Low-Income Program
Evaluation, Measurement and Verification Report
2016

Prepared for the FirstEnergy Ohio Companies:

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

Prepared by:

ADM Associates, Inc.
3239 Ramos Circle
Sacramento, CA95827
916.363.8383

Table of Contents

List of Figures

List of Tables

1. Executive Summary

During 2016, the Ohio operating companies, The Cleveland Electric Illuminating Company ("CEI"), Ohio Edison Company ("OE"), and The Toledo Edison Company ("TE") (collectively "Companies") continued the Low-Income Program (also known as the "Community Connections program"). The program was targeted to low-income residential customers, either directly or through landlords of such customers. The program was administered by Ohio Partners for Affordable Energy ("OPAE"), which worked with subcontractors to deliver weatherization services, energy efficient solutions, and customer education to participating low-income customers. For each participating customer, a walk-through audit of the residence was conducted to determine whether it was feasible and appropriate to install one or more weatherization or energy efficiency measures.

A total of 10,322 low-income households received energy efficiency services through the Low-Income Program in 2016. The numbers of participants in each service territory are shown in Table 1-1[1]:

Table 1-1 Program Participation by Utility

Utility	Number of Participants
CEI	1,550
OE	1,285
TE	872
Total	**3,707**

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

Table 1-2 Impact Evaluation Results

Utility	Ex Ante kWh Savings	Ex Ante Peak kW Savings	Ex Post kWh Savings	Ex Post Peak kW Savings	kWh Realization Rate	kW Realization Rate
CEI	2,377,062	342.86	2,372,770	333.27	100%	97%
OE	2,421,585	343.81	2,439,880	335.15	101%	97%
TE	1,179,557	165.24	1,180,15	158.88	100%	96%
Total	5,978,204	851.91	5,992,894	827.31	100%	97%

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

The gross ex post kWh savings total shown in Table 1-2 reflect a realization rate of 100 percent, as determined by the ratio of verified total kWh savings to expected gross kWh savings. The gross ex post kW savings total shown in Table 1-2 reflect a realization rate of 97 percent. The replacement of refrigerators and freezers with ENERGY STAR® models and the installation of energy efficient lighting accounted for 98 percent of the verified total kWh savings.

Key findings from the process evaluation of the 2016 Low Income program include:

- **Program satisfaction remains high.** The Companies' staff and agencies emphasized their satisfaction in working with OPAE as the program administrator. In 2016, participants were also generally very satisfied with the Community Connections Program overall and their experience with the home energy audit and the measures installed. Participants reported slightly lower levels of satisfaction with agency staff as compared to the audit and the program overall. Sources of dissatisfaction include the instances where staff did not follow up on reported equipment issues or the homeowner not qualifying for energy savings equipment or home repairs after receiving the audit.
- **There are more opportunities for auditors and program representatives to provide energy education to program participants**. Most respondents indicated they spoke with the auditor about ways to save energy in their home; however, approximately 15% of respondents stated they did not speak to the auditor about ways to save energy. After the auditor's visit took place, most respondents indicated they knew more about how to save energy in their home.
- **In 2016, the Community Connections Program was primarily comprised of projects involving baseload measures, such as CFLs, ENERGYSTAR refrigerators and freezers, hot water measures, as well as some health and safety measures.** Agencies provided feedback about the market constraints that keep them from using Community Connections dollars for building shell measures, which includes other programs that offer dollars for weatherization, few clients with all electric homes, and few agency staff with BPI certifications available to perform the work.
-

2. Introduction and Purpose of Study

Under contract with the Companies, ADM performed measurement and verification (M&V) activities to confirm the energy savings and demand reduction realized through the energy efficiency programs that the Companies implemented in Ohio in 2016. 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 2016. Additionally, this report presents the results of the process evaluation of the program focusing on participant and program staff perspectives.

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

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

The goal of the process evaluation component was to determine how effective the program is in terms of customer satisfaction, working relationships between the Companies, OPAE, and the implementing agencies. The process evaluation also focused on operational changes that occurred in 2016 including any changes made in response to recommendations made in 2015.

3. Description of Program

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

The Low-Income Program for 2016 was a continuation of the program that began in 2003. In the state of Ohio; there is a collaborative effort that leverages federal, state, utility, and other funding sources to provide weatherization and energy saving products and services to low-income customers. OPAE, a trade association that also does low-income advocacy work, administers the Low-Income Program and serves as the coordinator between utilities and the local agencies that perform the work. The program targets residential customers at or below 200% of Federal Poverty Guidelines and/or landlords of residents eligible for one of the following:

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

OPAE allocates weatherization and energy efficient products and services funding to counties based upon the number of LIHEAP applications received. Homes are prioritized using a point system with households with elderly, disabled, and young children receiving priority points. If the utility is offering funding for the job, there are additional priority points given to the applicant.

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

Participation in the program is straightforward for customers. Most local agencies interviewed had on-staff “inspectors” who visit the customer’s home. Inspectors meter the customer’s refrigerators and separate freezers to monitor the electrical use and they are replaced if the meter reads a certain kWh per hour based on unit size and type (i.e. chest, upright, etc.). The inspector talks with the client to understand energy use in the home and to provide energy conservation education. As part of the discussion, the inspector identifies which lights in the home are used more than 2.5 or 3 hours per day. Light bulbs are replaced with compact fluorescent lamps (CFLs) for the fixtures that meet the minimum use criteria. The local agencies determine how best to leverage all of the funds (federal, state, utility, and other) available to the customer by taking into account what

improvement and replacement equipment the customer needs. Other non-lighting measures that are administered through the program include: installation of insulation, air infiltration reduction (blower door test), and water heater measures (water heater wraps, low flow shower heads, and faucet aerators). Health and safety measures include roof repairs/replacement, electric wiring repairs and upgrades, stove replacement, and well pump replacement.

In addition, the cost to provide health & safety measures are not to exceed 15% of the Eligible Measures billed to the Companies during the 2012-2016 Program Years as part of the Community Connections Program. (OPAE further distributes this allotment at 15 percent of the agency's total job spending per year). The Companies also added a seasonal allowance spreadsheet to the program, which allows agencies to determine what shell or electric heating/cooling reducing measures the customer is eligible for based on their electric consumption.

Table 3-1 and Table 3-2 below detail the ex-ante savings per measure for program year 2016.

Table 3-1 Annual kWh & kW ex ante Estimates per Unit, Non-lighting

Energy Efficiency Measures: Non-Lighting	**kWh**	**kW**	**Source**
Central AC replacement	Varies by Project	Varies by Project	Ohio TRM
Hot water pipe insulation	Varies by Project	Varies by Project	Ohio TRM
HVAC Tune Up	Varies by Project	Varies by Project	Ohio TRM
Install 11-15 cu. ft. chest freezer	1,131	0.175	Ohio TRM
Install 14-16 cu. ft. refrigerator w/top freezer	1,251	0.192	Ohio TRM
Install 16-18 cu. ft. upright freezer	1,131	0.175	Ohio TRM
Install 16-20 cu. ft. chest freezer	1,131	0.175	Ohio TRM
Install 17-19 cu. ft. refrigerator w/top freezer	1,251	0.192	Ohio TRM
Install 19-21 cu. ft. upright freezer	1,251	0.192	Ohio TRM
Install 19-22 cu. ft. refrigerator w/bottom freezer	1,251	0.192	Ohio TRM
Install 20-22 cu. ft. refrigerator w/top freezer	1,251	0.192	Ohio TRM
Install 20-23 cu. ft. side by side refrigerator	1,251	0.192	Ohio TRM
Install 24-26 cu. ft. side by side refrigerator	1,251	0.192	Ohio TRM
Install 5-10 cu. ft. chest freezer	1,131	0.175	Ohio TRM
Install 9-15 cu. ft. upright freezer	1,131	0.175	Ohio TRM
Install faucet aerator w/o shut- off valve	30.9	0.004	Ohio TRM
Install faucet aerator w/shut-off valve	30.9	0.004	Ohio TRM
Install low flow showerhead	219.7	0.028	Ohio TRM
Install R-10 attic insulation (average)	Varies by Project	Varies by Project	Ohio TRM
Install R-10 attic insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-11 foundation wall insulation (average)	Varies by Project	Varies by Project	Ohio TRM
Install R-11 foundation wall insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-11 sidewall insulation - brick veneer (average)	Varies by Project	Varies by Project	Ohio TRM
Install R-11 sidewall insulation - framed siding (average)	Varies by Project	Varies by Project	Ohio TRM
Install R-11 sidewall insulation - framed siding (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-19 attic insulation (average)	Varies by Project	Varies by Project	Ohio TRM
Install R-19 attic insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Install R-27 attic insulation (average)	Varies by Project	Varies by Project	Ohio TRM
Install R-27 attic insulation (difficult)	Varies by Project	Varies by Project	Ohio TRM
Insulate <52 gallon water heater	79	0.009	Ohio TRM
Insulate > or = 52 gallon water heater	79	0.009	Ohio TRM
Insulate band joist to R-11 (average)	Varies by Project	Varies by Project	Ohio TRM
Retirement of additional freezer	1,244	0.2	Ohio TRM
Retirement of additional refrigerator	1,376	0.22	Ohio TRM
Seal air leakage by 100 CFM50	Varies by Project	Varies by Project	Ohio TRM

Table 3-2 Annual kWh & kW ex ante Estimates per Unit, Lighting

Energy Efficiency Measures: Lighting	**kWh**	**kW**	**Source**
Install .03 nightlight	21.3	0.000	Ohio TRM
Install .5 watt nightlight	21.3	0.000	Ohio TRM
Install 15 watt dimmable CFL	36.0	0.003	Ohio TRM
Install 15 watt globe CFL	36.0	0.004	Ohio TRM
Install 15 watt or less outdoor CFL	26.4	0.004	Ohio TRM
Install 16-20 watt floodlight	43.2	0.005	Ohio TRM
Install 16-20 watt outdoor CFL	43.2	0.005	Ohio TRM
Install 16-20 watt spiral CFL	43.2	0.005	Ohio TRM
Install 21 watt or above floodlight	50.5	0.005	Ohio TRM
Install 21 watt or above outdoor CFL	50.5	0.005	Ohio TRM
Install 21 watt or above spiral CFL	50.5	0.005	Ohio TRM
Install 3-way circle line CFL	79.3	0.008	Ohio TRM
Install 3-way dimmable torchiere CFL	128.9	0.015	Ohio TRM
Install 3-way spiral CFL	68.2	0.007	Ohio TRM
Install 7-9 watt candelabra	21.6	0.003	Ohio TRM
Install 9 watt globe CFL	21.6	0.002	Ohio TRM
Install 9-15 watt spiral CFL	31.2	0.003	Ohio TRM

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

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

4. Methodology

The following sections provide a detailed explanation of all methods used to evaluate the impacts and processes associated with the 2016 Low-Income program.

