	7,917	7,917	100%
16 CU FT FREEZER	9,048	9,048	100%
17 CU FT FREEZER	29,406	29,406	100%
18 CU FT FREEZER	6,786	6,786	100%
20 CU FT FREEZER	6,786	6,786	100%
21 CU FT FREEZER	4,524	4,524	100%
22 CU FT FREEZER	1,131	1,131	100%
25 CU FT FREEZER	1,131	1,131	100%
5 CU FT FREEZER	30,537	30,537	100%
6 CU FT FREEZER	1,131	1,131	100%
7 CU FT FREEZER	13,572	13,572	100%

8 CU FT FREEZER	30,537	30,537	100%
9 CU FT FREEZER	2,262	2,262	100%
Install 11-15 cu. ft. chest freezer	42,978	42,978	100%
Install 16-18 cu. ft. upright freezer	150,422	150,422	100%
Install 16-20 cu. ft. chest freezer	10,179	10,179	100%
Install 19-21 cu. ft. upright freezer	32,799	32,799	100%
Install 5-10 cu. ft. chest freezer	187,745	187,745	100%
Install 9-15 cu. ft. upright freezer	171,911	171,911	100%
Retirement of additional freezer	4,976	4,978	100%
Smart Strip Power Strip - 5 outlet	1,130	949	84%
Smart Strip Power Strip - 6 Outlet	206	95	46%
Smart Strip Power Strip - 7 outlet	129,528	108,804	84%
Smart Strip Power Strip - 10 outlet	103	86	84%
Air Sealing - CFM Reduction	9,633	9,538	99%
Air Sealing - Generic	27,199	33,021	121%
Attic Insulation - Generic	30,800	19,583	64%
Install R-19 attic insulation (difficult)	4	-	0%
Install R-38 attic insulation	7,267	7,194	99%
Install low flow showerhead	12,523	12,523	100%
Install showerhead - handheld	1,538	1,538	100%
Air Source Heat Pump	10,168	10,168	100%
Install faucet aerator w/o shut- off valve	1,606	1,606	100%
Install faucet aerator w/shut-off valve	1,452	1,452	100%
Wall Insulation - Generic	2,527	2,081	82%
Central AC replacement	1,859	1,859	100%
Hot water pipe insulation	630	1,655	263%
Ductless Mini-Split	1,150	1,150	100%
Replace dehumidifier	909	582	64%
Insulate <52 gallon water heater	237	300	126%
Lower DHW tank temp	166	166	100%
Replace room/window air conditioner	87	55	63%
Replace electric water heater	3,377	-	0%
Grand Total	**6,050,424**	**6,020,733**	**100%**

Table 5-8: Annual Energy Savings (kWh) by Measure: Lighting

Measure	Ex-Ante Energy Savings (kWh)	Ex-Post Energy Savings (kWh)	Realization Rate
LED Standard Bulb	17,643	16,616	94%
Install 10-12 Watt Flood LED	136,488	94,671	69%
Install 11-13 Watt Flood LED	212,634	245,588	115%
Install 11-13 Watt LED	104,351	92,962	89%
Install 14-16 Watt Flood LED	312,739	242,703	78%
Install 14-16 Watt LED	78,523	63,962	81%
Install 3-Way LED	68,014	96,736	142%
Install 4-6 Watt Mini-Candelabra LED	53,251	68,492	129%
Install 5-7 Watt Candelabra LED	224,208	209,365	93%
Install 5-7 Watt Globe LED	111,885	103,952	93%
Install 7-10 Watt LED	200,365	177,249	88%
Install 8-10 Watt Flood LED	147,892	125,924	85%
LED - 10 Watt Globe	1,076	1,288	120%
LED - 13-14 Watt Flood	3,114	3,005	97%
LED - 17 Watt Flood	1,180	1,141	97%
LED - 2.3 Watt Globe	1,372	741	54%
LED - 3.7-4.8 Watt Candelabra, 150-299 Lumens	5,167	4,987	97%
LED - 3.7-4.8 Watt Candelabra, 300-499 Lumens	19,655	19,153	97%
LED - 3.7-4.8 Watt Candelabra, 500-699 Lumens	3,613	3,465	96%
LED - 6-8 Watt Standard Bulb, 310-450 Lumens	1,734	1,673	97%
LED - 6-8 Watt Standard Bulb, 450-799 Lumens	3,291	3,321	101%
LED - 6-8 Watt Standard Bulb, 800-1099 Lumens	4,464	4,278	96%
LED - 9-13 Watt Standard Bulb, 1100-1599 Lumens	132,171	123,883	94%
LED - 9-13 Watt Standard Bulb, 450-799 Lumens	118,970	124,387	105%
LED - 9-13 Watt Standard Bulb, 800-1099 Lumens	363,753	369,488	102%
Install .03 nightlight	440	879	200%
Install .5 watt nightlight	3,553	7,106	200%
Total	**2,331,547**	**2,207,014**	**95%**

Table 5-9 and Table 5-10 include ex-post peak demand kW reductions and realization rates calculated for installed measures during program year 2019.

Table 5-9: Peak Demand Reductions (kW) by Measure: Non-Lighting

Measure	Ex-Ante Peak Demand Reduction (kW)	Ex-Post Peak Demand Reduction (kW)	Realization Rate
15 CU FT REFRIGERATOR	6.35	6.35	100%
16 CU FT REFRIGERATOR	13.85	13.85	100%
17 CU FT REFRIGERATOR	12.70	12.70	100%
18 CU FT REFRIGERATOR	220.29	220.29	100%
19 CU FT REFRIGERATOR	3.66	3.66	100%
20 CU FT REFRIGERATOR	35.78	35.78	100%
21 CU FT REFRIGERATOR	15.78	15.78	100%
22 CU FT REFRIGERATOR	5.39	5.39	100%
23 CU FT REFRIGERATOR	12.12	12.12	100%
24 CU FT REFRIGERATOR	1.15	1.15	100%
25 CU FT REFRIGERATOR	9.23	9.23	100%
26 CU FT REFRIGERATOR	5.58	5.58	100%
Install 14-16 cu. ft. refrigerator w/top freezer	88.88	88.88	100%
Install 17-19 cu. ft. refrigerator w/top freezer	157.95	157.95	100%
Install 19-22 cu. ft. refrigerator w/bottom freezer	10.20	10.20	100%
Install 20-22 cu. ft. refrigerator w/top freezer	76.38	76.38	100%
Install 20-23 cu. ft. side by side refrigerator	44.44	44.44	100%
Install 24-26 cu. ft. side by side refrigerator	44.63	44.63	100%
Retirement of additional refrigerator	0.88	0.88	100%
10 CU FT FREEZER	4.90	4.90	100%
11 CU FT FREEZER	2.27	2.27	100%
12 CU FT FREEZER	0.17	0.17	100%
14 CU FT FREEZER	5.77	5.77	100%
15 CU FT FREEZER	1.22	1.22	100%
16 CU FT FREEZER	1.40	1.40	100%
17 CU FT FREEZER	4.55	4.55	100%
18 CU FT FREEZER	1.05	1.05	100%
20 CU FT FREEZER	1.05	1.05	100%
21 CU FT FREEZER	0.70	0.70	100%
22 CU FT FREEZER	0.17	0.17	100%
25 CU FT FREEZER	0.17	0.17	100%
5 CU FT FREEZER	4.72	4.72	100%
6 CU FT FREEZER	0.17	0.17	100%

7 CU FT FREEZER	2.10	2.10	100%
8 CU FT FREEZER	4.72	4.72	100%
9 CU FT FREEZER	0.35	0.35	100%
Install 11-15 cu. ft. chest freezer	6.65	6.65	100%
Install 16-18 cu. ft. upright freezer	23.26	23.26	100%
Install 16-20 cu. ft. chest freezer	1.57	1.57	100%
Install 19-21 cu. ft. upright freezer	5.07	5.07	100%
Install 5-10 cu. ft. chest freezer	29.03	29.03	100%
Install 9-15 cu. ft. upright freezer	26.58	26.58	100%
Retirement of additional freezer	0.79	0.79	100%
Smart Strip Power Strip - 5 outlet	0.13	0.08	67%
Smart Strip Power Strip - 6 Outlet	0.02	0.01	37%
Smart Strip Power Strip - 7 outlet	14.54	9.73	67%
Smart Strip Power Strip - 10 outlet	0.01	0.01	67%
Air Sealing - CFM Reduction	0.01	0.01	130%
Air Sealing - Generic	0.38	0.54	141%
Attic Insulation - Generic	0.15	0.07	45%
Install R-19 attic insulation (difficult)	0.00	0.00	0%
Install R-38 attic insulation	0.00	0.00	0%
Install low flow showerhead	1.60	1.60	100%
Install showerhead - handheld	0.20	0.20	100%
Air Source Heat Pump	10.04	1.85	18%
Install faucet aerator w/o shut- off valve	0.20	0.20	100%
Install faucet aerator w/shut-off valve	0.18	0.18	100%
Wall Insulation - Generic	0.03	0.02	48%
Central AC replacement	3.05	3.05	100%
Hot water pipe insulation	0.07	0.19	263%
Ductless Mini-Split	4.27	4.27	100%
Replace dehumidifier	2.06	0.14	7%
Insulate <52 gallon water heater	0.03	0.03	127%
Lower DHW tank temp	0.01	0.01	100%
Replace room/window air conditioner	0.11	0.12	106%
Replace electric water heater	0.46	0.00	0%
Grand Total	**931.27**	**916.03**	**98%**

