Appliance Turn-In Program
Evaluation, Measurement, and Verification Report
2017

Prepared for FirstEnergy Ohio Companies:

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

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1. Executive Summary

In 2017, FirstEnergy's Ohio Utilities, The Cleveland Electric Illuminating Company (CEI), Ohio Edison Company (OE), and The Toledo Edison Company (TE) (collectively "Companies") offered the Appliance Turn-In Program. This program offered residential customers rebates for the recycling of refrigerators, freezers, dehumidifiers, and room air conditioners (RACs) during the 2017 program year. The goal of the program is to permanently remove from the system old appliances, which are generally inefficient. Units removed from customers' homes cannot enter the used appliance market, which in the absence of this program would be a likely alternate outcome.

A total of 26,907 households, in the service territories of the Companies, received appliance collection and recycling services through the Appliance Turn-In Program in 2017. Program design allows for an individual household to turn in up to two refrigerators or freezers, up to two dehumidifiers, and up to two RACs per year. The number of participating households within each utility is shown in Table 1-1.

Table 1-1: Program Participation by Utility

Utility	Number of Participants[1]
CEI	9,401
OE	14,245
TE	3,261
Total Program	26,907

Ex ante savings estimates for the Companies' Appliance Turn-In Program were taken directly from the *State of Ohio Energy Efficiency Technical Reference Manual* (TRM)[2] for units recycled during 2017. These values are 1,376 kWh per refrigerator, 1,244 kWh per freezer, 1,075 kWh per dehumidifier, and 122 kWh per RAC recycled through the program. Table 1-2 summarizes the *ex ante* per-unit annual kWh savings estimates by measure.

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[1] The number of participants was counted by identifying the number of unique customer IDs in the program tracking database. A number of participants recycled more than one appliance.

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

Table 1-2: Ex Ante Per-Unit Annual kWh Savings

Measure	Ex Ante kWh	Source
Refrigerator	1,376	Ohio TRM
Freezer	1,244	Ohio TRM
Dehumidifier	1,075	Ohio TRM
Room Air Conditioner	122	Ohio TRM

Ex post gross electric savings were calculated through detailed analysis of program tracking data and participant survey data. ADM Associates, Inc. (ADM) conducted analyses of these data using statistical models containing inputs reported in participant survey data and evaluation protocols that have been utilized to evaluate similar recycling programs. ADM compared these results to the deemed savings values reported in the TRM. Per Ohio RC §4928.662, the methodology that generated higher energy savings was selected for each appliance category.

Annual *Ex post* verified electric savings were 39,989,637 kWh (a realization rate of 98 percent). *Ex post* verified peak demand reduction was 6,659 kW. Detailed tables listing energy savings and demand reductions by measure type can be found in Appendix A. *Ex post* gross energy savings (kWh) and peak demand reduction (kW) for the program in the three service territories are compared to *ex ante* estimates in Table 1-3.

Table 1-3: Overall Evaluation Results[3]

Utility	Ex Ante Expected Gross Savings		Ex Post Verified Gross Savings		Realization Rate	
	Gross kWh	Gross kW	Gross kWh	Gross kW	kWh	kW
CEI	14,166,114	2,771	13,907,138	2,318	98%	84%
OE	21,677,468	4,183	21,247,198	3,534	98%	84%
TE	4,922,369	965	4,835,300	806	98%	84%
All Companies	40,765,951	7,918	39,989,637	6,659	98%	84%

A comprehensive process evaluation was performed during the 2017 program year.

Key findings from the process evaluation of the 2017 Appliance Turn-In Program include:

- Overall, the program is running very smoothly and effectively. Participation and satisfaction are both very high and the program is achieving its goal of moving old,

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

inefficient appliances off the grid. Additionally, responding customers are satisfied with the pick-up process and the program overall.

- Communication is strong. The program maintains open lines of communication between the Companies and the implementation contractor, Recleim.

- Bill inserts are the primary means by which people learn about the Appliance Turn-In Program. It will be important to continue to monitor sources of program awareness as the Companies move more towards paperless billing. With bill inserts driving most of the participation, other marketing materials may be needed if fewer people are receiving physical bills.

- Customers reported high levels of satisfaction with the VISA rebate cards, although some customers (39%) still prefer the option to receive a check. The primary source of dissatisfaction is the time it takes to receive the card which was typically from customers whose pickup occurred earlier in the month.   VISA rebate cards are sent to customers at the beginning of the next calendar month after appliance pick-up.

  - The program included a few additional offerings during the 2017 program year. Appliances picked up between September 1 and November 30 were offered an increased incentive of $75 for refrigerators and freezers to increase participation, rather than the standing $50 incentive. Also, at the beginning of September, the program began providing a four-pack of LED bulbs with literature on where to purchase additional bulbs through our Lighting Discount program to those customers who recycled an eligible appliance.

2. Introduction and Purpose of Study

Under contract with FirstEnergy's Ohio Utilities, The Cleveland Electric Illuminating Company (CEI), Ohio Edison Company (OE), and The Toledo Edison Company (TE) (collectively "Companies"), ADM Associates, Inc. (ADM) performed evaluation, measurement and verification (M&V) activities and confirmed the energy savings and demand reduction realized through the energy efficiency programs that the Companies implemented in Ohio in 2017. The purpose of this report is to present the results of the impact evaluation effort undertaken by ADM to verify the energy savings and peak demand reductions that resulted from appliances collected and recycled, as further described in Section 3, through the Appliance Turn-In Program during 2017. Additionally, this report presents the results of the process evaluation of the program completed by ADM and Tetra Tech focusing on participant and program staff perspectives regarding the program's implementation.