The methods used to calculate kWh savings and kW reductions for measures installed through the Low-Income Program are presented in this chapter. The methods used depended on whether or not a measure was a lighting measure. The methods used to calculate savings for lighting and non-lighting measures are therefore described separately in the following sections.

Verification of quantity of Measures Installed

ADM administered a telephone survey to 214 program participants to verify receipt of energy efficiency measures and services claimed in the Low-Income Program and to estimate customer satisfaction with the 2016 Low-Income Program. The survey was also used to describe CFL installation practices among customers who received CFLs as well as to describe customer experiences with the contractors who performed the measure installations and the health and safety repairs.

Out of the initial sample of surveyed customers, ADM randomly selected a subset of thirty-four additional sample points. Site visits, or over the phone verifications, were conducted for this population of customers.

4.1 Sampling Strategy

ADM developed a sampling plan enabling us to accomplish an unbiased review of a sample of participant records to determine the level of correlation between job-level savings reported by the program (i.e., *ex ante* expected savings as reported by the implementer through the AEG/Vision Database) and actual savings (i.e., *ex post* verified savings that were verified using the evaluation methodologies described in this EM&V Report).

ADM utilized the Dalenius-Hodges' stratification methodology to achieve the required sampling precision. ADM's stratified sampling plan utilized five strata per Operating Company. Strata boundaries per Operating Company were designed to minimize the coefficient of variance (CV) for all strata. The sample design used for selecting program projects allows estimates of savings to be determined with ±10% precision at a 90% confidence interval for the program.

Table 4-1 Ex Post Stratified Sampling Plan

Utility	CV	Sample Size	Precision @ 90% Confidence	Additional Field Visits Performed	Additional Telephone Verifications Performed
CEI	0.54	80	3.82%	10	0
OE	1.03	67	4.74%	8	5
TE	0.68	67	3.95%	11	0
Total		**214**		**29**	**5**

4.2 Calculating Gross Annual kWh and kW Savings

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

For Ohio compliance requirements in previous years, baseline assumptions were applied directly from the Ohio Technical Reference Manual and represent minimum efficiencies as defined by either code requirements or market standards.

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

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

The incremental savings resulting from using the existing equipment as the baseline were calculated for the 2016 program year. The existing equipment baselines were taken from the Ohio TRM. Measures for which the 310 legislation affected the baseline calculation are listed with the applicable baselines in the sections below.

4.3 Analysis of Savings – Lighting Measures

The lighting measures installed through the Low-Income Program are direct install CFLs of varying wattages. kWh savings per measure are calculated per procedures set out in the Ohio Technical Reference Manual (TRM).[2]

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

The following formula was used to calculate annual kWh *ex post* savings in accordance with the formula specified in the TRM. As set out in the TRM,

$$\text{kWh Savings} = \Delta\text{kWh} = \left(\frac{\Delta\text{Watts}}{1{,}000}\right) * \text{ISR} * \text{Hours} * \text{WHFe}$$

ΔWatts = CFL watts * delta watts multiplier

CFL watts = wattage of installed CFL, as verified

Delta watts multiplier = factor to account for baseline conditions = 3.25 (from TRM)

ISR = In Service Rate (0.81)

Hours = Average hours of use per year; (1,040 hours).

WHFe = Waste Heat Factor for energy (1.07)

Per the TRM, summer coincident peak demand savings (kW) per lighting measure are calculated according to the following formula.

$$\text{Summer Coincident Peak Demand Savings} = \left(\frac{\Delta\text{Watts}}{1{,}000}\right) * \text{ISR} * \text{WHFd} * \text{CF}$$

ΔWatts = CFL watts * delta watts multiplier:

CFL watts = wattage of installed CFL, as verified

Delta watts multiplier = factor to account for baseline conditions = 3.25 (from TRM)

ISR = In Service Rate (0.81);

WHFd = Waste Heat Factor for Demand (1.21)

CF = Summer Peak Demand Coincidence Factor (0.11)

4.4 Analysis of Savings – Non-Lighting Measures

The following types of non-lighting measures were installed through the Low-Income Program in 2016:

- Refrigerator replacement
- Freezer replacement
- Central air conditioning replacement
- Attic and Wall Insulation
- Water Heater Wraps
- Low Flow Showerhead

- Faucet Aerators
- Smart Power Strips
- HVAC Tune Up

For each non-lighting measure installed in 2016, total kWh savings and total peak demand savings for that measure were determined as a product of the number of measures verified as being installed and the savings per measure. The methods used to determine per-unit kWh and peak demand savings for the non-lighting measures are described in sections below.

Refrigerator Replacement

The procedures for calculating annual kWh savings and peak demand savings for replacement of a refrigerator for a low-income household are set out in the TRM. These procedures were used to calculate savings for the refrigerators replaced through the Low-Income Program. In 2016, modified values for UECexisting, UECES, and UECbase were used in the evaluation calculations, based on the information in the approved TRM. The modified savings values used for the 2016 evaluation are reported in Table 4-2.

Table 4-2 TRM Deemed Values for kWh & kW

	Per Unit kWh/kW
Average Annual **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)*	0.192 kW

Freezer Replacements

The TRM does not have procedures for calculating annual kWh savings and peak demand savings for replacement of a freezer for a low-income household. However, procedures are presented to calculate savings for freezers that are replaced in households that are not low-income.[3] The deemed savings values for kWh and kW savings for refrigerators and freezers reported in the TRM were used to calculate ratios between the freezer and refrigerator savings values. These calculated ratios were applied to the modified savings values for replacement of refrigerators for low-income households to estimate the savings for replacement of freezers for such households.[4] The resulting savings values that were used in the 2016 evaluation are reported in Table 4-3.

Table 4-3 TRM Deemed Values for kWh & kW

[3] Vermont Energy Investment Corporation (VEIC), State of Ohio Energy Efficiency Technical Reference Manual, Prepared for Public Utilities Commission of Ohio, Draft of August 6, 2010, pp. 23-24.

[4] For freezer kWh savings, calculation is (1244/1376)*1251 = 1,131 kWh. For freezer kW savings, calculation is (0.20/0.22)*0.192 = 0.175 kW

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

Smart Power Strips

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

Table 4-4 Deemed Savings Values for Smart Power Strips

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

ADM used the deemed savings values for 7-plug smart power strips to determine *ex post* savings.

Water Heater Wraps

Program-level energy (kWh) and peak demand (kW) savings from installing water heater wraps was calculated using the deemed savings values for this measure in the TRM.[5] The deemed annual energy savings value is 79 kWh per unit, and the deemed summer coincident peak demand savings is 0.009 kW.

Low-Flow Showerheads

Program-level energy (kWh) and peak demand (kW) savings from installing low-flow showerheads was calculated using savings values based on information submitted in the TRM. A value of 173 kWh saved per gallons per minute (gpm) was used in 2016 for the calculation of energy savings. Per the values given in the TRM, it is assumed that installation of a low-flow showerhead would change the water flow from 2.87 gpm to 1.6 gpm. Thus, the annual energy savings value used was 219.7 per showerhead, and the summer coincident peak demand savings used was 0.0281 kW.

Faucet Aerators

Program-level energy (kWh) and peak demand (kW) savings from installing faucet aerators were calculated using savings values for this measure calculated in the TRM. Values calculated in the TRM for a 1.5 gpm installation were used in 2016. The annual

[5] VEIC, State of Ohio Energy Efficiency Technical Reference Manual, Draft of August 6, 2010, pp. 131-132.

energy savings value used was 30.9 kWh per unit, and the deemed summer coincident peak demand savings used was 0.0039 kW.

Attic Insulation

For attic insulation measures, kWh cooling savings per measure were calculated per procedures set out in the TRM:

$$\Delta kWh = ((1/Rexist - 1/Rnew) * CDH * DUA * Area) / 1000 / \eta Cool$$

Rexist = existing effective whole-assembly R-value.

Rnew = new total effective whole-assembly R-value.

CDH = Cooling Degree Hours

DUA = Discretionary Use Adjustment[6]

Area = Square footage of insulated area

ηCool = Efficiency of Air Conditioning equipment

For attic insulation measures, kWh heating savings per measure were calculated per procedures set out in the TRM:

$$\Delta kWh = ((1/Rexist - 1/Rnew) * HDD * 24 * Area) / 1000000 / \eta Heat$$

Rexist = existing effective whole-assembly R-value.