Table 5-10: Peak Demand Reductions (kW) by Measure: Lighting

Measure	Ex-Ante Peak Demand Reduction (kW)	Ex-Post Peak Demand Reduction (kW)	Realization Rate
LED Standard Bulb	2.11	1.99	94%
Install 10-12 Watt Flood LED	13.96	11.32	81%
Install 11-13 Watt Flood LED	25.43	29.37	115%
Install 11-13 Watt LED	12.48	11.12	89%
Install 14-16 Watt Flood LED	37.41	29.02	78%
Install 14-16 Watt LED	9.39	7.65	81%
Install 3-Way LED	8.14	11.57	142%
Install 4-6 Watt Mini-Candelabra LED	6.37	8.19	129%
Install 5-7 Watt Candelabra LED	26.83	25.04	93%
Install 5-7 Watt Globe LED	13.38	12.43	93%
Install 7-10 Watt LED	23.97	21.20	88%
Install 8-10 Watt Flood LED	17.69	15.06	85%
LED - 10 Watt Globe	0.13	0.15	120%
LED - 13-14 Watt Flood	0.37	0.36	97%
LED - 17 Watt Flood	0.14	0.14	97%
LED - 2.3 Watt Globe	0.16	0.09	54%
LED - 3.7-4.8 Watt Candelabra, 150-299 Lumens	0.62	0.60	97%
LED - 3.7-4.8 Watt Candelabra, 300-499 Lumens	2.35	2.29	98%
LED - 3.7-4.8 Watt Candelabra, 500-699 Lumens	0.43	0.41	96%
LED - 6-8 Watt Standard Bulb, 310-450 Lumens	0.21	0.20	97%
LED - 6-8 Watt Standard Bulb, 450-799 Lumens	0.39	0.40	101%
LED - 6-8 Watt Standard Bulb, 800-1099 Lumens	0.53	0.51	96%
LED - 9-13 Watt Standard Bulb, 1100-1599 Lumens	15.66	14.81	95%
LED - 9-13 Watt Standard Bulb, 450-799 Lumens	14.19	14.87	105%
LED - 9-13 Watt Standard Bulb, 800-1099 Lumens	43.26	44.18	102%
Install .03 nightlight	0	0	0%
Install .5 watt nightlight	0	0	0%
Total	**275.59**	**254.67**	**92%**

5.2 Low-income New Homes Program Impact Evaluation Results

Table 5-11 includes energy savings and peak demand reduction for each home included in the Low-Income New Homes program. The ex-ante and ex-post savings values were developed using the same methodology and resulted in a realization rate of 100 percent.

Table 5-11: Energy Savings (kWh) and Peak Demand Reduction (kW): Low-income New Homes Program

Home Project	Ex-Ante Energy Savings (kWh)	Ex-Ante Peak Demand Reduction (kW)	Ex-Ante Energy Savings (kWh)	Ex-Post Peak Demand Reduction (kW)	Energy Savings Realization Rate	Peak Demand Reduction Realization Rate
Home 1	1,470	0.68	1,470	0.68	100%	100%
Home 2	780	0.49	780	0.49	100%	100%
Home 3	1,893	0.31	1,893	0.31	100%	100%
Home 4	1,816	0.65	1,816	0.65	100%	100%
Home 5	1,064	0.25	1,064	0.25	100%	100%
Home 6	5,174	1.70	5,174	1.70	100%	100%
Home 7	1,497	0.50	1,497	0.50	100%	100%
Home 8	1,064	0.25	1,064	0.25	100%	100%
Home 9	4,078	0.84	4,078	0.84	100%	100%
Home 10	2,042	1.02	2,042	1.02	100%	100%
Home 11	2,042	1.02	2,042	1.02	100%	100%
Home 12	1,969	0.54	1,969	0.54	100%	100%
Home 13	1,763	1.34	1,763	1.34	100%	100%
Home 14	1,104	0.49	1,104	0.49	100%	100%
Total	**27,756**	**10.08**	**27,756**	**10.08**	100%	100%

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 Staff interviews

The following section provides an overview of the Community Connections Program's operations constructed through in-depth discussions with the Companies and OPAE program staff and a survey of eleven participating community agencies. The program staff interviews, and program agency survey covered topics including staff roles and responsibilities, 2019 program operations and changes, satisfaction, and suggestions for improving program delivery.

6.1.1 Staff Roles and Responsibilities

ADM conducted in-depth interviews with the Companies' Community Connections program manager (the "program manager") and Ohio Partners for Affordable Energy's (OPAE) assistant program director during September of 2019. The program manager is responsible for overall program management and coordinates with OPAE staff to successfully implement the program. Their duties include, but are not limited to, reviewing procedures, investigating energy saving opportunities, and forecasting budgets.

OPAE's assistant program director oversees the day-to-day activities of the Community Connections Program. They are the main contact person for the Companies and nonprofit community agencies that are contracted to implement the program. They also are responsible for on-site visits with nonprofit agencies that participate in the program in northern Ohio. Another OPAE staff member is responsible for managing relationships with nonprofit agencies in the southern part of the state.

6.1.2 2019 Program Performance and Operations

Both the program manager and OPAE's assistant program director reported that the program was being implemented successfully. Though there were no major changes to the Community Connections program in 2019, the program manager reported the following implementation changes and improvements:

- Adding a tier two smart power strip and a water saving showerhead with a handheld arm and shut-off option in October 2019.
- Increased maximum SEER level for central air conditioners eligible for replacement, from 9 to 12 SEER, to increase replacement opportunities.

- Adding programmable and smart thermostats to the program this year (although no agencies had installed these measures through the program at the time of the interview).

The most significant change to the program this year was the implementation of a new tracking system for program data (the LEEN system). The new system, launched in April of 2019, replaced the previously used Community Connections tracking system. Both the program manager and the OPAE assistant program director agreed that the LEEN system provides many more options and the capacity to create more reports than the previous system. The program manager described the new system as a more holistic, all-around tool that is simple and easy to use to more easily access program information and create reports. The program manager noted that there have been numerous improvements to the system since it was launched (e.g. requiring data validation for information inputted by agencies).

The program manager also reported that nonprofit agencies appreciated the new system because they can use it to both input data and create work orders, whereas they were able only to input data in the previous system and had to invoice separately.

The assistant program director reported that OPAE attended various trainings before the LEEN system's launch so that they could assist nonprofit agencies with the new system and that there were several training sessions for nonprofit agencies to ensure they would be comfortable with the new system.

Both the program manager and OPAE assistant program director reported some early challenges with the new system. The assistant program director said that the nonprofits bring their questions and concerns about the new system to them, but when the assistant program director is unable to assist the agencies, they communicate with the Companies' program manager. The primary issue the implementation agencies have with the system is difficulty logging in because of forgotten passwords and difficulties logging with the system's two-step verification process. The OPAE assistant program director must contact the Companies' program manager to address this issue as the system requires the Companies to reset passwords.

The assistant director reported that agency staff have grown more comfortable with the system since its launch, although some individuals still have some challenges.

6.1.3 Program Communication and Quality Control

Both interviewees related that there is strong communication between OPAE and the Companies as well as with nonprofit agencies. OPAE's assistant program director reported that they are in constant communication with both the Companies and the individual agencies, having separate dedicated conference calls with the Companies and the agencies at least once a month.

OPAE's assistant program director said OPAE has continued to conduct on-site visits with nonprofit agencies this year. Those visits began in 2017 for the purposes of general oversight and relationship building. They had visited five agencies this year and that they and their colleague at OPAE had been in frequent contact with all the agencies to assist with program implementation, including with the new tracking system (as noted above). Both the program manager and the OPAE assistant program director reported that these visits were useful and strengthened the program.

The program manager said that meeting and having open and frequent communication with nonprofit agencies – the people who deliver program's services in customers' homes – was a strength of the program, supporting its effective administration and making the program better. For example, through active communication with agencies, program staff learned that agency staff had challenges using the required audit form. OPAE and the Companies worked to create an electronic PDF that could be filled out more easily.

Another improvement that came from strong program communication related to improved installation and implementation of program measures. Agency staff reported concerns that smart power strips might cause fires in customer homes. OPAE and the Companies were able to reduce those concerns by pointing out that fires were specifically related to a certain manufacturer's smart power strip and not those the program was implementing. By communicating effectively with the agencies, the Companies and OPAE were able to ensure that the agencies are implementing the measure.

Both interviewees attended the annual Weatherize Ohio conference in October 2019, which was another excellent opportunity for communication with the agencies regarding the program.

6.1.4 Program Outreach

OPAE's assistant director reported that, although OPAE conducts some marketing, customers learn about the program primarily through the agencies. Specifically, the Companies develop brochures and marketing material that program auditors distribute during their audits. The agencies are usually involved in several programs to assist low-income Ohioans and are best able to connect customers to the Community Connections program when it is appropriate.