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

- How many eligible refrigerators, freezers, dehumidifiers, and room air conditioners were collected for recycling?
- How many of the appliances were removed from the grid without replacement?
- What is the average annual kWh savings per collected appliance?
- What is the average kW reduction per collected appliance?
- What fraction of collected appliances were either not used, or used only part-time over the past year?

The goal of the process evaluation component was to determine how effective the program is in terms of customer satisfaction, customer awareness, and stakeholder interaction. The process evaluation was framed by the following six research questions:

- How effective were the marketing efforts for the program? Which marketing methods were most effective?
- How well did Company staff and the implementation team work together?
- Were the program participants satisfied with their experience? What was the level of satisfaction with the incentive amount, the scheduling process, and the pickup process? Did the increased incentive amount for part of the program year drive program participation satisfaction?
- Did the addition of providing customers packs of 4 LED light bulbs during the pick-up and removal service increase participant satisfaction in the program?
- Were there any significant changes or new obstacles during the 2017 program year?
- What changes can be made to the program's design or delivery to improve its effectiveness in future program years?

3. Description of Program

The Appliance Turn-In Program offers rebates to customers who recycle their old but working refrigerator or freezer. Dehumidifiers and room air conditioners (RAC) are also eligible to be recycled but must be recycled along with an eligible refrigerator or freezer. The goal of the program is to reduce the number of old, inefficient working refrigerators and freezers that customers have moved to their garages or other locations, such as basements or patios, and to have the old units recycled in a responsible manner. The program was brought back to the portfolio in 2017 and has transitioned to Recleim as the implementer.

To be eligible, refrigerators and freezers must be between 10 and 30 cubic feet, operational (i.e., able to cool), and must be empty at the time of pickup. Within four to six weeks of their appliance pickup, customers receive a $50 rebate for each recycled refrigerator or freezer and $25 for each recycled dehumidifier or room air conditioner in addition to the free pick-up and removal service. Appliances picked up between September 1 and November 30 were offered an increased incentive of $75 for refrigerators and freezers, to increase the number of appliances recycled through the program. Also, at the beginning of September, the program began providing a pack of four LED bulbs to those customers who recycled an eligible appliance. This was done to promote FirstEnergy Ohio's Energy Efficient Products program.

The program targets residential electric customers, single-family homeowners, empty-nesters, and recent movers, though a wide variety of residential customers participate. Marketing efforts include bill inserts, newspaper, TV and radio ads, and marketing materials at retailers. The program is also marketed through other Companies' programs, including the Energy Efficient Products, Energy Conservation Kits, and Energy Efficient Homes programs. Customers can either enroll online or by calling a toll-free number.

4. Methodology

This chapter provides a description of the methodology applied by ADM in the evaluation of the 2017 Appliance Turn-In Program. The chapter is divided into two sections: impact evaluation methodology and process evaluation methodology.

4.1 Impact Evaluation Methodology

Per Ohio RC §4928.662, 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 using the Uniform Methods Project (UMP) methodology described below ("As Found"). The values reported for both *ex ante* and *ex post* energy savings (kWh) and peak demand reduction (kW) represent the higher calculated value obtained from both methodologies.

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

- How many eligible refrigerators, freezers, dehumidifiers, and RACs were collected for recycling?

- How many of the appliances were replaced and how many represent a net removal from the grid?

- What is the average annual kWh savings per collected appliance?

- What is the average kW reduction per collected appliance?

- What fraction of collected appliances were either not used, or used only part-time over the past year?

The methodology used to address each of these questions is detailed in the following sections.

4.1.1 Data Collection Verification of Units Recycled

A first aspect of conducting measurements of program activity is to verify the number of refrigerators, freezers, dehumidifiers, and RACs collected and recycled. ADM completed the following steps in the verification effort:

- Validating program tracking data provided in the Vision DSM SSRS reporting system by checking for duplicate or erroneous entries; and,

- Conducting verification telephone surveys with a statistically valid sample of program participants. The focus of these verification surveys was to verify that customers listed in the program tracking database did indeed participate and that the number of appliances claimed to be recycled was accurate. Additionally, survey respondents

were asked a series of questions to verify the working condition of their recycled appliances; it is a program requirement that collected units be in working condition at the time of pick-up.

As the first step toward verification, tracking data for the program provided by Recleim through the Vision DSM SSRS reporting system were reviewed. The numbers of refrigerators, freezers, dehumidifiers, and RACs reported in the program tracking data that were recycled during 2017 are shown in Table 4-1.

Table 4-1: Appliances Recycled in 2017

Utility	Number of Refrigerators Collected	Number of Freezers Collected	Number of RACs Collected	Number of Dehumidifiers Collected
CEI	8,219	1,940	480	358
OE	12,102	3,399	680	664
TE	2,819	728	169	109
All Companies	23,140	6,067	1,329	1,131

As the table above shows, the majority of program participation was represented by recycled refrigerators. Freezer units were a distant second, and RACs were the third, while dehumidifiers represented the smallest portion of program participation. Refrigerators represent approximately 78% of the *ex ante* kWh savings claimed for the program, freezers represent approximately 19%, dehumidifiers represent approximately 3%, and RACs represent less than 1%.