Rnew = new total effective whole-assembly R-value.

HDD = Heating Degree Days for location

Area = Square footage of insulated area

ηHeat = Average Net Heating System Efficiency (Equipment Efficiency * Distribution Efficiency)

For attic insulation measures, kW savings per measure were calculated per procedures set out in the TRM:

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

ΔkWh = Cooling Savings

FLHcool = Full load cooling hours

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

CF = Summer Peak Coincidence Factor for measure

Wall Insulation

For wall insulation measures, kWh savings per measure were calculated per procedures set out in the TRM:

ΔkWh = ((1/Rexist – 1/Rnew) * CDH * DUA * Area) / 1000 / ηCool

Rexist = existing effective whole-assembly R-value.

Rnew = new total effective whole-assembly R-value.

CDH = Cooling Degree Hours

DUA = Discretionary Use Adjustment[7]

Area = Square footage of insulated area

ηCool = Efficiency of Air Conditioning equipment

For wall insulation measures, kW savings per measure were calculated per procedures set out in the TRM:

ΔkW = ΔkWh / FLHcool * CF

ΔkWh = Cooling Savings

FLHcool = Full load cooling hours

CF = Summer Peak Coincidence Factor for measure

Central AC Replacement

For Central AC Replacement, kWh savings per measure were calculated per procedures set out in the TRM,[8]

ΔkWh for remaining life of existing unit
= (FLHcool * BtuH * (1/SEERexist - 1/SEERee))/1000

FLHcool = Full load cooling hours

BtuH = Size of equipment in Btuh (note 1 ton = 12,000Btuh)

SEERexist = SEER Efficiency of existing unit

---

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

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

SEERee = SEER Efficiency of ENERGY STAR unit

SEERbase = SEER Efficiency of baseline unit

For Central AC Replacement measures, kW savings per measure were calculated per procedures set out in the TRM:

ΔkW = ((BtuH * ((1/EERexist) - (1/EERee))) / 1000) * CF

BtuH = Size of equipment in Btuh (note 1 ton = 12,000Btuh)

EERexist = EER Efficiency of existing unit

EERee = EER Efficiency of ENERGY STAR unit

CF = Summer Peak Coincidence Factor for measure

Air Infiltration Reduction

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

ΔkWh = (((CFM50Exist – CFM50New) / N-factor) *60 * CDH * DUA * 0.018) / 1000 / ηCool

CFM50Exist = Existing Cubic Feet per Minute at 50 Pascal pressure differential as measured by the blower door before air sealing.

CFM50New = New Cubic Feet per Minute at 50 Pascal pressure differential as measured by the blower door after air sealing.

N-Factor = Conversion factor to convert 50-pascal air flows to natural airflow.

60 = Constant to convert cubic feet per minute to cubic feet per hour

CDH = Cooling Degree Hours

For Air Filtration Reduction, kWh heating savings per measure were calculated per procedures set out in the TRM:

ΔkWh = (((CFM50Exist – CFM50New) / N-factor) *60 * 24 * HDD * 0.018) / 1000000 / ηHeat * 293.1

CFM50Exist = Existing Cubic Feet per Minute at 50 Pascal pressure differential as measured by the blower door before air sealing.

CFM50New = New Cubic Feet per Minute at 50 Pascal pressure differential as measured by the blower door after air sealing.

N-Factor = Conversion factor to convert 50-pascal air flows to natural airflow.

60 = Constant to convert cubic feet per minute to cubic feet per hour

HDD = Heating Degree Days (60º base temperature) for location

293.1 = Constant to convert MMBTU to kWh

For Air Infiltration Reduction measures, kW savings per measure were calculated per procedures set out in the TRM:

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

ΔkWh = Cooling Energy Savings

FLHcool = Full load cooling hours

CF = Summer Peak Coincidence Factor for measure

Residential HVAC Maintenance/Tune Ups

ADM performed an engineering desk review of available data to determine if the savings claims for tune-ups were rational. It was determined that the savings claimed for tune-ups was reasonable and conservative.

Hot Water Pipe Insulation

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

$\Delta kWh = ((1/Rexist – 1/Rnew) * (L * C) * \Delta T * 8{,}760)/ \eta DHW / 3413$

Rexist = Pipe heat loss coefficient of *uninsulated* pipe (Btu/hr-°F-ft)

Rnew = Pipe heat loss coefficient of *insulated* pipe (Btu/hr-°F-ft)

L = Length of pipe from water heating source covered by pipe wrap (ft)

C = Circumference of pipe (ft) (Diameter (in) * π * 0.083)

ΔT = Average temperature difference between supplied water and outside air temperature (°F)

8,760 = Hours per year

ηDHW = Recovery efficiency of electric hot water heater

3,413 = Conversion from Btu to kWh

For Hot Water Pipe Insulation measures, kW savings per measure were calculated per procedures set out in the TRM:

$\Delta kW = \Delta kWh / 8{,}760$

ΔkWh = Energy Savings

4.5 Calculation of Lifetime kWh Savings per Measure

Lifetime kWh savings were calculated by multiplying annual kWh savings for each measure by a deemed effective useful life of 8 years.

4.6 Process Evaluation Methodology

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

Customers

- How satisfied are participants with the products/services provided through the program?
- How did the participants hear about the program?
- What factors influenced the participants to participate in the program?
- Do the participants notice a change in their energy usage as a result of the new product?

Contractors and Agencies

- How satisfied are they with the program in general?
- Do they feel that there was enough programmatic support?
- How satisfied are the Agencies with the administrator's (OPAE) monitoring of the program?
- How satisfied are the Agencies with the administrators of the program?
- Do they think that there was enough effective marketing to encourage customers to participate in the program?
- Do they have any recommendations for improvements in the design and/or delivery of the program?

Program Managers and Administrators

- How satisfied are they with the program in general?
- How satisfied are the administrators with the Companies' monitoring of the program?
- How satisfied are the Companies with the administrator's administering the program?
- Do they think that there was enough effective marketing to encourage customers to participate in the program?

- Do they feel that there was enough programmatic support?
- Do they have any recommendations for improvements in the design and/or delivery of the program?
- Were previous issues and/or concerns resolved in 2015? Were there any lessons learned in resolving previous issues?

Program, Implementation, and Action Agency Interviews

ADM conducted in-depth interviews with staff from the Companies, OPAE, and local agencies. Interviews were conducted in November 2016 through February 2017. ADM completed interviews with Company staff, OPAE staff, and eight community action agencies. Agencies represented by this report were located in each of the Companies' service areas.

Participating Customer Survey

Quantitative surveys were completed with participating customers by VuPoint Research, a professional survey firm, during November 2016. A total of 214 surveys were completed across all three operating companies. Table 4-5 shows the number of completed surveys by electric distribution company (EDC).

Table 4-5 Number of Completed Process Surveys

	CEI	OE	TE	Total
Quantity	80	67	67	214

Analysis of survey data in this report is unweighted. All questions in the telephone survey were optional and respondents could choose not to respond (i.e., answers recorded as "don't know" or "refused"). Unless otherwise reported, the reported number of observations for each question exclude blank or not applicable, "don't know," and "refused" responses.

5. Detailed Impact Evaluation Findings

The numbers of low-income households that received energy efficiency services through the Low-Income Program in 2016 in the service territories of the Companies are shown in Table 5-1 below.

Table 5-1 Number of Participants

Utility	Number of Participants
CEI	1,550
OE	1,285
TE	872
Total Companies	**3,707**

Impact Evaluation Results

Table 5-2 shows the quantities of energy efficient lighting measures that were installed for these participants through the Low-Income Program and Table 5-3 shows the quantities of energy efficient non-lighting measures that were installed for the participants in 2016. Table 5-4 shows the number of health and safety measures and the number of energy education consultations that were conducted under the Low-Income Program in 2016.

Applying the methods described in Chapter 4 produced estimates of savings per unit on a measure-by-measure basis.

Table 5-2 Quantities of Lighting Measures

CFL Category	CEI	OE	TE	Total
Install 15 watt dimmable CFL	54	408	12	474
Install 15 watt globe CFL	481	1,113	268	1,862
Install 15 watt or less outdoor CFL	10	159	0	169
Install 16-20 watt floodlight	0	127	0	127
Install 16-20 watt outdoor CFL	7	194	0	201
Install 16-20 watt spiral CFL	2,794	1,739	1,943	6,476
Install 21 watt or above floodlight	0	235	0	235
Install 21 watt or above outdoor CFL	20	71	0	91
Install 21 watt or above sprial CFL	2,697	1,674	1,239	5,610
Install 3-way circle line CFL	5	2	0	7
Install 3-way dimmable torchiere CFL	4	6	1	11
Install 3-way spiral CFL	103	441	40	584
Install 9 watt globe CFL	72	68	0	140
Install 9-15 watt spiral CFL	7,507	9,818	6,301	23,626
Install 7-9 watt candelabra	312	1,031	258	1,601
Total	**14,066**	**17,086**	**10,062**	**41,214**