6.1.5 Program Strengths and Challenges

The project manager and OPAE assistant program director commented on program strengths and challenges. The program manager said that the program's primary strength is its mission to help limited income customers to reduce their electric bills, but both respondents agreed that the communication among the agencies, OPAE, and the Companies is a key program strength.

OPAE's assistant program director indicated that difficulty hiring people to administer the program at the agencies is a challenge. They said the agencies are not able to compete with big box retail stores and other similar employers for employees. They said that competitive wages, drug tests, and having a driver's license are three barriers that agencies face to hiring employees.

The program manager noted that, because of their limited time with the program, they were unable to provide insightful reflection regarding program challenges or areas for improvement, either in program design or in OPAE's implementation. They reiterated, however, that the program was exceeding goals and the budgets are being met and that she was satisfied with OPAE as the program administrator.

6.1.6 Program Future

Both interviewees reported that they did not foresee the design or implementation of the program changing in 2020, though both said they foresaw certain challenges depending on market and external factors.

6.2 Agency Survey

ADM administered an online survey to participating community agencies in October and November 2019. The survey was designed to investigate agencies' experiences and overall satisfaction with the Community Connections Program. This section presents findings from the survey and relates respondents' sentiments regarding the program.

6.2.1 Respondent's Roles

In total, nineteen staff members for eleven agencies responded to the online survey. More than half of the respondents were either program coordinators or program managers. Other respondents reported roles including Energy Support Specialist and billing staff. Table 6-1 provides a summary of the respondents' roles.

Table 6-1: Respondents' Roles

	Response	n = 19
What is your role with regards to the Community Connections Program?	Program Coordinator	6
	Program Manager	5
	Director	4
	Other	3
	Technician	1

6.2.2 Program Administration

In 2019, the program added mini split systems to the list of eligible measures. Ten respondents were not sure whether that addition had been useful. Of the other nine, six reported that the addition of mini split systems to the program had been useful, while three said this addition was not useful because there was no demand or use for this measure in the areas they serve through the Community Connections program.

The program also added smart thermostats in 2019. Those respondents who had an opinion were roughly split between those who said that smart thermostats were a useful addition (eight respondents) and those who said they were not a useful addition (seven respondents). Respondents who said smart thermostats were not a useful addition mentioned customer aversion or confusion with the measure and concerns about possible future customer complaints. Four respondents were unsure whether smart thermostats were a useful addition.

Fourteen of the nineteen respondents did not have any suggestions to add additional energy-saving technologies to the program. Three respondents provided recommendations for additional energy-saving technologies, including weather-stripping for all exterior doors[6] and adding ENERGYSTAR washers, dryers, and dishwashers as program-eligible measures[7]. One respondent noted that providing energy usage charts to the program to inform customers of their appliances' energy consumption would strengthen the program and help customers to be better informed.

6.2.3 Use of Seasonal Allowance Worksheet

Seventeen respondents reported using the Seasonal Allowance Worksheet. One respondent stated that it would be helpful if the customers' address was listed on the form, while another mentioned highlighting the worksheet's most important content to improve the system's clarity and user experience.

6.2.4 Program Marketing and Outreach

The methods that agencies reported using to market and conduct outreach for the Community Connections Program remained consistent in 2019. Fifteen of the agency staff that responded to the survey reported that their organization marketed the program to residents. Agency staff reported that they marketed the program on their websites, at community events, through brochures, fliers, and in their newsletters. Respondents also noted that their clients are informed of the program at their offices with posters or through word-of-mouth and direct phone call outreach.

[6] Weather-stripping was included in the program in 2019. Recommendations for the inclusion of this improvement in the program may indicate a lack of understanding regarding eligible measures among some agency staff.

[7] ADM and the Companies have investigated the inclusion of these measures in the program but found that they would not be cost-effective.

Ten respondents made recommendations to help the program improve marketing and outreach. Suggestions from respondents included adding bill inserts with program information, using posters to promote the program, allocating supplemental funding to promote the program and including eligibility information.

6.2.5 Participation Barriers

Respondents observed several barriers to program participation. Four agency staff members noted that renters were a challenging demographic to enroll in the program because they require working with landlords. Two respondents noted that older adults were a challenging demographic to enroll in the program because they were independently minded, skeptical of the service, or hesitant to allow workers into their homes. To address these challenges, agency staff noted that they ensure that they explain the program thoroughly and contact landlords directly. Two respondents noted that incorrect client contact information was a challenge. These two respondents stated that they overcome communication issues by using post cards. One respondent noted that rural outreach was a challenge; they stated that they work in person one day a week in rural communities to share information about the program.

6.2.6 Program Training and Program Staff Support

Agency staffs' responses to the survey indicated that overall training was sufficient and there was a broad understanding of the program processes and procedures. Seventeen of the nineteen survey respondents noted that their organization felt comfortable with the documentation requirements for all measure types and that they did not have any issues with interpreting the program guidelines or understanding program qualified measures. All survey respondents reported that their agencies' staff were well trained with testing and installing program qualifying appliances. Eighteen respondents stated that their agencies' staff was well-trained in the steps required to participate in the program.

Eighteen of the survey respondents noted that they had direct communication with the program implementation contractor (OPAE) in 2019. On a scale from 1 (not at all knowledgeable) to 5 (very knowledgeable), all these respondents rated OPAE staffs' level of knowledgeability as either a 4 (four respondents) or 5 (fourteen respondents). Similarly, respondents reported they were satisfied with OPAE staff and rated the length of time and thoroughness of OPAE's responses positively.

Twelve respondents noted that they had direct communication with Company staff in 2019. Of those respondents, the majority related satisfaction and positive sentiments regarding their knowledge, responsiveness, and thoroughness. Survey results regarding agency staff interactions with OPAE and the Companies staff are displayed in Figure 6-1: Satisfaction with Interactions with OPAE staff and Figure 6-2: Satisfaction with Interactions with the Companies' staff.

Figure 6-1: Satisfaction with Interactions with OPAE staff

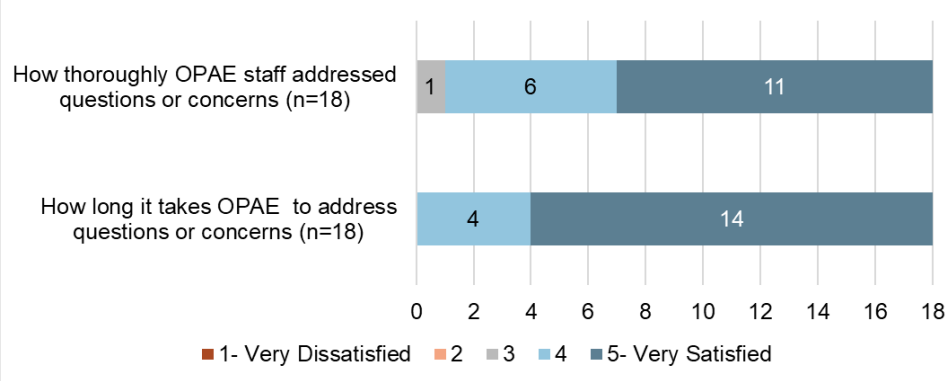
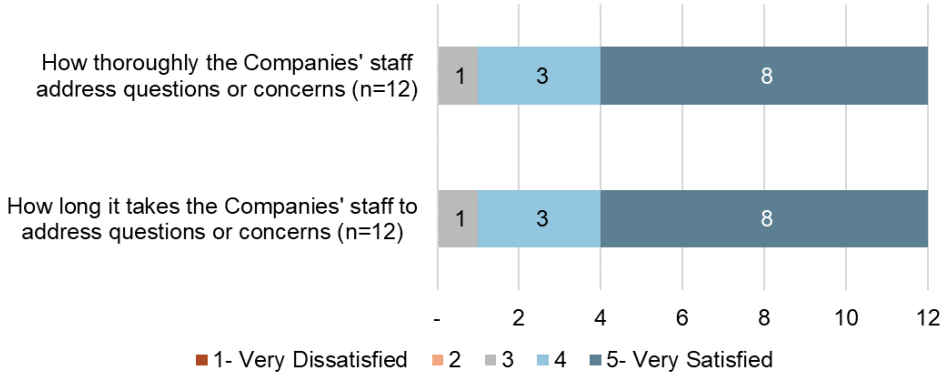