4.2   Sampling Strategy

A random sample was selected to ensure that 90 percent confidence with ±10 percent relative precision or better would be achieved for each utility.

For the calculation of sample size, a coefficient of variation of 0.5 was assumed.[4] With this assumption, a minimum sample size of 68 participants per utility was required, as shown in the following formula:

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

Minimum Sample Size Formula for 90 Percent Confidence Level

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

Where:

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

ADM conducted phone surveys with 285 participants across the three service territories. Specifically, 95 surveys were completed with customers from each of the three operating companies. The instrument for the survey is provided in Appendix B. Survey respondents were asked a number of appliance-specific questions.

In addition to the phone surveys, ADM performed 70 ride-along verification visits across three utilities with the program implementer, Recleim to observe the collection and recycling processes.

Table 4-2 below presents sample points from phone surveys and ride along varication activities in 2017 categorized by measure type.

Table 4-2: Sample points by measure type

Utility	Number of collected Appliances			
	Refrigerators	Freezers	RACs	Dehumidifiers
CEI	76	14	8	2
OE	83	17	4	4
TE	86	14	6	-
Total	245	45	18	6

The results of this survey and ride-along effort were used to verify the number of program eligible appliances recycled in 2017. Overall, ADM sampled 355 (285 phone surveys and 70 ride along visits) participants, which satisfied the target precision and minimum sample size of the sampling strategy and accounted for the variation in measure type.

4.3 Calculating Gross Annual kWh Savings per Appliance

Ex ante savings estimates for the Companies' Appliance Turn-In Program were taken directly from the *State of Ohio Energy Efficiency Technical Reference Manual* (TRM) for units recycled during 2017. These values are 1,376 kWh per refrigerator, 1,244 kWh per freezer, 1,075 kWh per dehumidifier, and 122 kWh per RAC[5] recycled through the program.

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[5] The annual kWh savings for RACs is based on an assumed average capacity of 10,000 Btuh as opposed to the 8,500 Btuh assumed in the TRM.

During the impact evaluation effort, ADM calculated annual kWh savings for measures in the program using both the deemed savings values from the OH TRM and the as found methodology described in the following sections. The higher gross annual kWh values were extrapolated to the population of 2017 recycled units to obtain a program-level estimate of gross kWh savings resulting from refrigerator and freezer recycling per Ohio RC §4928.662.

The estimated savings from the as found methodologies were assessed by developing separate, independent gross unit energy consumption (UEC) estimates for refrigerators, freezers, dehumidifiers, and RACs recycled through the program in 2017. The details regarding how these UEC estimates were developed are provided in the following sections.

Refrigerators and Freezers

Gross savings for refrigerators and freezers recycled through utility pickup programs have been estimated in previous impact evaluations by using multiple linear regression analysis to determine UECs. In analytical terms, the regression analysis involves estimating the parameters of a regression model:

$$UEC = \text{function of } (V_1, V_2, V_3, \ldots, V_n)$$

Where UEC is a measure of the annual energy use of a refrigerator and the V_i are independent variables (e.g., age, configuration, etc.) used to explain the amount of energy use. Energy use for the population of recycled appliances is then estimated by applying the regression equations to data characterizing these factors for all appliances in the population.

This regression-based approach to estimating refrigerator and freezer energy use is described in the U.S. Department of Energy's (DOE) *Uniform Methods Project Refrigerator Recycling Evaluation Protocol.*[6] The Uniform Methods Project (UMP) is a set of protocols under development by the DOE that provides straightforward methods for evaluating gross energy savings for common energy efficiency measures offered through utility-sponsored programs. The first set of protocols, which includes the refrigerator recycling evaluation protocol, was published in April of 2013. The refrigerator recycling evaluation protocol includes a previously developed regression model based on in-situ monitoring from 472 refrigerators recycled through five separate utility-sponsored programs. The regression model estimates refrigerator energy usage (kWh) based on a number of appliance characteristics including age, size, configuration, usage (primary/secondary), and location (conditioned or unconditioned space).

ADM used this regression model developed by the UMP to estimate the UEC for refrigerators recycled through the Companies' program. Specifically, the average characteristics of refrigerators recycled through the program were multiplied by the associated coefficients from the UMP model and summed to produce an estimated

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[6] http://www1.eere.energy.gov/wip/pdfs/53827-7.pdf

average UEC for refrigerators recycled through the program. This average UEC represents an estimate of the annual energy usage of the average refrigerator recycled through the program in 2017. The program tracking data collected by Recleim and stored in the VisionDSM database contained much of the necessary appliance characteristic data needed to use the UMP model. ADM supplemented the program tracking data with survey data from program participants regarding primary/secondary usage, and appliance location.

It is important to note that the UMP model only considers refrigerators. Accordingly, ADM used a refrigerator-to-freezer ratio factor to determine the average UEC for freezers. This refrigerator-to-freezer factor methodology is similar to that used by the NMR Group, Inc. in a recent evaluation of the Massachusetts Appliance Turn-in Program.[7] Using relevant secondary sources, ADM concluded that freezers on average use 15% less energy annually than refrigerators. This implies a refrigerator-to-freezer factor of 0.85. The analysis supporting this refrigerator-to-freezer factor is detailed in the previously mentioned Massachusetts Appliance Turn-In Program Evaluation performed by NMR Group, Inc.