Table 5-3 Quantities of Non - Lighting Measures

Measure Category	CEI	OE	TE	Total
HVAC Tune Up	0	1	0	1
Seal ducts with tape, mastic	0	2	1	3
Install R-10 attic insulation (difficult)	0	0	1	1
Install R-11 blown cellulose-sloped ceiling	0	1	0	1
Install R-19 attic insulation (difficult)	0	2	1	3
Install R-19 blown cellulose-floored attic	0	1	0	1
Install R-19 blown cellulose-sloped ceiling	0	0	1	1
Install R-19 fiberglass batt insulation	0	0	1	1
Install R-27 attic insulation (difficult)	0	4	5	9
Install R-27 blown cellulose-floored attic	0	1	0	1
Install R-38 attic insulation	0	8	3	11
Install R-49 attic insulation	0	1	0	1
Insulate band joist to R-11 (difficult)	0	0	1	1
Central AC replacement	0	2	1	3
Install faucet aerator w/o shut- off valve	0	39	0	39
Install faucet aerator w/shut-off valve	1	28	0	29
Install 11-15 cu. ft. chest freezer	0	20	26	46
Install 16-18 cu. ft. upright freezer	140	68	31	239
Install 16-20 cu. ft. chest freezer	23	13	2	38
Install 19-21 cu. ft. upright freezer	2	20	9	31
Install 5-10 cu. ft. chest freezer	190	81	15	286
Install 9-15 cu. ft. upright freezer	7	20	5	32
Retirement of additional freezer	0	2	0	2
Install .03 nightlight	0	4	1	5
Install .5 watt nightlight	0	257	14	271
Hot water pipe insulation	0	7	0	7
Install 14-16 cu. ft. refrigerator w/top freezer	119	178	78	375
Install 17-19 cu. ft. refrigerator w/top freezer	429	403	152	984
Install 19-22 cu. ft. refrigerator w/bottom freezer	2	41	25	68
Install 20-22 cu. ft. refrigerator w/top freezer	230	260	67	557
Install 20-23 cu. ft. side by side refrigerator	144	101	62	307
Install 24-26 cu. ft. side by side refrigerator	109	111	105	325
Retirement of additional refrigerator	2	2	1	5
Install low flow showerhead	1	44	0	45
Smart Strip Power Strip - 6 Outlet	0	1	0	1
Smart Strip Power Strip - 10 outlet	0	0	2	2
Install R-11 foundation wall insulation (difficult)	0	0	1	1
Install R-11 sidewall insulation - framed siding (difficult)	0	5	2	7
Lower DHW tank temperature	0	1	1	2
Insulate <52 gallon water heater	0	12	0	12
Insulate > or = 52 gallon water heater	0	6	0	6
Total	**1,399**	**1,747**	**614**	**3,760**

Table 5-4 Quantities Health & Safety and Education Measures

Measure Category	CEI	OE	TE	Total Companies
Carbon Monoxide Detector	5	44	249	298
Electrical Repairs	98	40	25	163
Roof Repairs	0	6	0	6
Replace Electric Stove	0	40	1	41
Replace Sump Pump	0	4	2	6
Total Health & Safety and Education Measures	**103**	**134**	**277**	**514**

Table 5-5 through Table 5-8 below detail the ex-post savings values and realization rates calculated per measure during program year 2016.

Table 5-5 Estimates of Annual kWh Savings by Measure (Non-Lighting)

Measure	Ex-Ante kWh	Ex Post Savings kWh	Realization Rate
HVAC Tune Up	0	0	0%
Seal ducts with tape, mastic	0	792	0%
Install R-10 attic insulation (difficult)	3	3	130%
Install R-11 blown cellulose-sloped ceiling	0	35	0%
Install R-19 attic insulation (difficult)	865	1,721	199%
Install R-19 blown cellulose-floored attic	24	52	218%
Install R-19 blown cellulose-sloped ceiling	1,180	3,486	295%
Install R-19 fiberglass batt insulation	7,524	2,451	33%
Install R-27 attic insulation (difficult)	9,100	13,327	146%
Install R-27 blown cellulose-floored attic	0	63	0%
Install R-38 attic insulation	16,452	20,815	127%
Install R-49 attic insulation	0	63	0%
Insulate band joist to R-11 (difficult)	38	28	74%
Central AC replacement	1,725	1,725	100%
Install faucet aerator w/o shut- off valve	1,205	1,205	100%
Install faucet aerator w/shut-off valve	896	896	100%
Install 11-15 cu. ft. chest freezer	52,026	52,026	100%
Install 16-18 cu. ft. upright freezer	270,309	270,307	100%
Install 16-20 cu. ft. chest freezer	42,978	42,978	100%
Install 19-21 cu. ft. upright freezer	35,061	35,061	100%
Install 5-10 cu. ft. chest freezer	323,466	323,464	100%
Install 9-15 cu. ft. upright freezer	36,192	36,192	100%
Retirement of additional freezer	2,488	2,262	91%
Install .03 nightlight	57	106	187%
Install .5 watt nightlight	3,089	5,769	187%
Hot water pipe insulation	2,298	2,318	101%
Install 14-16 cu. ft. refrigerator w/top freezer	469,125	469,125	100%
Install 17-19 cu. ft. refrigerator w/top freezer	1,230,984	1,230,984	100%
Install 19-22 cu. ft. refrigerator w/bottom freezer	85,068	85,068	100%

Measure	Ex-Ante kWh	Ex Post Savings kWh	Realization Rate
Install 20-22 cu. ft. refrigerator w/top freezer	696,807	696,807	100%
Install 20-23 cu. ft. side by side refrigerator	384,057	384,057	100%
Install 24-26 cu. ft. side by side refrigerator	406,575	406,575	100%
Retirement of additional refrigerator	6,880	6,255	91%
Install low flow showerhead	9,887	9,887	100%
Smart Strip Power Strip - 6 Outlet	103	103	100%
Smart Strip Power Strip - 10 outlet	206	206	100%
Install R-11 foundation wall insulation (difficult)	15	15	100%
Install R-11 sidewall insulation - framed siding (difficult)	150	240	161%
Lower DHW tank temperature	246	332	135%
Insulate <52 gallon water heater	948	944	100%
Insulate > or = 52 gallon water heater	474	472	100%
Total	**4,098,498**	**4,108,209**	**100%**

Table 5-6 Estimates of Annual kWh Savings by Measure (Lighting)

Measure	Ex-Ante Savings kWh	Ex Post Savings kWh	Realization Rate
Install 15 watt dimmable CFL	20,820	21,001	101%
Install 15 watt globe CFL	81,800	82,221	101%
Install 15 watt or less outdoor CFL	6,433	7,476	116%
Install 16-20 watt floodlight	6,694	6,953	104%
Install 16-20 watt outdoor CFL	11,753	10,628	90%
Install 16-20 watt spiral CFL	341,362	345,695	101%
Install 21 watt or above floodlight	17,204	14,505	84%
Install 21 watt or above outdoor CFL	6,129	5,573	91%
Install 21 watt or above spiral CFL	410,676	382,653	93%
Install 3-way circle line CFL	676	685	101%
Install 3-way dimmable torchiere CFL	1,772	1,418	80%
Install 3-way spiral CFL	34,214	48,578	142%
Install 9 watt globe CFL	3,690	3,716	101%
Install 9-15 watt spiral CFL	898,974	910,852	101%
Install 7-9 watt candelabra	37,510	42,732	114%
Total	**1,879,705**	**1,884,686**	**100%**

Table 5-7 Estimates of Peak Demand kW Reductions by Measure (Non-Lighting)

Measure	Ex-Ante kW	Ex Post Savings kW	Realization Rate
HVAC Tune Up	0.00	0.00	0%
Seal ducts with tape, mastic	0.00	0.00	0%

Measure	Ex-Ante kW	Ex Post Savings kW	Realization Rate
Install R-10 attic insulation (difficult)	0.00	0.00	134%
Install R-11 blown cellulose-sloped ceiling	0.00	0.04	0%
Install R-19 attic insulation (difficult)	0.03	0.05	218%
Install R-19 blown cellulose-floored attic	0.03	0.06	216%
Install R-19 blown cellulose-sloped ceiling	0.00	0.04	0%
Install R-19 fiberglass batt insulation	0.06	0.03	49%
Install R-27 attic insulation (difficult)	0.05	0.30	596%
Install R-27 blown cellulose-floored attic	0.00	0.08	0%
Install R-38 attic insulation	0.18	0.79	435%
Install R-49 attic insulation	0.00	0.08	0%
Insulate band joist to R-11 (difficult)	0.04	0.03	74%
Central AC replacement	2.32	1.81	78%
Install faucet aerator w/o shut- off valve	0.16	0.31	200%
Install faucet aerator w/shut-off valve	0.12	0.11	96%
Install 11-15 cu. ft. chest freezer	8.05	8.05	100%
Install 16-18 cu. ft. upright freezer	41.82	41.80	100%
Install 16-20 cu. ft. chest freezer	6.65	6.65	100%
Install 19-21 cu. ft. upright freezer	5.43	5.42	100%
Install 5-10 cu. ft. chest freezer	50.05	50.02	100%
Install 9-15 cu. ft. upright freezer	5.60	5.60	100%
Retirement of additional freezer	0.40	0.35	87%
Install .03 nightlight	0.00	0.00	0%
Install .5 watt nightlight	0.00	0.00	0%
Hot water pipe insulation	0.26	0.26	101%
Install 14-16 cu. ft. refrigerator w/top freezer	72.00	72.15	100%
Install 17-19 cu. ft. refrigerator w/top freezer	188.93	189.31	100%
Install 19-22 cu. ft. refrigerator w/bottom freezer	13.06	13.08	100%
Install 20-22 cu. ft. refrigerator w/top freezer	106.94	107.16	100%
Install 20-23 cu. ft. side by side refrigerator	58.94	59.06	100%
Install 24-26 cu. ft. side by side refrigerator	62.40	62.53	100%
Retirement of additional refrigerator	1.10	0.96	87%
Install low flow showerhead	1.26	1.49	118%
Smart Strip Power Strip - 6 Outlet	0.01	0.01	100%
Smart Strip Power Strip - 10 outlet	0.02	0.02	100%
Install R-11 foundation wall insulation (difficult)	0.02	0.02	100%
Install R-11 sidewall insulation - framed siding (difficult)	0.18	0.28	157%
Lower DHW tank temperature	0.02	0.03	130%
Insulate <52 gallon water heater	0.11	0.11	100%
Insulate > or = 52 gallon water heater	0.05	0.05	100%
Total	**626.29**	**628.16**	**100%**