Figure 6-2: Satisfaction with Interactions with the Companies' staff



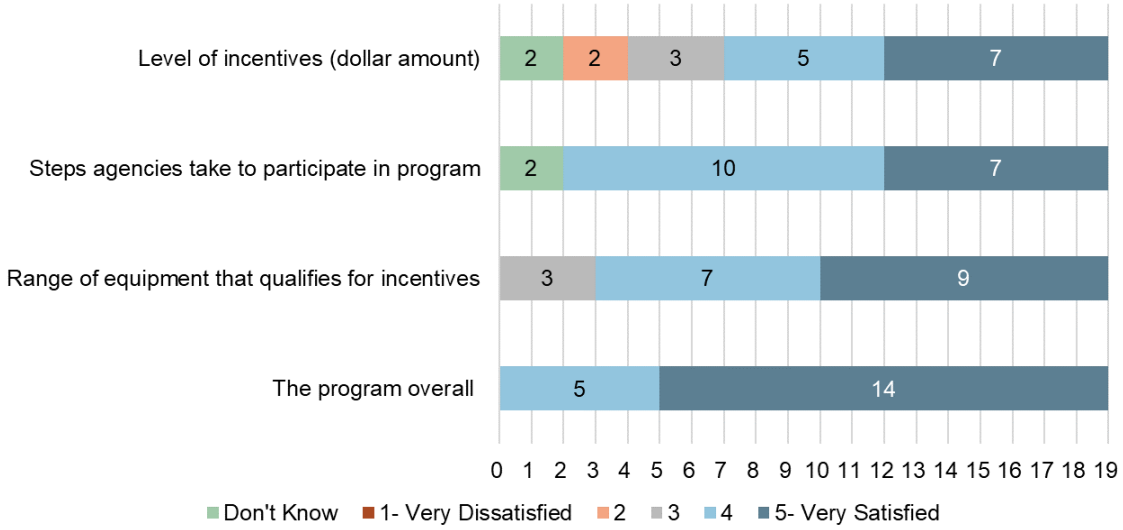
Respondents for seven of the eleven agencies indicated that they had an in-person visit from program staff this year. Agencies that reported having a site visit in 2019 observed that OPAE staff visited with them, attended customer's homes, and were helpful and informative with program information and guidance. Fifteen of the nineteen respondents observed that it was valuable to speak with program staff in person.

Each year OPAE holds a conference ("Weatherize Ohio") that brings together various stakeholders responsible for administering and implementing energy efficiency programs to low-income residents in Ohio. Thirteen of the nineteen respondents to this year's survey indicated they attended the conference. Additionally, four of the nineteen respondents indicated that they attended a program webinar this year. Several respondents offered a suggestion to improve the conference or program training including, additional training for new staff, implementing mini or virtual trainings and summaries of classes before the conference begins.

Agency staff rated their level of satisfaction with various aspects of the Community Connections Program. Their responses are displayed in Figure 6-3: 2019 Program

Satisfaction. Feedback reflects relatively high levels of satisfaction with the program overall. The only aspect of the program any agency respondents indicated dissatisfaction with in 2019 was the total level of incentives.

Figure 6-3: 2019 Program Satisfaction



6.3 Participant Survey Results

This section summarizes feedback received from a sample of Community Connections Program participants. ADM conducted a mixed mode (online and telephone) survey to collect data on program awareness, satisfaction, program experience, and installed equipment in September and October 2019. The results reported here reflect the data collected in that survey.

6.3.1 Program Awareness

The most often cited methods that participants learned about the program were through a community agency or through word of mouth. Table 6-2: How did respondents learn about the program? Table 6-2 summarizes the various sources of program awareness identified by survey respondents.

Table 6-2: How did respondents learn about the program?

Source	CEI (*n* = 71)		OE (*n* = 74)		TE (*n* = 72)		Total (*n* = 217)	
	n	%	n	%	n	%	N	%
Community agency	24	34%	38	51%	23	32%	85	39%
Word-of-Mouth	17	24%	20	27%	21	29%	58	27%
Brochure or Bill Insert	17	24%	7	9%	13	18%	37	17%
Internet	7	10%	2	3%	8	11%	17	8%
Property owner/landlord	4	6%	4	5%	4	6%	12	6%
Other	0	0%	3	4%	2	3%	5	2%
Contractor	2	3%	0	0%	1	1%	3	1%

6.3.2 Measures Installed

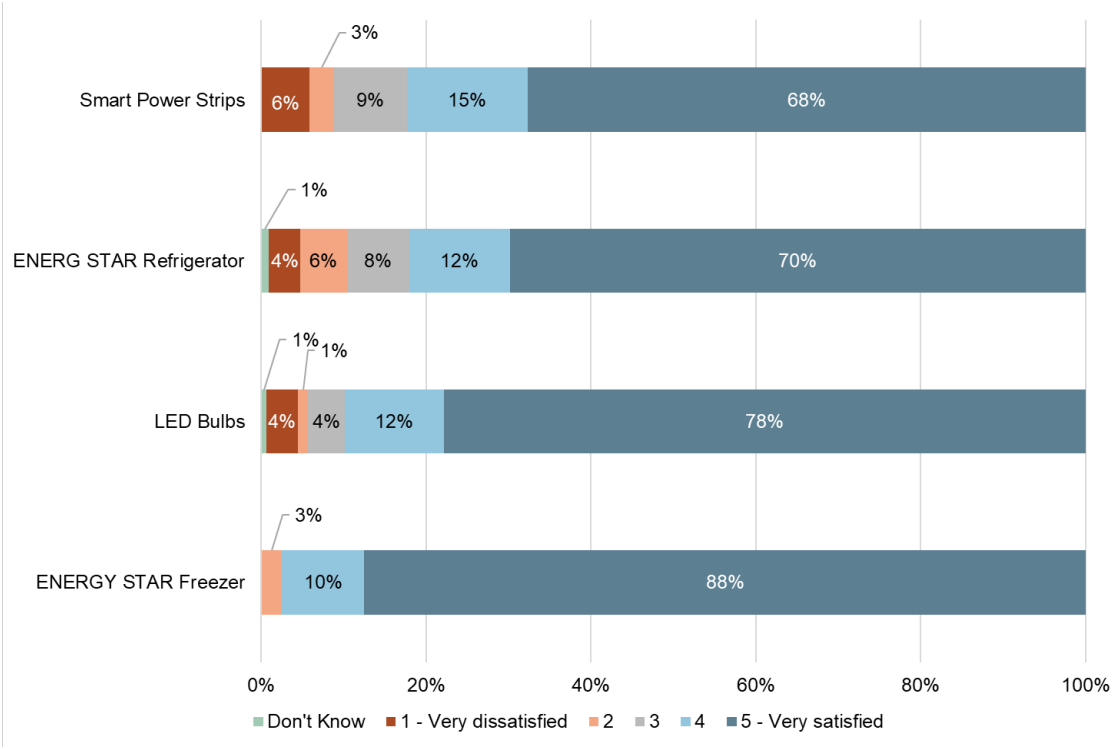
The survey asked respondents about measures installed in their homes. Most survey respondents reported receiving LED light bulbs (72%). A substantial portion of respondents confirmed that they received ENERGY STAR refrigerators (48%), ENERGY STAR freezers (19%), or smart power strips (16%). Other measures that survey respondents confirmed receiving included faucet aerators, LED nightlights, attic insulation, smart power strips, piping insulation, air sealing / duct sealing, energy saving showerheads and a heat pump. Table 6-3 displays a summary of the measures that survey respondents reported receiving.

Table 6-3: What measures did survey respondents receive?

Measure	CEI (*n* = 71)		OE (*n* = 74)		TE (*n* = 72)		Total (*n* = 218)	
	N	%	n	%	n	%	N	%
LED bulbs	47	65%	61	82%	50	69%	158	72%
ENERGY STAR Freezer	43	60%	41	55%	21	29%	105	48%
ENERGY STAR Refrigerator	16	22%	13	18%	12	17%	41	19%
Smart power strips	5	7%	7	9%	22	31%	34	16%
Faucet aerators	0	0%	9	12%	0	0%	9	4%
Water heater pipe insulation	0	0%	5	7%	0	0%	5	2%
Air Sealing	0	0%	2	3%	1	1%	3	1%
Low-flow showerhead	0	0%	2	3%	1	1%	3	1%
Attic Insulation	0	0%	2	3%	0	0%	2	1%
LED Night Lights	0	0%	1	1%	0	0%	1	1%
Air Source Heat Pump	0	0%	1	1%	0	0%	1	1%

ADM asked respondents to rate their satisfaction with the measures they received through the program on a scale from 1 (very dissatisfied) to 5 (very satisfied). Almost all respondents (98%) rated their satisfaction with their ENERGY STAR freezer a 4 (10%) or 5 (88%). Similarly, nearly all respondents (89%) rated their satisfaction with the LED bulbs they received through the program a 4 (12%) or 5 (78%). Figure 6-4 displays survey respondents' level of satisfaction with LED light bulbs, ENERGY STAR freezers, ENERGY STAR refrigerators, and smart power strips.

Figure 6-4: Satisfaction with Energy Savings Measures



6.3.3 Audit Experience

Most survey respondents reported that they had a positive audit experience. Ninety-two percent of respondents rated their satisfaction with scheduling their audit a 4 (16%) or 5 (76%). Nearly all respondents stated that their visit was scheduled at a convenient time (96% of respondents) and that the home energy auditor or inspector arrived at their home on time or at least within 15 minutes of the scheduled appointment (97% of respondents).

Despite overall satisfaction with promptness and scheduling their audit, a few customers voiced dissatisfaction with their overall audit or appliance drop-off experience (3%).