Finally, a partial use factor, consistent with the UMP protocol, was developed for refrigerators and freezers to adjust UEC estimates to reflect the fact that not all recycled refrigerators would have operated year-round had they not been decommissioned. Secondary appliances are more likely to be unplugged for a portion of the year than primary appliances, and since there was a large presence of secondary appliances in the program, the partial use factor is an important consideration when developing gross savings estimates.

Based on the proceeding discussion, the procedure used by ADM to estimate gross energy savings (kWh) for the refrigerators and freezers recycled through the program can be summarized by the following steps:

1) The UMP model was used to predict the average UEC for participating refrigerators in 2017 based on the average refrigerator characteristics established from Recleim tracking data and participant surveying.
2) Freezer UEC was obtained by multiplying the estimated refrigerator UEC by the refrigerator-to-freezer factor of 0.85 to obtain estimates of the average freezer UECs.
3) Partial-use factors were applied to the UEC estimates to account for the fact that some appliances would likely not be plugged in year-around had they not been decommissioned.

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[7] NMR Group, Inc. *Massachusetts Appliance Turn-in Program Impact Evaluation, Final.* June 15th, 2011. Available at: http://ma-eeac.org/wordpress/wp-content/uploads/Impact-Evaluation-Final-Report.pdf

Room Air Conditioners (RACs)

Calculating gross kWh savings for recycled room air conditioners was done in accordance with the algorithms in the Energy Star Room AC Calculator.[8] For the sake of consistency with the methodology outlined in the TRM, savings were adjusted for units that were replaced by new RACs after recycling. The percentage of units replaced by new RACs was assumed to be 76% based on assumptions presented in the TRM. As part of the participant survey, respondents were asked to identify whether they replaced the RACs they recycled. The survey results suggest that 50% of RACs were replaced directly with new RACs, while an additional 17% of recycled RACs were supplanted by new central AC systems. While these results suggest that the actual direct replacement rate may be less than the 76% stipulation in the TRM, the cooling load in participant homes is likely met by new or existing equipment in most cases. The standard TRM algorithm may not be appropriate in all cases, given the various replacement scenarios. However, because RAC recycling makes up such a small percentage of program savings, the stipulated 76% replacement value from the TRM was used. The following formula was used to calculate kWh savings for the average RAC recycled through the program:

$$Annual\ kWh\ Savings = \frac{EFLH * \left(\frac{CAPY_{existing}}{EER_{existing}}\right)}{1000} - (\%replaced * \frac{EFLH * \left(\frac{CAPY_{newbase}}{EER_{newbase}}\right)}{1000})$$

Where:

$EFLH$ = Effective Full Load Cooling Hours

$CAPY_{existing}$ = Capacity of the average collected unit (in BtuH).

$CAPY_{newbase}$ = Capacity of the baseline replacement unit (in BtuH).

$EER_{existing}$ = The Energy Efficiency Ratio of the average collected unit.

$EER_{newbase}$ = The Energy Efficiency Ratio of the baseline replacement unit.

%replaced = The percentage of collected units replaced.

Furthermore, performance degradation of existing room air conditioners was accounted for using the methodology established by the National Renewable Energy Laboratory's 2006 "*Building America Performance Analysis Procedures for Existing Homes*" booklet[9]. Specifically, the following equation was used to degrade the existing room air conditioners' at-manufacture EER value:

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[8]http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorRoomAC.xls?7e02-5075

[9] NREL (2006). "*Building America Performance Analysis Procedures for Existing Homes.*" https://www.nrel.gov/docs/fy06osti/38238.pdf

$$EER_{degrade} = \left(EER_{At-manufacture}\right) * (1 - M)^{age}$$

Where:

   $EER_{degrade}$ = Estimated EER at time of collection.

   $EER_{At-manufacture}$ = At-manufacture EER

   M = Maintenance Factor (0.02[10])

   Age = Age of unit at time of collection in years.

Information regarding the age of collected RACs was provided in the tracking database. The Association of Home Appliance Manufacturers (AHAM) maintains sales-weighted average capacity and EER data going back to 1972[11]. The most recent year that the data was available was 2010[12]. Some interpolation was required for the years 1973 and 1979 and 1998.

Using this AHAM data, each RAC recycled through the program was assigned a proxy EER value based on the units age reported in the tracking system. For RACs whose reported age indicated a vintage before 1972, the sales-weighted average EER for 1972 was used as a proxy. For RACs whose reported age indicated a 2011 or 2012 vintage, the sales-weighted average EER for 2010 was used as a proxy. The EER values were then adjusted to account for equipment degradation as described above. The baseline replacement RAC was assumed to have an EER equal to the sales-weighted average RAC in 2010 from the AHAM data (EER = 10.18). Effective Full Load Hours (EFLH) were assumed to be 233 hours based on the assumptions in the TRM. The existing and new baseline capacity was assumed to be 10,000 BtuH based on the assumptions in the Energy Star Room Air Conditioner Savings Calculator.