Table 5-8 Estimates Peak Demand kW Reductions by Measure (Lighting)

Measure	Ex-Ante kW Savings	Ex Post Savings kW	Realization Rate
Install 15 watt dimmable CFL	2.50	2.18	87%
Install 15 watt globe CFL	9.84	7.26	74%
Install 15 watt or less outdoor CFL	0.79	1.24	158%
Install 16-20 watt floodlight	0.81	0.50	61%
Install 16-20 watt outdoor CFL	1.40	1.64	117%
Install 16-20 watt spiral CFL	40.94	36.56	89%
Install 21 watt or above floodlight	2.08	1.21	58%
Install 21 watt or above outdoor CFL	0.73	0.84	115%
Install 21 watt or above sprial CFL	49.31	40.47	82%
Install 3-way circle line CFL	0.08	0.08	102%
Install 3-way dimmable torchiere CFL	0.21	0.16	76%
Install 3-way spiral CFL	4.09	5.08	124%
Install 9 watt globe CFL	0.44	0.50	114%
Install 9-15 watt spiral CFL	107.92	96.34	89%
Install 7-9 watt candelabra	4.48	5.11	114%
Total	**225.61**	**199.19**	**88%**

Overall the ex ante and ex post kWh and kW savings calculation resulted in very similar savings. The difference in saving values are explained by measure below.

For the lighting measures the ex post savings are, on average, higher than what was claimed in the ex ante estimates. Through on-site verifications, over the phone verifications, and over the phone surveys, a higher in-service rate was found than the TRM value used to calculate the ex ante estimates. Other factors affecting measure-level realization rates are differences in assumed baseline bulb or fixture wattage.

Attic insulation measure ex post savings are, on average, also higher than what was claimed. The contributing factor primarily affecting the realization rate for some of these measures is most likely a difference in Cooling Degree Days, Heating Degree Days, or area of insulated space applied in the ex ante and ex post calculations.

6. Detailed Process Evaluation Findings

This chapter presents the results of the process evaluation of FirstEnergy's Community Connections Program during the 2016 program year. The purpose of the process evaluation is to assess the effectiveness of the Community Connections Program in delivering appropriate energy efficiency technologies to low-income customers who receive electric services from the Companies.

To inform the process evaluation, ADM conducted in-depth interviews with program staff and participating community agencies. We also administered an online survey to residential customers who received measures through the Community Connections Program.

In the state of Ohio, there is a collaborative effort that leverages federal, state, utility, and other funding sources to provide weatherization and energy saving products and services to low-income customers. OPAE, a trade association that also does low-income advocacy work, administers the Community Connections program and serves as the coordinator between EDCs and the local agencies that perform the work. OPAE and its member agencies also deliver the following energy assistance programs:

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

OPAE and local agencies do not market the program in the traditional sense. The state's electronic tracking system provides a way for agencies to identify customers who are eligible for, and prioritized to receive, services. Agencies are well-established in their communities, administer other programs targeting low-income families, and have close ties to social service organizations. Agencies may also advertise their weatherization and energy conservation services in public service announcements or local publications. All agencies interviewed experience great demand for weatherization and conservation services and operate with a backlog of eligible customers. The waiting list reported by participating agencies was shorter than in previous years—all agencies have a wait list. Further, the waitlist is associated with delivery of comprehensive weatherization services and not necessarily delivery of equipment or services available through Community Connections. When waitlists for weatherization reach several months, agencies provide energy efficient products (CFLs, refrigerators, freezers, as eligible) earlier to help meet customers' energy conservation needs.

Participation in the program is straightforward for customers. The local agencies have on-staff inspectors who visit the customer's home. Inspectors place a meter on the customer's refrigerator to monitor the electrical usage and, if applicable, the freezer to log usage. The inspector talks with the client to understand energy use in the home and to provide energy conservation education. As part of the discussion, the inspector identifies which lights in the home are used more than two hours per day. Light bulbs are replaced with compact fluorescent lamps (CFLs) for the fixtures that meet the minimum use criteria, and refrigerators are replaced if the meter reads greater kWh usage than the prescribed threshold guidelines for the unit's size. The local agencies determine how best to leverage all of the funds (federal, state, utility, and other sources) available to the customer and the type of equipment or services needed to improve the energy efficiency and comfort of their home.

A proportion of funds (15 percent of the agency's expended budget) can be used for health and safety measures, such as electrical wiring, roof repairs, mechanical ventilation, and carbon monoxide detectors. The seasonal allowance worksheet allows agencies to determine what shell or electric heating/cooling reducing measures the customer is eligible for based on their electric consumption. Agencies use of the seasonal allowance worksheet is discussed in a later section of this report.

6.1 Program Design and Operations

The following section provides an overview of the Community Connections Program's operations constructed through in-depth discussions with program staff and participating community agencies. Interviewees were asked to discuss program design and implementation procedures, as well as any changes made since the 2015 program year.

ADM spoke with the Companies' current program manager and previous program manager to ensure the perspectives of both these individuals were captured in evaluation reporting. We also spoke with two long standing Ohio Partners for Affordable Energy (OPAE) staff members, the director of finance and the field activities manager. During January and February of 2017, ADM also conducted in-depth interviews with eight community agencies who participated in the Community Connections Program during the 2016 program year.

Implementation Contractor

From a contractual perspective, in 2016 OPAE began work under a new eight year Stipulation and Agreement[9] that awarded the organization $6 million annually to implement the Community Connections Program as outlined in Electric Security Plan (ESP) IV. OPAE's role as program administrator was secured for the next eight years, not only because of the institutional knowledge they have regarding the Community

[9] FE Ohio. ESPIV Third Supplemental Stipulation 14-1297-EL-SSO- Latest.pdf

Connections Program, but also because of their long-standing experience integrating the utility program with other federal assistance programs[10].

Both utility and agency staff had positive feedback regarding communication with OPAE, stating they are always thorough and quick to respond. OPAE provides a monthly report that summarizes spending per measure type, agency, and operating company. Most staff indicated the reporting is sufficient.

OPAE staff indicated that they perform annual administrative QA/QC visits to each agency. During this procedure, OPAE staff spot-check program files to ensure agencies are collecting the necessary supporting documentation such as removal forms, metering sheets, C-4 forms (used to record information during the audits), invoices, release forms that authorizes work, as well as recycling certification forms. If there are issues of non-compliance the agency will be flagged for a re-visit.

2016 Program Changes

The Community Connections Program made several changes to the price list in 2016. Of greatest note were the additional and increased rebate amounts for hot water measures, including pipe insulation, hot water heater insulation and temperature reduction, and low-flow shower heads. OPAE staff indicated that prices are designed to cover 100% of installed costs. Program staff review the price list on an annual basis and make changes based on other regional programs, market research, and feedback from agencies. OPAE will send a survey to the agencies that requested information on current costs for the list of eligible measures. OPAE staff will consider each of these sources of information, discuss with Company staff and make adjustments to the price list as deemed appropriate within the contract terms.

Agencies discussed the changes made to the measure list and pricing as well. Agency staff said there is a ramp-up period at the beginning of every year when they have to familiarize themselves with the changes made to measures offered or their pricing and work with their auditors/staff to ensure the changes are understood and questions are answered.

Market Constraints

An issue noted in prior evaluation reporting was the program's desire to identify additional opportunities to generate energy savings by implementing more building shell measures and to identify the market constrains that limit the program's ability to meet this objective. Below is a list of constraints described by program and agency staff.

[10] OPAE also administered the Ohio Home Weatherization Assistance Program (HWAP), Percentage of Income Payment Plan (PIPP), and Home Energy Assistance Program (HEAP).

- **Competing Funding Sources:** The Community Connections Program is one of multiple sources of funding that agencies utilize to install weatherization measures. Other funding sources include the Home Weatherization Assistance Program and Electric Partnership Program (EEP). The Companies' staff indicated that these other funding sources are primarily used for building envelope improvements.

- **Few Clients with All Electric Homes:** Weatherization measures generate larger electricity savings for homes with electric heating. Interviewed agencies and program staff echoed previous evaluation feedback that described the difficulties involved with identifying clients with all electric homes where these measures would have the greatest electricity saving benefit.

- **Insufficient Funds:** Agencies indicated that the seasonal allowance worksheet, although based on individual customer usage, typically results in $1,500 per home on average for heating and cooling load reducing measures. Most agencies interviewed noted that this amount would not cover all the measure costs associated with performing all the electric heating/cooling reducing measures with internal staff or subcontracting the work to a 3rd party. However, agencies can utilize funds from other sources or request additional funds from the Companies.

- **BPI Trained Staff:** A point that was reiterated in this year's evaluation was the fact that many agencies don't have trained BPI staff to install the weatherization measures. Many of the agencies we spoke with are small, with limited funding, and they tend to subcontract the work as opposed to incurring the expenses related to employing skilled technical staff.

The 2015 evaluation noted that OPAE had worked with agencies to seek out more multifamily units. However, of the agencies that were interviewed, none had plans to increase outreach to multifamily properties. Community agencies provided feedback on their ability to serve these customers and noted the following constraints:

- **Insufficient Funds:** Most community agencies we spoke with have a significant waitlist of clients seeking services when funds become available. These customers are actively seeking program resources and therefore are going to be prioritized over additional outreach to customers in the multifamily market.