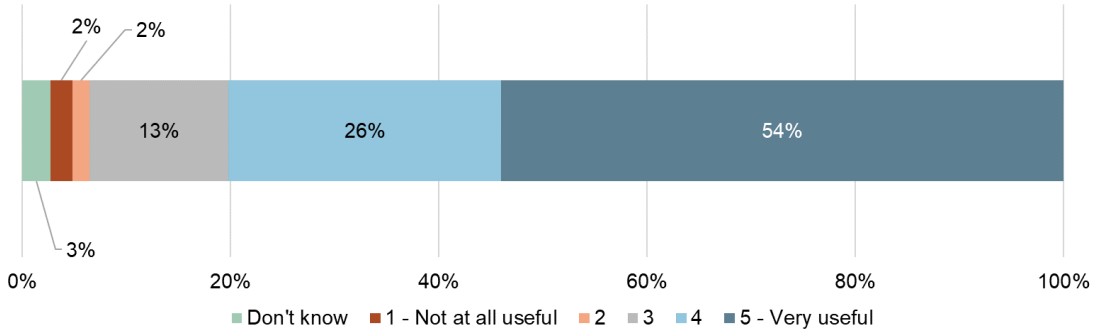
Eighty-nine percent of respondents remembered the home energy auditor testing, metering, or evaluating appliances in their household to see how much energy they used. Of these respondents, most recalled them testing their refrigerator (94%) and a significant portion also recalled the auditor testing their freezer (52%), water heater (20%), and electric heat pump or furnace (18%).

Eighty-six percent of respondents indicated the auditor spoke with them about ways to save energy in their home or left educational materials about how to save energy. Eighty percent of respondents indicated that they thought they knew more about saving energy after the auditor's visit.

Eighty percent of respondents rated the information's usefulness a 4 (26%) or a 5 (54%) on a scale from 1 (not at all useful) to 5 (very useful). Figure 6-5 displays respondents'

rating of the usefulness of the information provided by the auditor. Figure 6-5 displays the results.

Figure 6-5: Usefulness of Energy Savings Tips and Information



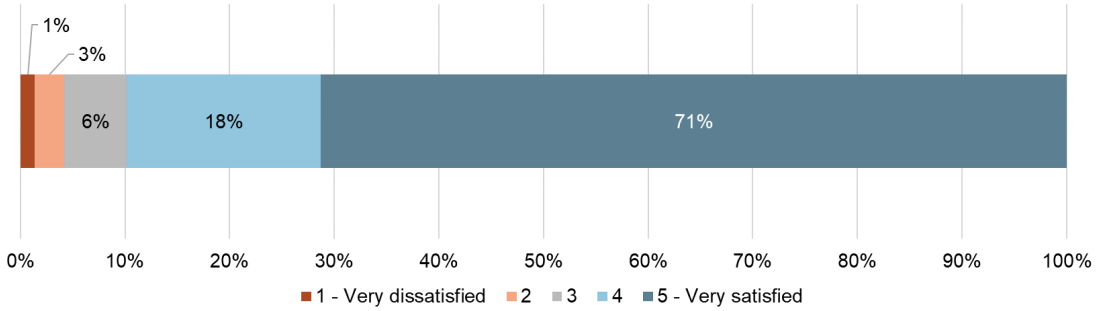
Eighty percent of respondents noted that they had done something to change their behavior or habits in their home to use less electricity since the auditor had visited their home. About half of respondents noted turning off lights and being more conscious of keeping lights on when they are not in use. Other common actions that respondents noted included changing their thermostat, hot water heater, or refrigerator temperature settings, unplugging appliances, or purchasing more energy efficient products such as LED light bulbs. Forty-four percent of respondents said that they have noticed energy savings since participating in the program; of these respondents, 83 percent rated their satisfaction with their savings either a 4 (17%) or 5 (66%).

6.3.4 Program Satisfaction

Half of survey respondents indicated that they had contacted agency staff with questions about the items or services they could receive through this program through the course of participating in this program. Of those that contacted agency staff, 71% rated their satisfaction a 4 (15%) or 5 (56%). Twenty-eight percent of respondents rated their communication with agency staff a 3 or lower and noted dissatisfaction with staffs support on reported equipment issues.

Overall, the vast majority (89%) of program participant surveyed reported satisfaction with the Community Connections Program; 18% of participants rated the program a 4 out of 5 and 71% of respondents rated it a 5 out of 5, indicating they were “very satisfied” with the program overall respectively. Only 4% of respondents rated the program a 1 (1%) or 2 (3%) out of 5. Figure 6-6 displays the results.

Figure 6-6: Overall Program Satisfaction



The nine respondents who indicated dissatisfaction were given the opportunity to provide additional feedback and took this opportunity to request a more clear or direct process to communicate with staff, inclusion or consideration of additional measures (e.g. windows, water heaters), and to voice dissatisfaction with the site visit staff.

7. Conclusions and Recommendations

7.1 Program Level Conclusions

The following section summarizes the conclusions for the Community Connections evaluation.

1. The Community Connections low-income program exceeded 2019 projected program savings targets and customer participation levels as set in the Company's portfolio plan.
2. The program had the following realizations rates for 2019: 98 percent for kWh savings and 100 percent realization rate for peak demand reduction.
3. Nearly all (98.4%) kWh savings were generated from the following baseload measure categories: refrigerators (60.4%), LED lighting (26.7%), freezers (10%), and smart power strips (1.3%).
4. The Companies continue to partner effectively with Ohio Partners for Affordable Energy ("OPAE") to implement the Community Connections low-income program. Because OPAE manages multiple federal, state and local low-income energy program funds, the Companies benefit from:
    - Leveraging multiple funding streams to maximize the number of measures that can be installed in a single home and therefore maximizes benefits for customers and maximizing overall energy savings.
    - Lower program administration costs. By managing multiple funding streams, OPAE distributes overhead costs across funders.
    - Access to trained weatherization workforce. Weatherization programs are facing a shortage of a trained workforce. By partnering with OPAE, the Companies benefit from the small pool of trained weatherization professionals and ongoing field training provided by OPAE.
    - Partnerships with agencies that have long-standing, trusted relationships with difficult-to-reach customer base.
    - Established and effective communication between the Companies, OPAE, and the network of community agencies.

5. Program staff and agency partners indicate that the upgrade to the new LEEN data tracking system has been successfully implemented. The Company provided extensive LEEN system training and support to agencies. The LEEN system's key benefits over the old system are:
    - Better reporting system results in more accurate tracking data.
    - Agencies are better able to track their program funding and therefore they are better able to meet their performance goals.
    - OPAE is better able to monitor agencies and encourage consistent production.
6. Most Community Connections participants who responded to ADM's survey shared positive feedback and support for the program. Respondents reported high levels of overall satisfaction with the program and with installed measures. Most also noted that they learned new ways to save energy in their home.
7. The Companies have developed a partnership with Habitat for Humanity to provide energy efficient measures for the volunteer-built homes. This partnership has allowed Habitat for Humanity to build Energy Star certified homes in the Companies' service areas.

7.2 Recommendations

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

1. Continue to administer the program through OPAE and its member community agencies. The Companies gain multiple benefits from contracting with OPAE to manage the program in coordination with other low-income weatherization funding sources.
2. When determining which services and measures to include in the Community Connections program, consider other low-income weatherization programs' funding priorities and restrictions. Work with OPAE and agencies to identify and evaluate appropriate and effective measures that:
    - Reduce duplication of services and measures where cross-program funding exceeds total demand.
    - Identify services and measures cross-program funding gaps for which demand exceeds total cross-program funding.
3. Continue to attend Weatherize Ohio and regional weatherization meetings to strengthen partnerships with OPAE and agencies.

Appendix A: Required Savings Tables

This appendix provides a summary of the savings associated with the low-income programs.

Table A-1: Impact Evaluation Energy Savings (kWh) Results

Utility	Ex-Ante Energy Savings (kWh)	Ex-Post Energy Savings (kWh)	Realization Rate
CEI	3,958,811	3,850,147	97%
OE	3,130,328	3,109,540	99%
TE	1,320,586	1,295,815	98%
Total	**8,409,726**	**8,255,502**	98%

Table A-2: Impact Evaluation Peak Demand Reduction (kW) Results

Utility	Ex-Ante Peak Demand Reduction (kW)	Ex-Post Peak Demand Reduction (kW)	Realization Rate
CEI	571.80	559.83	98%
OE	461.46	449.20	97%
TE	183.68	180.03	98%
Total	**1,216.93**	**1,189.07**	**98%**

Table A-3: Lifetime Energy Savings (kWh)

Utility	Annual Energy Savings (kWh)	Peak Demand Reduction (kW)	Lifetime Energy Savings (kWh)
CEI	3,850,147	559.83	62,051,295
OE	3,109,540	449.20	49,685,725
TE	1,295,815	180.03	19,697,040
Total	**8,255,502**	**1,189.07**	**131,434,061**

Appendix B: Participant Survey

2019 Community Connections Program

Participant Survey

Survey Variables [DO NOT DISPLAY]

Variable	Description
CUSTOMER NAME	First and last name
UTILITY	Customer's EDC
EMAIL	Customer email address
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 NIGHT-LIGHTS	Nightlight quantity from tracking data
# OF POWER STRIPS	Power strip quantity from tracking data
# OF SMART THERMOSTATS	Smart thermostat quantity from tracking data

Screening

1. Do you recall participating in [UTILITY]'s Community Connections "Weatherization" Program? 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.