Dehumidifiers

Calculating energy savings for participating dehumidifiers was done in accordance with the Ohio TRM with updated run hours per EnergyStar revisions. Savings were adjusted for units that were retired and recycled without a direct replacement. Therefore, the energy savings were the same as energy consumptions. The kWh energy savings per

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[10] On page 11 of "*Building America Performance Analysis Procedures for Existing Homes.*", the professional maintenance factor is 0.01, and the seldom or never maintained factor is 0.03. ADM decided to take 0.02 as a conservative assumption.

[11] This AHAM data was accessed from two sources:
   1. https://rtf.nwcouncil.org/meeting/rtf-meeting-march-1-2011
   2. https://ieer.org/wp/wp-content/uploads/2012/03/DOE-2011-Buildings-Energy-DataBook-BEDB-tables.xlsx

[12] The data applied to this report was still the most recent version based on ADM's verification.

unit was taken to be equal to the Federal Standard dehumidifier energy consumptions by capacity. The table below showed the Federal Standard kWh consumptions by capacity.

Table 4-3: Federal Standard Unit kWh Consumption of Dehumidifier

Capacity	kWh per Unit
<25	720.47
>25 to 35	804.10
>35 to 45	989.66
>45 to 54	1,224.71
>54 to 75	1,383.05
>75 to 185	1,326.59

The peak kW reduction for recycling a dehumidifier was taken to be equal to the peak demand of the recycled unit.

Energy and demand savings is the estimated energy consumption of the retired unit over its remaining useful life (RUL).

4.4   Calculating Gross Peak Demand (kW) Savings

During the calculation of gross peak demand (kW) effort, ADM calculated kW values for measures in the program using both the deemed values from the OH TRM and the as found methodology described in the following sections. The higher kW values from OH TRM for refrigerators, freezers were extrapolated to the population of 2017 recycled units to obtain a program-level estimate of gross peak demand savings resulting from refrigerator and freezer recycling per Ohio RC §4928.662. The OH TRM kW savings per unit was 0.22 for refrigerators and 0.20 for freezers.

Refrigerators and Freezers

Gross peak demand savings were calculated based on the algorithms and stipulations specified in the TRM. For refrigerators and freezers, the TRM stipulates that summer coincident peak demand savings are estimated by dividing verified gross per-unit kWh savings by 8,760 and multiplying by a temperature adjustment factor of 1.30[13] as well as a load shape adjustment factor of 1.074.[14]

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[13] Temperature adjustment factor based on Blasnik, Michael, "Measurement and Verification of Residential Refrigerator Energy Use, Final Report, 2003-2004 Metering Study", July 29, 2004 (p. 47). It assumes 64% of Ohio homes have central air conditioning.

[14] Daily load shape adjustment factor also based on Blasnik, Michael, "Measurement and Verification of Residential Refrigerator Energy Use, Final Report, 2003-2004 Metering Study", July 29, 2004 (p. 48, using the average Existing Units Summer Profile for hours ending 16 through 18)

Room Air Conditioners (RACs)

For room air conditioning units, the TRM stipulates that summer coincident peak demand savings are estimated using a summer peak coincidence factor of 0.3.[15] While the algorithm for calculating RAC peak kW reduction presented in the TRM is reasonable, there is an order-of-operations error in the TRM that results in an over-statement of the intended calculation's actual per-unit reduction. ADM corrected this error in applying the TRM algorithm for RACs recycled through the program in 2017. The error generated kW value per unit of 1.07. The verified *ex post* kW savings per unit was 0.21.

Dehumidifiers

For dehumidifiers, the peak demand savings for recycling a dehumidifier were taken to be equal to the peak demand of the recycled unit. The verified ex post kW savings per unit was 0.15.

4.5 Calculating Lifetime kWh Savings

Lifetime kWh savings were calculated by multiplying *ex post* verified annual gross kWh estimates by remaining useful life (RUL) values for each appliance type. The RUL values used were eight years for refrigerators and freezers, three years for RACs, and three years for dehumidifiers based on the assumptions presented in the TRM.

4.6 Calculating the Percent of Savings from Income Qualified Customers

Questions were added to the evaluation survey to assess low-income participation in this program. The survey was administered so that the customer disclosed their annual income range from a series of categories. Customers also reported the number of occupants in the household. This information was used to support the determination of whether the household is above or below 150% of Federal Poverty Level (FPL). Respondents were as low-income-qualified if the stated incomes were below 150% of FPL (Table 4-4).

Table 4-4: 2017 Federal poverty levels and 150% of poverty levels.

Persons in Household	2017 Federal Poverty Level	150% Federal Poverty Level
1	$12,060	$18,090
2	$16,240	$24,360

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[15] Consistent with coincidence factors found in: RLW Report: Final Report Coincidence Factor Study Residential Room Air Conditioners, June 23, 2008 (http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/National%20Grid/117_R LW_CF%20Res% 20RAC.pdf)

3	$20,420	$30,630
4	$24,600	$36,900
5	$28,780	$43,170
6	$32,960	$49,440
7	$37,140	$55,710
8	$41,320	$61,980

The Participant survey results were sorted by the number of people reported in each household and the household income ranges that fall below the 150% Federal Poverty Level shown in Table 4-4. For each of these groupings of occupants and incomes, ADM further broke down the data by reported participants in each EDC by measure type. Once these counts of low-income participants are calculated for each group in Table 4-4, they are summed up to get the number of low-income participants in each EDC by measure type. Because the survey represents a statically valid sample for the program population we can use the percentages calculated from the numbers of low-income participants relative to the number of participants in the entire survey, to assess the savings for low-income participants in the program. To calculate the savings for the low-income portion of the program participants, the ex-post energy and demand savings are multiplied by the percentage of low-income participants by EDC.