- **Logistics of Program Enrollment**: Two agencies that have experience working with multifamily properties commented on the challenges associated with getting residents enrolled. Often it takes multiple attempts to make contact with a resident and when they do, there are more challenges locating an electric bill and verifying the residents is the utility account holder. Some multifamily buildings have an electric account in the landlord's name, and landlords must sign an agreement to allow their buildings to participate.

Program Communication with Agencies

OPAE program staff provided feedback on the various communication channels used for agency outreach and information sharing. The annual Weatherize Ohio Conference was the primary means by which staff delivered information regarding the Community Connections Program to participating agencies. This conference is a meeting of low income weatherization providers, utilities and PUCO staff in Ohio. The conference provides an opportunity for agencies to network, participate in continuing education courses, and learn about program offerings and updates. Courses are accredited through the Corporation for Ohio Appalachian Development (COAD) training center[11].

Suggestions for Program Design

In support of the program's continuous improvement, program and agency staff offered several suggestions to be considered for future program design.

- **Increase Communication Between Agencies and Company Program Staff**: The Companies' staff emphasized the value of direct communication with agencies which occurs during the Weatherize Ohio conference. Historically, OPAE has facilitated communication with agencies as program changes occur.
- **Consider additional measures:**
    - **LED Replacements:** Several agencies noted that LEDs should be added to the list of eligible measures. Lamp types such as dimmable CFLs and 3-way CFLs are no longer available in the market.
    - **Refrigerator Replacements:** One agency suggested allowing the replacement of refrigerators that pass the diagnostic test but are beyond their useful life. The interviewee stated that there are a lot of out-of-date appliances that should qualify because they are very old, but do not qualify because they pass the metering test.

6.2 Program Participant Findings

This section summarizes feedback received from a sample of 215 of Community Connections Program participants. The evaluation team contracted with VuPoint Research to conduct telephone surveys of program participants from each of the Companies. The survey collected data on program awareness, customer decision making, satisfaction, experiences with the program and installed equipment.

[11] http://www.coadinc.org/

Program Awareness

Program participants learned about the Community Connections from a variety of sources in 2016. Table 6-2 summarizes the various sources of program awareness identified by survey respondents. Most frequently mentioned, by 44% of respondents, was community agencies or other energy assistance programs they participated in, such as Ohio's Home Weatherization Assistance Program (HWAP) and Ohio's Percentage of Income Payment Plan (PIPP) Plus. Other common sources include word of mouth from a friend or family member (31%), or via mail from an informational brochure or utility bill insert (10%).

Table 6-1 Sources of Program Awareness

	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
Agency/another program	26	33%	28	42%	33	50%	87	41%
From a friend/family member	30	38%	22	33%	20	30%	72	34%
Received an information brochure/bill insert	11	14%	5	7%	6	9%	22	10%
Contractor	2	3%	1	1%	1	2%	4	2%
Property owner/landlord	2	3%	0	0%	0	0%	2	1%
Other	9	11%	11	16%	6	9%	26	12%

Satisfaction with Measures Installed

Respondents provided feedback on their level of satisfaction with the measures installed. Figure 6-1 summarizes the responses. ENERGY STAR Freezers and CFLs received the highest satisfaction rating with 95% of respondents indicating they were either very satisfied or somewhat satisfied with the measure. Sources of dissatisfaction noted by participants included the time it takes for CFLs to achieve full brightness and that the total lumen output is less than what the resident expected.

Participants were also generally satisfied with installed ENERGYSTAR refrigerators and freezers. The issues noted by participants who were dissatisfied with the refrigerator were that they were smaller than what they expected, or that they broke after a few weeks/months (two customers stated the handle broke and one stated that the unit stopped working), or that they disliked the door configuration.

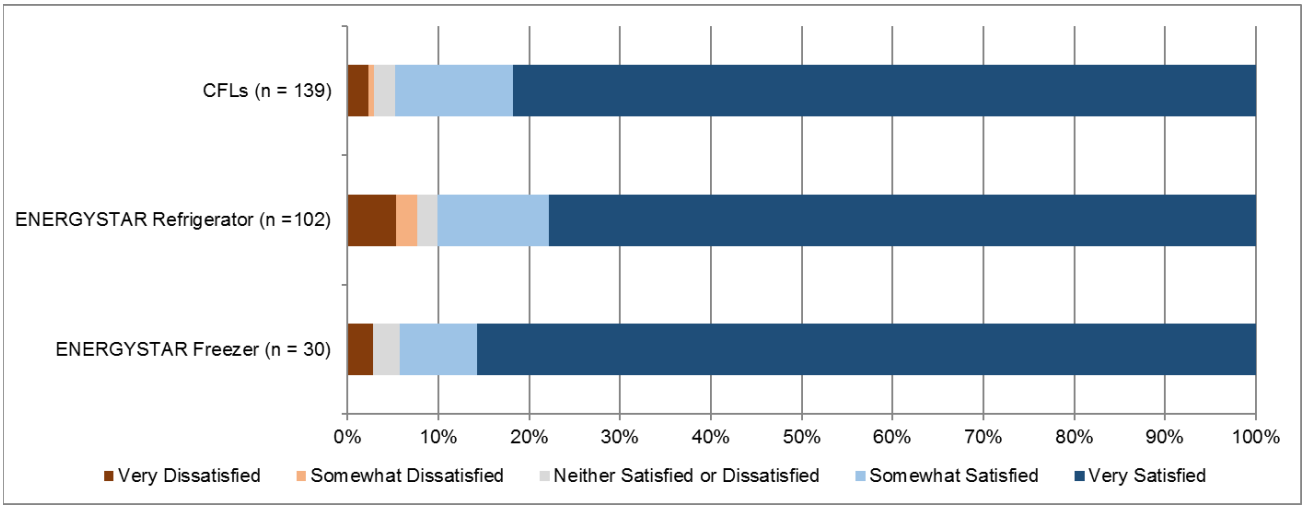

Figure 6-1 Satisfaction with Energy Savings Measures

Audit Experience

Each customer that receives program assistance, first receives a home energy audit, typically performed by an agency staff member or contractor hired by the community agency. Nearly all participants surveyed reported satisfaction with the logistics of scheduling the audit; 96% noted the time was convenient while 96% said the auditor was on time. The collective feedback is summarized in Table 6-3 below.

Table 6-2 Audit Experience

Audit Experience	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
Convenient Time								
Yes	77	96%	65	98%	66	99%	208	98%
No	2	3%	0	0%	0	0%	2	1%
Don't know	1	1%	1	2%	1	1%	3	1%
Was the auditor on time (or within 15 min)?								
Yes	76	95%	65	97%	64	97%	205	96%
No	1	1%	0	0%	0	0%	1	0%
Don't know	3	4%	2	3%	2	3%	7	3%

As part of the program participation process, the auditor is required to perform diagnostic testing on appliances in the home if the appliance can be moved without damage to flooring or other aspects of the living space. Most of the survey respondents (82%) verified appliance testing occurred. The most common appliances tested were refrigerators and freezers, as reported by 86% and 42% of respondents respectively. Participants also reported having their furnace/heat pumps tested, as well as their water heater and air conditioner. Approximately 10% of respondents could not recall if the auditor tested their appliances. Table 6-4 summarizes the responses.

Table 6-3 Appliance Testing

Audit Experience	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
Appliances Tested								
Yes	64	80%	53	79%	58	87%	175	82%
No	8	10%	5	7%	4	6%	17	8%
Don't know	8	10%	9	13%	5	7%	22	10%
Which appliances								
Refrigerator	54	84%	46	87%	51	88%	151	86%
Freezer	31	48%	22	42%	20	34%	73	42%
Wall air conditioner	1	2%	1	2%	3	5%	5	3%
Central air conditioner	1	2%	2	4%	3	5%	6	3%
Electric water heater	10	16%	5	9%	9	16%	24	14%
Electric heat pump / Furnace	12	19%	5	9%	12	21%	29	17%
Other	13	20%	1	2%	12	21%	26	15%
Don’t know/recall	9	14%	5	9%	4	7%	18	10%

In addition to testing the appliances, the auditor provides each resident with information and tips regarding home energy use and conservation. Eighty-five percent of respondents indicated they spoke with the auditor about ways to save energy in their home. Table 6-5 summarizes the various energy savings topics auditors discussed with participants.

Table 6-4 Energy-Savings Topics Discussed with Residents

Energy-savings topics discussed with residents	CEI		OE		TE		Total	
	n	Percent	n	Percent	n	Percent	n	Percent
Did the auditor or inspector talk with you about any other ways to save energy in your home?								
Yes	66	83%	57	85%	59	88%	182	85%
No	9	11%	7	10%	5	7%	21	10%
Don't know	5	6%	3	4%	3	4%	11	5%
Topics Discussed								
The benefit of using CFLs	60	97%	52	96%	52	93%	164	95%
The benefit of using smart power strips	45	73%	35	65%	28	50%	108	63%
Costs associated with appliances	56	90%	43	80%	42	75%	141	82%
Benefits of using cold wash cycle	45	73%	38	70%	40	71%	123	72%
Removing unnecessary appliances	37	60%	30	56%	33	59%	100	58%
Turning off lights when not in the room	56	90%	46	85%	54	96%	156	91%
Adjusting the thermostat	43	69%	31	57%	44	79%	118	69%
Cleaning furnace filters	52	84%	38	70%	52	93%	142	83%
Changing other behaviors to save energy	47	76%	35	65%	43	77%	125	73%
Turning off electronics when not in use	54	87%	44	81%	50	89%	148	86%
High cost of electric space heater use	38	61%	30	56%	33	59%	101	59%

The most common energy savings topics discussed with residents were the benefits of using CFLs, the cost savings associated with turning off lights and electronics when not in use, as well as the benefits of cleaning furnace filters.