    1. Yes
    2. No [THANK AND TERMINATE]
    98. Don't know [THANK AND TERMINATE]

Awareness

2. How did you first learn 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: _____

3. Program records indicate that you received the following items from the Community Connections Program. Could you please confirm whether these records are correct? [INSERT RESPONSES 1 = YES, 2 = NO, 98 = DON'T KNOW] [Read items that were received according to records. Record answer indicated by respondent.]

    a. LED light bulbs **[DISPLAY IF LED BULBS = 1]**
    b. ENERGY STAR certified refrigerator **[DISPLAY IF ES REFRIGERATOR = 1]**
    c. ENERGY STAR certified freezer **[DISPLAY IF ES FREEZER = 1]**
    d. Energy saving showerheads **[DISPLAY IF SHOWERHEADS = 1]**
    e. Faucet aerators **[DISPLAY IF AERATORS = 1]**
    f. Electrical repairs or upgrades **[DISPLAY IF ELECTRICAL REPAIRS = 1]**
    g. Roof repairs or replacement **[DISPLAY IF ROOF REPAIRS = 1]**
    h. Water heater pipe insulation **[DISPLAY IF PIPE INSULATION = 1]**
    i. Air sealing (such as caulk or foam / duct sealing) **[DISPLAY IF AIR SEALING = 1]**
    j. Water heater **[DISPLAY IF WATER HEATER = 1]**
    k. Attic insulation **[DISPLAY IF ATTIC INSULATION = 1]**
    l. Wall insulation **[DISPLAY IF WALL INSULATION = 1]**
    m. Night lights **[DISPLAY IF NIGHT LIGHTS = 1]**
    n. Central AC replacement **[DISPLAY IF AC = 1]**
    o. Smart power strips **[DISPLAY IF POWER STRIPS = 1]**
    p. Heat pump / electric furnace **[DISPLAY IF HEAT PUMP = 1]**
    q. Smart thermostat **[DISPLAY IF # OF SMART THERMOSTATS > 0]**

[DISPLAY Q4-Q5 IF Q3.A = 1 OR Q3.M = 1]

4. Before today, had you ever heard of light emitting diode light bulbs, or LEDs?

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

5. Do you believe you could correctly identify a typical LED light bulb if one was placed in front of you?

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

LEDs

[DISPLAY Q6 IF Q3.A = 1]

6. You indicated that you received LEDs from the program. Program 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

[DISPLAY Q7 IF Q6 = 2]

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

    _____Number of LEDs received [REQUIRE NUMERIC RESPONSE]

[DISPLAY Q8 IF Q6 = 1 OR Q7 > 0]

8. Were any of the LEDs that were installed through this program removed?

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

[DISPLAY Q1 IF Q8 = 1]

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

[DISPLAY Q9 IF Q6 = 1 OR Q7 > 0]

9. Were any of the LED bulbs you received from the program never installed?

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

[DISPLAY Q10 IF Q9 = 1]

10. Why were some of the LEDs never installed?

    [OPEN END]

[DISPLAY Q11 IF Q3A = 1 AND Q6 = 1]

11. To verify, of the [# OF LEDs] LED bulbs you received, how many are currently installed, were installed and removed, or were never installed? **[VALIDATE RESPONSE USING # OF LED VARIABLE]**

    1. # of LED light bulbs currently installed
    2. # of LED light bulbs installed and removed
    3. # of LED light bulbs never installed

[DISPLAY Q12 IF Q3A = 1 AND Q7 > 0]

12. Of the [ANSWER Q7] LED bulbs you received, how many are currently installed, were installed and removed, or were never installed? **[VALIDATE RESPONSE USING ANSWER Q7]**

    1. # of LED light bulbs currently installed
    2. # of LED light bulbs installed and removed
    3. # of LED light bulbs never installed

[DISPLAY Q13 IF Q3A = 1 AND Q6 = 1]

13. 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? **[VALIDATE RESPONSE USING # OF LED VARIABLE]**

Room Location	# of LEDs Installed
Bedrooms	
Bathrooms	
Living Room	
Kitchen	
Entry Way	
Dining Room	
Garage	
Basement	
Den	
Stairway	
Office	

[DISPLAY Q14 IF Q3A = 1 AND Q7 > 0]

14. 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? **[VALIDATE RESPONSE USING ANSWER Q7]**

Room Location	# of LEDs Installed
Bedrooms	
Bathrooms	
Living Room	
Kitchen	
Entry Way	
Dining Room	
Garage	
Basement	
Den	
Stairway	
Office	
Other	

[DISPLAY Q15 IF Q6 = 1 OR Q7 > 0]

15. What type of lighting equipment did the LEDs replace? [SELECT ALL THAT APPLY]

    1. Incandescent
    2. CFL
    3. LED
    4. Installed in new fixture
    96. Other (Please Specify)
    98. Don't know

LED Night-lights

[DISPLAY Q17 IF Q3.MERROR! REFERENCE SOURCE NOT FOUND. **= 1]**

16. You indicated that you received LED night-lights from the program. Program records indicate you received [# OF LED NIGHT-LIGHTS]. To the best of your knowledge, is that number correct or did you receive a different number of night-lights?

    1. Yes, that is the correct number of LED night-lights
    2. No, received a different number of LED night-lights
    98. Don't know

[DISPLAY Q17 IF Q17 = 2]

17. What is the correct number of LED night-lights that you received?

    _____Number of LED night-lights received [REQUIRE NUMERIC RESPONSE]

[DISPLAY Q18 IF Q17 = 1 OR Q17 > 0]

18. Were any of the night-lights you received from the program removed?

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

[DISPLAY Q19 IF Q18 = 1]

19. Why were some night-lights removed? (SELECT ALL THAT APPLY)

    1. LED broke or burned out
    2. LED 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)

[DISPLAY Q20 IF Q17 = 1 OR Q17 > 0]

20. Were any of the nightlights you received from the program never installed?

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

[DISPLAY Q21 IF Q20 = 1]

21. Why were some of the nightlights never installed?

[DISPLAY Q22 IF Q3M = 1 AND Q17 = 1]

22. To verify, of the [# of Nightlights] night-lights you received, how many are currently installed, were installed & removed, or were never installed? **[VALIDATE RESPONSE USING # OF NIGHTS VARIABLE]**

    a. # of Night-lights currently installed
    b. # of Night-lights installed and removed
    c. # of Night-lights never installed

[DISPLAY Q24 IF Q3M = 1 AND Q17 > 0]

23. To verify, of the [Answer to Q17] night-lights you received, how many are currently installed, were installed and removed, or were never installed? **[VALIDATE RESPONSE USING ANSWER Q18]**

    a. # of Night-lights currently installed
    b. # of Night-lights installed and removed
    c. # of Night-lights never installed

[DISPLAY Q24 IF Q3M = 1 AND Q17 = 1]

24. 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? **[VALIDATE RESPONSE USING # OF NIGHTS VARIABLE]**

Room Location	# of nightlights Installed
Bedrooms	
Bathrooms	
Living Room	
Kitchen	
Entry Way	
Dining Room	
Garage	
Basement	
Den	
Stairway	
Office	
Other	

[DISPLAY Q25 IF Q3M = 1 AND Q17 > 0]

25. 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? **[VALIDATE RESPONSE USING ANSWER Q18]**

Room Location	# of nightlights Installed
Bedrooms	
Bathrooms	
Living Room	
Kitchen	
Entry Way	
Dining Room	
Garage	
Basement	
Den	
Stairway	
Office	
Other	

Refrigerator Replacement

[DISPLAY Q26 IF Q3.B = 1]

26. You indicated that your refrigerator was replaced. What is the door style configuration of the new refrigerator that was installed? Is it a…

    1. Freezer-on-top model
    2. Freezer-on-bottom model
    3. Side-by-Side model
    98. Don't know

[DISPLAY Q27 IF # OF REFRIGERATORS > 1]

27. According to program records, you had more than 1 refrigerator replaced. Was the door style configuration of the second refrigerator also [ANSWER Q26]?

    1. Yes
    2. No
    3. I didn't have more than 1 refrigerator replaced
    98. Don't know

[DISPLAY Q28 IF Q27 = 2]

28. What is the door style configuration of the other new refrigerator that was installed? **(MULTISELECT-LIMIT 2)**

    1. Freezer-on-top model
    2. Freezer-on-bottom model
    3. Side-by-Side model
    98. Don't know

Freezer Replacement

[DISPLAY Q29 IF Q3.C = 1]

29. You indicated that your freezer was replaced. What is the type of new freezer that was installed?

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

[DISPLAY Q30 IF # OF FREEZERS > 1]

30. According to program records, you had more than 1 freezer replaced. Was the other type of freezer(s) also [ANSWER Q29]?