4.7 Process Evaluation Methodology

The process evaluation component of this report was designed to address the following researchable questions:

- How satisfied are customers with various aspects of the program?

- What are the characteristics of the appliances being recycled?

- How effective were the marketing efforts for the program? Which marketing methods were most effective?

- How well did the program team (the Companies and Recleim) work together?

- What changes, if any, could be made to the program's design or delivery to improve its effectiveness in future program years?

- What are the characteristics of the customers participating in the program?

- What were significant changes or new obstacles during the 2017 program year?

The data collection activities used to address these researchable questions are discussed in the following sections.

Participant Telephone Interviews

Telephone surveys of customers who participated in the program between February and October in 2017 were conducted by VuPoint Research in October and November 2017. In total, 285 customers completed the survey. The survey questions were developed by ADM with input from Tetra Tech and focused on the pick-up process, appliance characteristics, customer characteristics, and customer satisfaction. The survey sample was selected to ensure representativeness across the three EDCs.

Program Staff Interviews

Tetra Tech, under a subcontract with ADM, conducted in-depth interviews with program staff from the Companies and Recleim. The interviews were conducted during October of 2017. The objective of these interviews was to gather feedback from the Appliance Turn-In Program implementation staff to determine how the program is operating and to collect suggestions for potential future program improvements. In total, Tetra Tech conducted two in-depth interviews. The interview questions were developed by Tetra Tech with input from ADM and focused on program operations and suggestions for improvement.

5. Detailed Impact Evaluation Findings

This chapter presents the findings of the impact evaluation of the 2017 Appliance Turn-In Program.

5.1 Verification of Units Recycled

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data contained in the VisionDSM SSRS reporting system for accuracy. No duplicate entries were discovered. To verify that the number of units claimed in the program tracking database was accurate, ADM administered a telephone survey with a sample of program participants.

The telephone surveys were completed with 285 customers who participated in the Appliance Turn-In Program by recycling at least one appliance in 2017. These respondents were evenly distributed across the three EDCs with 95 completed surveys for each. All 285 respondents who completed the participant survey verified that they had in fact participated in the program during 2017. All except four of the survey respondents also indicated that the number or type of appliances recycled was identical to the claims in the program tracking database. The four respondents who claimed they recycled different appliance types or quantities are shown in Table 5-1 below. Overall, these discrepancies make up less than 2% of survey respondents. Because the program tracking data includes detailed model information, it is likely these discrepancies reflect survey respondent recall issues. No changes to the number of units recycled were made based on these survey responses.

Table 5-1: Survey Respondent Appliance Type/Quantity Differences

Respondent Number	Database Claim	Respondent Claim	Quantity Difference
1	1 Refrigerator	0 Refrigerator	+1 Refrigerator
2	1 Refrigerator	2 Refrigerator	-1 Refrigerator
3	1 Refrigerator	2 Refrigerator	-1 Refrigerator
4	1 RACs	0 RACs	+1 RAC
		Total	+1 RAC, - 1 Refrigerator

In order for participating appliances to accrue energy savings by being taken out of service, the units must be in working condition at the time of pick-up. Both survey and ride along respondents were questioned regarding whether the recycled appliances were in working condition at the time of pick-up. Across the three service territories, only five (three refrigerators, one freezer, and one dehumidifier) out of 314 appliances were reported as non-working at the time of pickup. These non-working designations included a follow-up question to ensure that by "not working" the respondents did not mean anything cosmetic or otherwise unrelated to the energy use of the appliance. Survey

respondents for all of the other 309 appliances indicated that their units were in working condition at the time of pick-up, as expected based on the program requirements.

Based on these results, the verification rates shown in Table 5-2 for each utility and each appliance were determined:

Table 5-2: Verification Rates by Appliance Type

Metric	Appliance Type			
	Refrigerator	Freezer	RAC	Dehumidifiers
Verification Rate	98.8%	97.8%	100%	100%[16]

Based on these verification rates, Table 5-3 reports the numbers of refrigerators, freezers, RACs, and dehumidifiers recycled through the program during 2017 that were verified as being in working condition when recycled and therefore program-eligible.

Table 5-3: Recycled Appliances Verified to be in Working Condition

Utility	Quantity Reported as Recycled	Verification Rate	Quantity of Recycled Units Verified as Program Eligible
CEI			
Refrigerator	8,219	98.8%	8,118
Freezer	1,940	97.8%	1,897
RAC	480	100%	480
Dehumidifier	358	100%	358
OE			
Refrigerator	12,102	98.8%	11,954
Freezer	3,399	97.8%	3,323
RAC	680	100%	680
Dehumidifier	664	100%	664
TE			
Refrigerator	2,819	98.8%	2,784
Freezer	728	97.8%	712
RAC	169	100%	169
Dehumidifier	109	100%	109

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[16] While the verification rate produced for dehumidifiers through ride along and phone surveys was 83.3%, the number of customers involving dehumidifiers was too low to avoid introducing bias. Therefore, ADM decided to adjust the verification rate to 100% to prevent biased impact.