Ninety-two percent of survey respondents indicated they knew more about how to save energy in their home after the auditor's visit, while 81% changed their habits to use less energy.

Participants rated the usefulness of the information on saving energy using a five-point scale where 1 meant not at all useful and 5 meant extremely useful. Overall, 94% of survey respondent who received information on home energy savings rated its usefulness as a 4 or 5 (as shown in Figure 6-2).

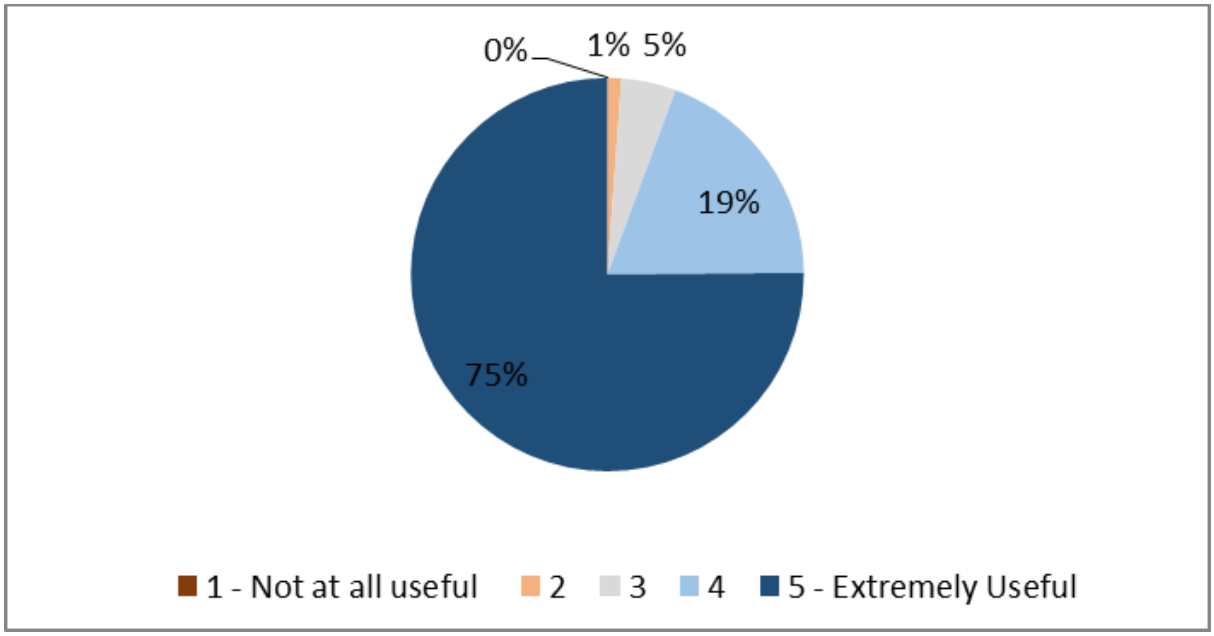

Figure 6-2 Usefulness if Energy Savings Tips and Information Received from Auditor (n = 116)

Figure 6-3 below displays participant satisfaction with the energy saving tips and scheduling of the auditor's visit. As shown, most participants were satisfied with these aspects of their participation.

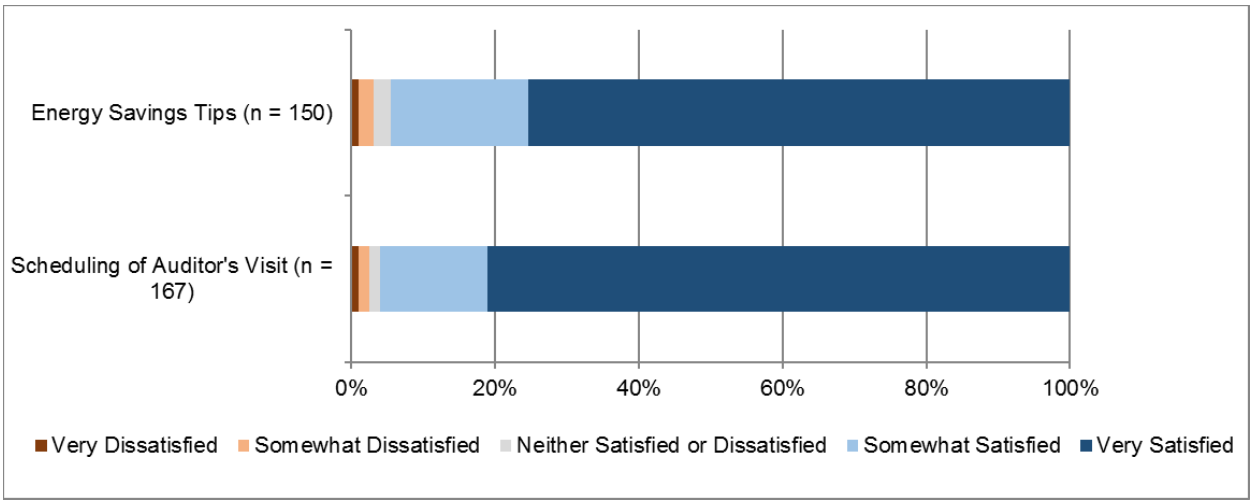

Figure 6-3 Satisfaction with Audit Experience

Agency Staff Communication

Participants have several reasons to communicate with agency staff including program enrollment, scheduling of the audit, and follow up regarding the resolution of any issues that occurred during, or after the audit. Approximately half (48%) of survey respondents indicated they spoke to agency staff one or more times. Of the 48% that did speak to staff, 85% were very satisfied with their communication, 10% were neither satisfied nor dissatisfied, and 6% were very dissatisfied. Sources of dissatisfaction include instances where staff did not follow up on reported equipment issues, or that the homeowner did not qualify for energy savings equipment or home repairs after receiving the audit.

Program Satisfaction

Most participants (91%) were very satisfied or somewhat satisfied with the program overall, 5% were neither satisfied nor dissatisfied and 4% were very dissatisfied. Figure 6-4 displays the results.

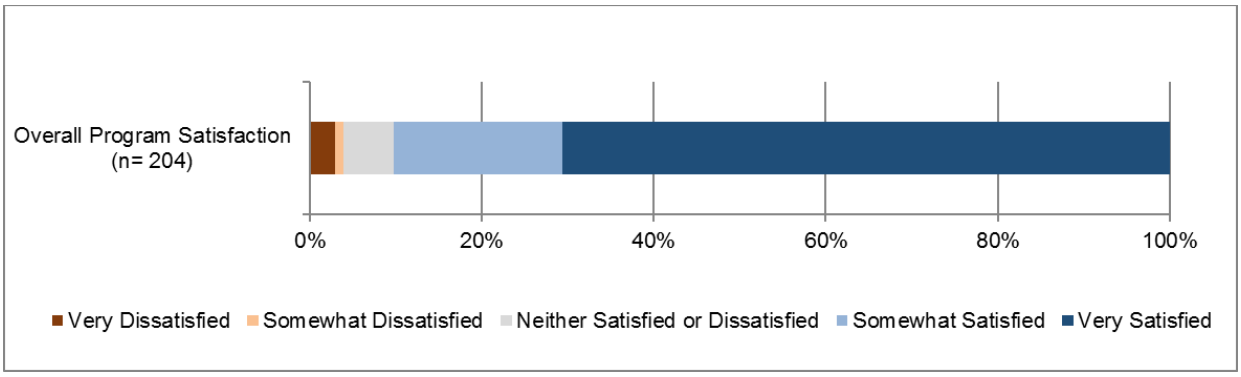

Figure 6-4 Overall Program Satisfaction

7. Conclusions and Recommendations

The following sections provide ADM conclusions and recommendations pertaining to program performance and improvement.

Process Conclusions

- Program satisfaction remains high. The Companies' staff and agencies emphasized their satisfaction in working with OPAE as the program administrator. In 2016, participants were also generally very satisfied with the Community Connections Program overall and their experience with the home energy audit and the measures installed. Participants reported slightly lower levels of satisfaction with agency staff as compared to the audit and the program overall. Sources of dissatisfaction include the instances where staff did not follow up on reported equipment issues or the homeowner not qualifying for energy savings equipment or home repairs after receiving the audit.
- There are more opportunities for auditors and program representatives to provide energy education to program participants. Most respondents indicated they spoke with the auditor about ways to save energy in their home; however, approximately 10% of respondents stated they did not speak to the auditor about ways to save energy. After the auditor's visit took place, most respondents indicated they knew more about how to save energy in their home.
- In 2016 the Community Connections Program was primarily comprised of projects involving baseload measures, such as CFLs, ENERGYSTAR refrigerators and freezers, hot water measures, as well as some health and safety measures. Agencies provided feedback about the market constraints that keep them from using Community Connections dollars for building shell measures, which includes other programs that offer funds for weatherization, few clients with all electric homes, and few agency staff with BPI certifications available to perform the work.

Process Recommendations

- Provide materials for auditors to leave with the program participants that include behavioral tips and low-cost measures to address some participants reporting that they did not have discussions with the auditor regarding ways that they could save energy. Additionally, add a check box on the C-4 Form for the customer to mark that they received energy saving education during the audit.
- Add LEDs as a program measure and allow them to substitute for CFLs as needed.

- The Companies' staff indicated a preference for direct communication with the agencies implementing the audits and efficiency improvements throughout the year. Consider adding quarterly meetings with the Companies, OPAE, and agency leads.