    1. Yes
    2. No
    3. I didn't have more than 1 freezer replaced
    98. Don't know [PROMPT TO LOOK AT THE UNIT]
    99. Prefer not to answer

[DISPLAY Q31 IF Q30 = 2]

31. What type is the other new freezer(s) that was installed?

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

Showerheads

[DISPLAY Q33 IF Q3.D = 1]

32. You indicated that you received energy saving showerheads from the program. Program 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

[DISPLAY Q33 IF Q33 = 2]

33. What is the correct number of showerheads that you received?

    _____Number of showerheads received [REQUIRE NUMERIC RESPONSE]

[DISPLAY Q34 IF Q33 = 1 OR Q33 > 0]

34. Were any of the showerheads that were installed in this program removed?

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

[DISPLAY Q36 IF Q34 = 1]

35. 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
96. Other (specify)
98. Don't know

[DISPLAY Q37 = 1 OR Q33 > 0]

36. Were any of the showerheads never installed?

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

[DISPLAY Q37 IF Q36 = 2]

37. Why were some of the showerheads you received from the program never installed?

[OPEN END]

[DISPLAY Q39 IF Q3D = 1 AND Q33 = 1]

38. To verify, of the [Number of showerheads] showerheads you received, how many are currently installed, were installed and removed, or were never installed?

a. # Showerheads currently installed
b. # Showerheads installed and removed
c. # Showerheads never installed

[DISPLAY Q40 IF Q3D = 1 AND Q33 > 0]

39. To verify, of the [Answer to Q33] showerheads you received, how many are currently installed, were installed and removed, or were never installed?

a. # Showerheads currently installed
b. # Showerheads installed and removed
c. # Showerheads never installed

[DISPLAY Q40 IF Q3d = 1 AND Q33 = 1]

40. 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	
96. Other (Please specify)	

[DISPLAY Q41 IF Q3d = 1 AND Q33 > 0]

41. 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	
97. Other (Please specify)	

Aerators

[DISPLAY Q43 IF Q3.E = 1]

42. You indicated that you received energy saving 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 aerators
    2. No, received a different number of aerators
    98. Don't know

[DISPLAY Q43. IF Q42 = 2]

43. What is the correct number of aerators that you received?

    _____Number of aerators received [REQUIRE NUMERIC RESPONSE]

[DISPLAY Q45 IF Q43 = 1 OR Q44 > 0]

44. Were any of the aerators that were installed through this program removed?

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

[DISPLAY Q45 IF Q0 = 1]

45. 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
    96. Other (specify)
    98. Don't know

[DISPLAY Q46. IF Q45. = 1 OR Q45 > 0]

46. Were any of the aerators you received from the program never installed?

    1. Yes
    2. No

98. Don't know

[DISPLAY Q47 IF Q0 = 1]

47. Why were some of the aerators never installed?

[OPEN END]

[DISPLAY Q48 IF Q3E = 1 AND Q47 = 1]

48. Of the [Number of Aerator] aerators you received, how many are currently installed, were installed and removed, or were never installed?

a. # Aerators currently installed
b. # Aerators installed and removed
c. # Aerators never installed

[DISPLAY Q49 IF Q3E = 1 AND Q48 > 0]

49. Of the [Answer to Q44] aerators you received, how many are currently installed, were installed and removed, or were never installed?

a. # Aerators currently installed
b. # Aerators installed and removed
c. # Aerators never installed

[DISPLAY Q51 IF Q3E = 1 AND Q43 = 1]

50. 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	
2. Kitchen	
96. Other (Please specify)	

[DISPLAY Q51 IF Q3E = 1 AND Q44 > 0]

51. 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	
2. Kitchen	
96. Other (Please specify)	

Power Strips

[DISPLAY Q53 IF Q3.O = 1]

52. 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 power strips
    2. No, received a different number of power strips
    98. Don't know

[DISPLAY Q54 IF Q53 = 2]

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

    _____Number of power strips received [REQUIRE NUMERIC RESPONSE]

[DISPLAY Q55 IF Q53 = 1 OR Q54 > 0]

54. Were any of the power strips that were installed through this program removed?

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

[DISPLAY Q55 IF Q54 = 1]

55. 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
    7. Other (specify)
    98. Don't know

[DISPLAY Q57 IF Q53 = 1 OR Q54 > 0]

56. Were any of the power strips that were installed through this program never installed?

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

[DISPLAY Q57 IF Q56 = 1]

57. Why were some of the power strips never installed?

    [OPEN END]

[DISPLAY Q59 IF Q3.O = 1 AND Q53 = 1]

58. Of the [Number of Power Strips] power strips you received, how many are currently installed, were installed and removed, or were never installed?

    a. # Power strips currently installed
    b. # Power strips installed and removed
    c. # Power strips never installed

[DISPLAY Q60 IF Q3.O = 1 AND Q54 > 0]

59. Of the [Answer to Q53] power strips you received, how many are currently installed, were installed and removed, or were never installed?

    a. # Power strips currently installed
    b. # Power strips installed and removed
    c. # Power strips never installed

[DISPLAY Q61 IF Q53 = 1 OR Q54>0]

60. To the best of your recollection, what electronics are plugged into the power strips? Please select "no" if you do not own the electronic item named. [INSERT 1 = YES, 2 = NO, 98 = DON'T KNOW]

    a. Television
    b. Speakers
    c. DVD/Blu Ray Player
    d. Video Game Console
    e. Desktop Computer
    f. Laptop Computer
    g. Computer Monitor
    h. Printer/Scanner/Copier
    i. Other (please specify) [OPEN END]

Home Improvement Retrofits

[DISPLAY Q62 - Q64 IF Q3.I OR K OR L = 1]

61. Program 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? [INSERT 1 = YES, 2 = NO, 98 = DK]

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

62. 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? [INSERT 1-5 SCALE AS DEFINED ABOVE, WITH 98 = DK]

    a. Wanted to improve home comfort
    b. The improvements were free
    c. Possibly reduce your electric bill

63. Were there any other factors that were also important in your decision to receive the home energy improvements? If so, what were they?

    [OPEN END]

Smart Thermostat

[DISPLAY Q64 IF Q3.Q = 1]

64. You indicated that you received smart thermostats from the program. Our records indicate you received [# OF SMART THERMOSTATS]. To the best of your knowledge, is that number correct or did you receive a different number of smart thermostats?

    1. Yes, that is the correct number of smart thermostats
    2. No, received a different number of smart thermostats
    98. Don’t know

[DISPLAY Q65 IF Q64 = 2]

65. What is the correct number of smart thermostats that you received?

    _____Number of smart thermostats received

[DISPLAY Q66 IF Q64 = 1 OR Q65 > 0]

66. Were any of the smart thermostats you received from the program removed?

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

[DISPLAY Q67 IF Q66 = 1]

67. Why were some smart thermostats removed? [SELECT ALL THAT APPLY]

1. Smart thermostat broke
2. Smart thermostats 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
7. Other (specify)
98. Don't know

[DISPLAY Q69 IF Q64 = 1 OR Q65 > 0]

68. Were any of the smart thermostats that you received never installed?

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

[DISPLAY Q69 IF Q68 = 1]

69. Why were some of the smart thermostats never installed?

[OPEN END]

[DISPLAY Q70 IF Q64 = 1]

70. Of the [# OF SMART THERMOSTATS] smart thermostats you received, how many are currently installed, were installed and removed, or were never installed?

a. # of smart thermostats currently installed
b. # of smart thermostats installed and removed
c. # of smart never installed

[DISPLAY Q71 IF Q65 > 0]

71. Of the [Answer to Q65] smart thermostats you received, how many are currently installed, were installed and removed, or were never installed?

a. # of smart thermostats currently installed
b. # of smart thermostats installed and removed
c. # of smart never installed

[DISPLAY Q72 IF Q64 = 1]

72. To the best of your recollection, what type of thermostat did the smart thermostats received through the program -- that are currently installed – replace?

Old Thermostat	# of smart thermostats installed
1. Analog	
2.Programmable	

Old Thermostat	# of smart thermostats installed
1. Analog	
2. Programmable	

[Note: Total should not exceed number in Q70.a or Q71A**Error! Reference source not found.**]

[DISPLAY Q73 IF Q65 > 0]

73. To the best of your recollection, what type of thermostat did the smart thermostats received through the program -- that are currently installed – replace?

Old Thermostat	# of smart thermostats installed
1. Analog	
2.Programmable	

[Note: Total should not exceed number in Q70.a or Q71]

Audit Experience

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

74. Was the home visit scheduled at a convenient time for you?

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

75. Did the home energy auditor or inspector arrive at your home on time, or at least within 15 minutes of the scheduled appointment?

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

76. Did the home energy auditor or inspector test, meter, or evaluate appliances in your household to see how much energy they use?

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

[DISPLAY Q77 IF Q76 = 1]

77. Which appliances were tested, metered, or evaluated? [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

Energy Education

78. When the auditor or inspector visited your home, did he or 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

[DISPLAY Q79 IF Q78 = 1]

79. What ways to save energy did that person mention? [Record verbatim response]

[OPEN END]

80. 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?

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

81. 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?