5.2   Gross Annual kWh Savings per Appliance

Gross annual kWh savings were calculated as described in chapter four of this report per Ohio RC §4928.662. The details and results of these calculations are reported in this section. The table below shows the results:

Table 5-4: Gross Annual kWh Savings per Appliance

Appliance Type	Ex Ante kWh per Unit	Ex Post kWh per Unit	Overall Ex Ante kWh	Overall Ex Post kWh
Refrigerators	1,376	1,376	31,840,640	31,450,755
Freezers	1,244	1,244	7,547,348	7,379,629
RACs	122	162	162,138	215,128
Dehumidifiers	1,075	835	1,215,825	944,125
Total			40,765,951	39,989,637

5.2.1   Refrigerators and Freezers

For refrigerators, both UMP and OH TRM methodologies were applied to the gross savings calculation per Ohio RC §4928.662. The findings are presented below.

UMP

Unit Energy Consumption (UEC) estimates were derived using the UMP regression model developed based on in-situ metering data from 472 refrigerators just before decommissioning. The model specification and estimated coefficients of the UMP model are shown in Table 5-5.

Table 5-5: DOE Uniform Methods Project UEC Regression Details[17]

(Dependent Variable – Daily kWh)

Independent Variables	Coefficient
Intercept	0.582
Appliance Age	0.027
Dummy: Manufactured Pre-1990	1.055
Appliance Size (cubic feet)	0.067
Dummy: Single-Door Configuration	-1.977
Dummy: Side-by-Side Configuration	1.071
Dummy: Primary Usage Type (in absence of program)	0.605
Interaction: Located in Unconditioned Space x CDD	0.020

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[17] Source: Uniform Methods Project Refrigerator Recycling Evaluation Protocol.

Interaction: Located in Unconditioned Space x HDD	-0.045

The program tracking database included information regarding configuration, size, age,[18] and pickup address for the 23,140 refrigerators collected in 2017. Of these 23,140 refrigerators, 64.3% were top freezer; 24.3% were side-by-side models; 6.2% were single door models;[19] the average size was 18.80 cubic feet; 25.3% percent were manufactured before 1990 and the average age was 22.34 years old. Additionally, the participant survey asked respondents to indicate whether their refrigerators were primary or secondary appliances. Across the three companies, 51% of respondents indicated the recycled unit was a primary refrigerator. Respondents also indicated that 66.5% of the recycled refrigerators and freezers were located in spaces that are generally unconditioned, such as a garage or porch. This information, along with TMY3 heating and cooling degree days (base temperature = 65F) for the Ohio reference cities outlined in the TRM were used to generate the final two interaction variables.

Table 5-6 shows all of the refrigerator characteristics relevant to the UMP model.

Table 5-6: 2017 Program Refrigerator Characteristics

Appliance Characteristic	Average for Refrigerators
Appliance Age (Years)	22.34
Percentage of Units Manufactured before 1990	25%
Average Size (Cubic Feet)	18.80
Percentage Single Door	6%
Percentage Side-by-Side	24%
Percentage Primary	51%
Interaction: Unconditioned Space x CDD	0.20
Interaction: Unconditioned Space x HDD	7.27

The refrigerator characteristics shown in Table 5-6 were used in conjunction with the model coefficients in Table 5-5 to calculate annual energy consumption estimates for verified refrigerators. The refrigerator-to-freezer factor of 0.85 was applied to develop annual energy consumption estimates for freezers. These calculations are shown below:

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[18] Model year is listed on refrigerator nameplates for many but not all units. As explained to ADM staff, when model year is not listed on the nameplate it is estimated based on appliance characteristics common to certain vintages.

[19] The complete breakdown of recycled refrigerator configuration is: 64.3% top freezer, 24.3% side-by-side, 6.2% single door, and 5.3% bottom freezer.

Refrigerator UEC (kWh)

365.25 (days per year)*[0.582 + 0.027*22.34(age) + 1.055*0.349(dummy: 1990) + 0.067*18.80 (size, cu. ft.)-1.977*0.06 (dummy: single door) + 1.071*0.24(dummy: sbs) + 0.6054*0.51 (dummy: primary) + 0.02*0.20 (CDD Interaction)-0.045*7.27 (HDD Interaction)] = 1,036 kWh

Freezer UEC (kWh)

$1,036 * 0.85\ (refrigerator - to - freezer\ factor) = 880\ kWh$

One final adjustment was made to account for the fact that not all refrigerators and freezers are plugged in year-round. This partial use adjustment assigns different part-use factors based on three categories into which recycled appliances fall:

1) Some units that were recycled are not likely to operate at all in the absence of the program. The part-use factor for such units, therefore, would be zero.

2) Other units are likely to have operated part-time in the absence of the program. For these units, the partial use factor is calculated by dividing the number of months in the past year that the unit had been plugged in and running by the number of months in the year (i.e., 12). Based on data collected through the survey of participants, the average number of months in use for a refrigerator that was being partially used was 1.2 months, implying a use factor of 0.1 (i.e., 1.2/12). For freezers in this category, the use factor was calculated to be 0.5, reflecting an average of 6.0 months in use for freezers being partly used.

3) Units used all the time have a use factor of one (1). It is assumed that all primary refrigerators operate all the time.

The overall part-use factor and the corresponding overall Unit Energy Savings (UES) are calculated as a weighted average across the three categories, where the weights are determined by the percentages of units falling into the three categories. It is worth noting that the information used to calculate the part-use factor is based on usage during the past year, under the assumption that the distribution of usage patterns for the population of recycled units would be similar in the absence of the program. Table 5-7 shows the calculation of the overall UES for refrigerators and freezers when partial use is taken into account.