8. Appendix A: Required Savings Table

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

Table 8-1: Ex Post Lifetime Energy Savings (kWh)

Utility	***Annual kWh Savings***	***Annual kW Savings***	***Lifetime kWh Savings***
CEI	2,372,770	333.27	18,978,036
OE	2,439,969	335.15	19,416,947
TE	1,180,155	158.88	9,440,207
Total	**5,992,894**	**827.31**	**47,835,191**

9. Appendix B: Surveys and Interview Guides

2016 Community Connections Program
Participant Telephone Survey

1. Hello, my name is (interviewer name), and I am calling on behalf of (name of EDU), your electric utility company. May I speak with (name of respondent)?

   1. Yes
   2. No [IF NOT AVAILABLE, ASK FOR ANOTHER ADULT FAMILIAR WITH HOUSEHOLD'S PARTICIPATION IN COMMUNITY CONNECTIONS PROGRAM]

2. I'm with ADM Associates, an independent research firm. We are speaking with homeowners and tenants who participated in the (name of EDU's) Community Connections "Weatherization" Program. You will receive a $10 gift card for Target Stores for participating in this survey.

   Through this program you would have received energy-efficient light bulbs called compact fluorescent lights or CFLs for short; or you might have had your refrigerator or freezer replaced with an Energy Star refrigerator or freezer; or you might have received insulation, air infiltration reduction (blower door test), or water heater measures (such as water heater wraps, low flow shower heads, and faucet aerators). Do you recall participating in this program?

   1. Yes [SKIP TO Q6]
   2. No
   98. Don't know
   99. Refused [THANK AND TERMINATE]

3. You may have received these services as part of another program. It is possible you worked with an energy auditor or inspector from the Ohio Home Weatherization Assistance Program (HWAP), the Electric Partnership Program (EPP), the Warm Choice or House Warming Program, or the Home Energy Assistance Program (HEAP). Do you recall participating in Community Connections through any of these other programs?

   1. Yes [SKIP TO Q6]
   2. No
   98. Don't know
   99. Refused [THANK AND TERMINATE]

[ASK Q4 IF Q3 = 2]

4. Is it possible that someone else in your household would be familiar with the items you received through this program?

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

[ASK Q5 IF Q4 = 1]

5. May I speak with that person?

    1. Yes [RECYCLE THROUGH 2 & 3 WITH NEW RESPONDENT]
    2. No [THANK AND TERMINATE]
    98. Don't know [THANK AND TERMINATE]
    99. Refused [THANK AND TERMINATE]

6. Great, thank you. First I want to assure you that I'm not selling anything. I just want to ask for your feedback about the program. Your responses will be kept confidential. For quality and training purposes, this call will be recorded. May I take a few minutes of your time to talk with you now about the equipment and services you received?

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

1. I would like to start by asking you about how you first learned about the Community Connections Program?

i. Received an information brochure
ii. From a friend/neighbor
iii. Property owner/landlord
iv. Community agency
v. Contractor
vi. Other: _____

2. Our records indicate that you received the following items from the Community Connections Program. Please tell me if you received these items or not.

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

	Yes	No	DK	NA
a. Compact fluorescent light bulbs, called CFLs	1	2	98	99
b. Energy Star Refrigerator	1	2	98	99
c. Energy Star Freezer	1	2	98	99
d. Energy Saving Showerheads	1	2	98	99
e. Faucet Aerators	1	2	98	99
f. Electrical Repairs	1	2	98	99
g. Roof Repairs	1	2	98	99
h. Water heater pipe insulation	1	2	98	99
i. Seal Air Leakage / Duct Sealing	1	2	98	99
j. Water Heater	1	2	98	99
k. Attic Insulation	1	2	98	99
l. Side Wall Insulation	1	2	98	99
m. Night Lights	1	2	98	99
n. Central AC Replacement	1	2	98	99

CFLS

[ASK Q3-Q9 IF Q2a = 1]

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

i. Number of CFLs in record is
ii. Received a different number of CFLs [GO TO Q4]
98. Don't know
99. Refused

[ASK Q4 IF Q3 = 2]

4. What is the correct number of CFLs that you received?

_____Number of CFLs received

5. Of the [# OF CFLS] CFL bulbs you received, how many [READ LIST; ENTER NUMBER FOR EACH]

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

[ASK Q6 IF Q5b > 0]

6. Why were some CFLs removed? (SELECT ALL THAT APPLY)

1. CFL broke or burned out
2. CFL 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
7. Other (specify)

[ASK Q7 IF Q5c > 0]

7. Why were some of the CFLs never installed? [RECORD VERBATIM RESPONSE]

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

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

Note: Total should not exceed number in Q5a

a) Specify other room location:

9. What type of lighting equipment did the CFLs replace? [SELECT ONE]

1. Standard incandescent light bulbs
2. Other CFLs
3. Both incandescent light bulbs and CFLs

4. Other (specify)
98. Don't Know
99. Refused
Specify if other_____

REFRIGERATOR REPLACEMENT

[ASK Q10 IF Q2b = 1]

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

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

FREEZER REPLACEMENT

[ASK Q11 IF Q2c = 1]

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

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

HOME IMPROVEMENT RETROFITS

[ASK Q12-1 IF Q2k,l,i = 1]

12. Our records show that you had some home energy improvements installed by a participating agency or contractor. Is that correct?

	Yes	No	DK
a. Attic Insulation			
b. Wall Insulation (Side wall insulation)			
c. Duct Sealing / Seal Air Leakage /			

13. I am going to read a list of three factors that may have been important to your decision to implement the home energy improvements. After I read the list, I will read the reasons again and would like you to rank them by importance, where 1 is the most important reason and 2 is the second most important reason and 3 is the least important reason.

a.	Wanted to improve home comfort	1	2	3
b.	The improvements were free	1	2	3
c.	Impact of home improvements on reducing my electric bill	1	2	3

14. Were there any other reasons that were also important to your decision to install the home energy improvements?[RECORD ANSWER VERBATIUM]

AUDIT EXPERIENCE

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

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

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

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

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

17. During the home energy audit or inspection, did the auditor ask you to share copies of your electric bills?

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

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

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

[ASK Q19 IF Q18 = 1]

19. Which appliances were tested? (DO NOT READ; Select all that apply)

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

ENERGY EDUCATION

20. Did an auditor or inspector visit your home and talk with you about ways to use less energy in your home or leave materials with you that described how you could save energy?

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

[ASK Q21, 22, 24, & 25 IF Q20 = 1]

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

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

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

1. Yes
2. No

[Ask Q23 IF Q22=1]

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

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

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

25. 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 energy? (Select one)

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

[IF Q26 IF Q25 = 1]

26. What are the most important things you have done to use less energy? [RECORD VERBATIM RESPONSE]

27. 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 information you received from the auditor or inspector?

_____ [ENTER 1 TO 5]

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

1. Yes, more information would have been helpful
2. No, what was provided was enough
98. Don't know
99. Refused

SATISFACTION

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

[ASK Q29 IF Q2a = 1]
29. …the CFLs you received through the program?

_____ [ENTER VD D N S VS DK]

[ASK Q30 IF Q2b = 1]
30. …the Energy Star refrigerator you received through the program?

_____ [ENTER VD D N S VS DK]

[ASK Q31 IF Q2c = 1]
31. …the Energy Star freezer you received through the program?

_____ [ENTER VD D N S VS DK]

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

_____ [ENTER VD D N S VS DK]

[ASK Q33 IF Q2f = 1]
33. …the electrical repairs you received through the program?

_____ [ENTER VD D N S VS DK

[ASK Q34 IF Q2g = 1]
34. …the roof repairs you received through the program?

_____ [ENTER VD D N S VS DK]

35. …the scheduling of the visit?

_____ [ENTER VD D N S VS DK]

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

_____ [ENTER VD D N S VS DK]

[ASK Q37 IF Q29 OR Q30 OR Q31 OR Q33 OR Q34 OR Q35 OR Q36 = VD or D]

37. Why weren't you satisfied with (type of product or service)?
[RECORD VERBATIM RESPONSE AND IDENTIFY ITEM(S) CUSTOMER IS DISSATISFIED WITH]

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

1. Never
2. Once
3. 2 or 3 times
4. 4 times or more

98. Don't know
99. Refused

[ASK Q39 IF Q38 = 2,3,4]

39. And how satisfied were you with your communications with program staff? Would you say you were:

_____ [ENTER VD D N S VS DK]

[ASK Q40 IF Q39 = VD or D]

40. Why were you dissatisfied?

41. Have you noticed any savings on your electric bill since the home improvements were completed?

1. Yes
2. No
3. Not sure

98. Don't know
99. Refused

[ASK Q42 IFQ41 = 1]

42. How satisfied are you with any savings you noticed on your electric bill? Would you say you are:

_____ [ENTER VD D N S VS DK]

43. How satisfied were you with the overall with the Community Connections "Weatherization" Program? Would you say you are

_____ [ENTER VD D N S VS DK]

44. Do you have any suggestions for improving the program?

1. Yes
2. No

[ASK Q45 IF Q44 = 1]

45. What suggestions do you have for improving the program? [RECORD VERBATIM RESPONSE]

46. Could you please confirm if this is the address to where the gift card should be sent? [HOME ADDRESS]

That's all the questions for this survey. Thank you for your time.

You will receive your gift card within the next 30 days. If you do not receive your gift card within the next 30 days, please contact ADM Associates, Inc. directly at 916-889-7634, or email john.vazquez@admenergy.com to check the status of your gift card. Do you have any questions?

OK. Good bye.