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

[DISPLAY Q82 IF Q81 = 1]

82. What are the things you have done to use less electricity?

[OPEN END]

83. 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? [INSERT 1-5 SCALE AS DEFINED ABOVE, WITH 98 = DON'T KNOW]

84. The program also provides educational material and a coloring book for children. Did you receive these things?

    1. Yes
    2. No
    3. I don't have children
    98. Don't know

[DISPLAY Q85 IF Q84 = 1]

85. Did you give them to children in your household?

    1. Yes
    2. No
    3. I don't have children
    98. Don't know

[DISPLAY Q86 IF Q85 = 2]

86. And why did you decide not to give them to children in your household?

    [OPEN END]

Satisfaction

87. 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 rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied." [INSERT 1-5 SCALE AS DESCRIBED, WITH 98 = DON'T KNOW]

    a. [DISPLAY Qd IF Q3a = 1] …the LEDs you received through the program?
    b. [DISPLAY Qe IF Q3m = 1] …the LED nightlights you received through the program?
    c. [DISPLAY Qf IF Q3b = 1]…the ENERGY STAR certified refrigerator you received through the program?
    d. [DISPLAY Qg IF Q3c = 1]…the ENERGY STAR certified freezer you received through the program?
    e. [DISPLAY Qh IF Q3d = 1]…the energy saving showerheads you received through the program?
    f. [DISPLAY Qi IF Q3e = 1]…the energy saving faucet aerators you received through the program?
    g. [DISPLAY Qj IF Q3o = 1]…the smart power strips you received through the program?
    h. [DISPLAY Qk IF Q3i,k,l = 1] …the home improvement items installed through the program? (which includes attic insulation, wall insulation, and/or duct sealing)
    i. [DISPLAY Ql IF Q3f = 1]…the electrical repairs or upgrade you received through the program?

j. [DISPLAY Qm IF Q3g = 1]…the roof repairs or replacement you received through the program?

k. …the scheduling of the visit?

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

[DISPLAY Q88 IF ANY PART OF Q87 < 3]

88. You indicated you were less than satisfied with some product(s) or service(s) you received. What was less than satisfactory about the product(s) or service(s)?

[OPEN END]

89. 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

[DISPLAY Q90 IF Q89 = 2 OR 3 OR 4]

90. And how satisfied were you with your communications with agency staff? Again, please rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied." [INSERT 1-5 SCALE AS DESCRIBED, WITH 98 = DK]

[DISPLAY Q91 IF Q90 < 3]

91. What was not satisfactory?

[OPEN END]

92. 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

[DISPLAY Q93 IF Q92 = 1]

93. How satisfied are you with any usage reductions or savings you noticed on your electric bill? Again, please rate your satisfaction on a scale of 1 to 5, where 1 is "very dissatisfied" and 5 is "very satisfied." [INSERT 1-5 SCALE AS DESCRIBED, WITH 98 = DON'T KNOW]

94. How satisfied were you overall with the Community Connections Program? Again, please rate your satisfaction on a scale of 1 to 5, where 1 is “very dissatisfied” and 5 is “very satisfied.” [INSERT 1-5 SCALE AS DESCRIBED, WITH 98 = DON’T KNOW]

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

1. Yes
2. No

[DISPLAY Q96 IF Q95 = 1]

96. What suggestions do you have for improving the Program? [Record verbatim response]

[OPEN END]

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, we’ll need to confirm your email address at this time.

97. To confirm, your email address is [EMAIL]

1. Yes
2. No

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-surveys2019@admenergy.com. Once again thank you for your participation on behalf of [UTILITY]. Have a great day!

Appendix C: Agency Survey

2019 FirstEnergy Ohio

Community Connections Agency Survey

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

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

Program Changes

2. In the last two years, has your organization changed the way you are allocating funds for residents?

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

[DISPLAY Q3 IF Q2 = 1]

3. Could you please describe what changes were made and why?

4. 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 Q5 IF Q4 = 1]

5. Could you please describe what changes were made and why?

6. Do you use the seasonal allowance worksheet?

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

[DISPLAY Q7 IF Q6 = 1]

7. Do you have any suggestions for improving the tool or how it's used to make decisions regarding funding levels? Please share your suggestions here.

8. Is your agency planning on making changes to the way you implement the program, qualify residents, and/or allocate funds to residents?

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

[DISPLAY Q9 IF Q8 = 1]

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

10. The next few questions are about some things that we understand FirstEnergy has added to the program. First, we understand that mini split systems have been added to the program. Will these be a useful addition?

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

[DISPLAY Q11 IF Q10 <> 1]

11. Why might they not be a useful addition to the program?

12. We also understand that smart thermostats have been added to the program. Will these be a useful addition?

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

[DISPLAY Q13 IF Q12 <> 1]

13. Why might they not be a useful addition to the program?

14. And we understand that the program is distributing educational materials and a coloring book to residents. Has your agency had experience distributing these?

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

[DISPLAY Q15-Q16 IF Q14 = 1]

15. How are they used?

16. What has the response been from the residents you've given them to?

17. Do you have suggestions regarding energy-savings technologies that should be added to the program?

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

[DISPLAY Q18 IF Q17 = 1]

18. What energy-savings technologies should be added to the program in the future?

Marketing and Outreach

19. Does your agency market the program to residents?

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

[DISPLAY Q20 IF Q19 = 1]

20. What outreach methods and/or marketing channels does your agency use?

21. Are there any types of residents that are a challenge to enroll?

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

[DISPLAY Q22-Q24 IF Q21 = 1]

22. What types of residents are a challenge to enroll in the Community Connections program?

23. What makes those types of residents a challenge to enroll?

24. What does your agency do, if anything, to address those enrollment challenges?

25. Does your agency host an open house during "Weatherization Month" (October)?

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

[DISPLAY Q26-Q27 IF Q25 = 1]

26. How important is the open house to the success of your efforts to enroll residents in the Community Connections program?

27. What could the program do, if anything, to make your open house more effective?

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

Staff Communication

29. 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 Q30 IF Q29 = 1]

30. On the scale provided, please indicate how knowledgeable OPAE staff are about the issues you discuss with them? [INSERT 1-5 SCALE, WITH 1 = NOT AT ALL KNOWLEDGEABLE, 5 = VERY KNOWLEDGEABLE, AND 98 = DON'T KNOW (NO OTHER POINTS DEFINED)]

31. On the scale provided, please indicate how satisfied or dissatisfied you are with the following: [FOR EACH ITEM, INSERT 1-5 SCALE, WITH 1 = VERY DISSATISFIED, 5 = VERY SATISFIED, AND 98 = DON'T KNOW (NO OTHER POINTS DEFINED)]

    a. how long it takes OPAE staff to address your questions or concerns

    b. how thoroughly OPAE staff address your question or concern

[DISPLAY Q32 IF Q31 A OR B = 1 OR 2]

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

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

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

[DISPLAY Q34 IF Q33 = 1]

34. On the scale provided, please indicate how knowledgeable FirstEnergy staff are about the issues you discuss with them? [INSERT 1-5 SCALE, WITH 1 = NOT AT ALL KNOWLEDGEABLE, 5 = VERY KNOWLEDGEABLE, AND 98 = DON'T KNOW (NO OTHER POINTS DEFINED)]

[DISPLAY Q35 IF Q33 = 1]

35. On the scale provided, please indicate how satisfied or dissatisfied you were with the following: [FOR EACH ITEM, INSERT 1-5 SCALE, WITH 1 = VERY DISSATISFIED, 5 = VERY SATISFIED, AND 98 = DON'T KNOW (NO OTHER POINTS DEFINED)]

    a. how long it took FirstEnergy staff to address your questions or concerns

    b. how thoroughly FirstEnergy staff addressed your question or concern

[DISPLAY Q36 IF Q35 A OR B = 1 OR 2]

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

37. On the scale provided, please indicate how satisfied or dissatisfied you were with the following: [FOR EACH ITEM, INSERT 1-5 SCALE, WITH 1 = VERY DISSATISFIED, 5 = VERY SATISFIED, AND 98 = DON'T KNOW (NO OTHER POINTS DEFINED)]

    a. the steps agencies take to get through the program

    b. the range of equipment that qualifies for incentives

    c. the level of incentives (dollar amount)

    d. the program, overall

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

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

[DISPLAY Q39 IF Q38 = 1]

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

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

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

[DISPLAY Q41 IF Q40 = 1]

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

[DISPLAY Q42 IF Q40 = 2]

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

43. Have you had any challenges in interpreting the program guidelines or determining what qualifies as an eligible measure?

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

[DISPLAY Q44 IF Q43 = 1]

44. Please explain what challenges you have had interpreting the program guidelines or determining what qualifies as an eligible measure and how the program could better support you.

45. 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 Q46 IF Q45 = 2]

46. 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

47. Has your organization participated in any of the following events in 2019?

    1. Weatherize Ohio Conference
    2. LEEN training
    3. Other: _____
    98. Don't know

[DISPLAY Q48 IF Q47 = 1,2 OR 3]

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

49. Do you think your agency staff are well-trained on the following: [INSERT RESPONSES 1 = YES, 2 = NO, 3 = WE HIRE A THIRD PARTY FOR THAT, 98 = DON'T KNOW FOR EACH ITEM]

    a. testing and installing qualifying appliances
    b. auditing and installing shell measures
    c. electrical and roof repairs
    d. the steps required to participate in the program

[DISPLAY Q50 IF Q49A, B, C, OR D = 2]

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

51. 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.