Table 5-7: Unit Energy Savings Adjusted for Part-Use

Operating Status of Unit	Percentage of Recycled Units in Category	Use Factor	Calculation of UES to Adjust for Part Use
Refrigerators (n=245)			
Not running	10.81%	0	0
Running part time	12.97%	0.10	104
Running all time	76.22%	1.00	1,036
Weighted Average UES for Refrigerators			803
Freezers (n=45)			
Not running	8.33%	0	0
Running part time	16.67%	0.50	440
Running all time	75.00%	1.00	880
Weighted Average UES for Freezers			734

OH TRM

In accordance with the OH TRM methodology, the deemed in-situ factor, partial use factors, and UECs were applied to the calculation. These calculations are shown below:

Refrigerator (kWh)

$1{,}619 \ (\text{UEC}_{\text{retired}})*0.85 \ (\text{ISAF}) = 1{,}376 \ \text{kWh}$

$\text{UEC}_{\text{retired}}$ = Unit Energy Consumption of Retired Unit

$\text{In Situ Adjustment Factor}$ = In Situ Adjustment Factor.

- Adjustment to savings based on Ohio climate and whether the recycled appliance was a primary or secondary unit.

Freezer (kWh)

$1{,}464 \ (\text{UEC}_{\text{retired}})*0.85 \ (\text{ISAF}) = 1{,}244 \ \text{kWh}$

Per Ohio RC §4928.662, the *ex post* gross per-unit annual kWh savings from OH TRM are reported as the final ex post.

5.2.2   Room Air Conditioners (RACs)

AHAM Sales-weighted average EER values were applied to each RAC recycled through the program in 2017 based on the reported vintage. If the vintage was missing in the data set, the TRM deemed EER value was applied to the recycled unit. The resulting average EER value was 9.76. Appliance degradation was calculated using the methodology established by the National Renewable Energy Laboratory's 2006 "*Building America*

Performance Analysis Procedures for Existing Homes" booklet.[20] After accounting for degradation, the average EER for recycled RACs dropped to 6.94.

Based on the assumptions presented in the TRM, EFLH were assumed to be 233 hours per year and 76% of recycled units were assumed to be replaced. The average capacity for the existing and baseline replacement RACs was assumed to be 10,000 BtuH based on the assumptions in the Energy Star Room Air Conditioner Savings Calculator. This assumption is in line with the AHAM data implied an average of 10,004 BtuH for RACs recycled in 2017. The EER of replacement RACs was assumed to be 10.18 – the sales-weighted average RAC EER in 2010 according to AHAM data.

Based on these assumptions, gross per unit kWh savings for RACs recycled through the Appliance Turn-In Program in 2017 was calculated to be 162 kWh as follows:

$$
\begin{aligned}
Recycled\ &RAC\ Annual\ kWh\ Savings^{21} \\
&= (233\ (Hours) * 10,000\ (BtuH)\ /6.94\ (EER_{exist}))/1000 \\
&- (0.76\ (\%replaced) * (233 * (10,000/10.18(EER_{base})))/1000) \\
&= 162\ kWh
\end{aligned}
$$

The realization rate for room ACs was 133%. The variation in realization rate was caused by a lower *ex post* verified efficiency for both baseline and existing unit conditions. The *ex post* annual kWh savings from the as found methodology were reported as the final results in this report. The kW realization rate for room ACs was 19% there is an order-of-operations error in the TRM that results in an over-statement of the intended calculation's actual per-unit reduction. ADM corrected this error in applying the TRM algorithm for RACs recycled through the program in 2017. The error generated kW value per unit of 1.07. The verified *ex post* kW savings per unit was 0.21.

5.2.3   Dehumidifiers

Calculating energy savings for participating dehumidifiers was done in accordance with the Ohio TRM with updated runtimes for EnergyStar. Savings were adjusted for units that were retired and recycled without a direct replacement. The kWh energy savings per unit was taken to be equal to the Federal Standard dehumidifier unit energy consumptions by capacity. Energy impacts were based only on the existing unit, and savings apply only for the remaining useful (RUL) of the unit. Based on the algorithms, the gross per unit kWh savings across all capacities of dehumidifiers recycled through 2017 was calculated to be 835.

The *ex ante* kWh savings per unit provided in the tracking data was 1,075, and the *ex post* verified kWh savings per unit were 835, which generated a 78% realization rate. The

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[20] NREL (2006). "*Building America Performance Analysis Procedures for Existing Homes.*" https://www.nrel.gov/docs/fy06osti/38238.pdf Any efficiency lower than 9.75 was adjusted to 9.75 so the applicable formula could be correctly applied. Degradation EERs were caped at 6.83. (VEIC comments EER value)

[21] The formula and methodology were defined on page 4-6.

variation in realization rate was caused by the difference in savings calculation methodologies. The *ex ante* reported savings were the straight average unit energy consumption across all different capacities of dehumidifiers referenced in the Ohio TRM for downstream rebated dehumidifiers. However, the *ex post* energy savings were verified and calculated based on the actual capacity of each unit recycled in 2017.

5.3 Gross Peak Demand (kW) Savings per Appliance

The gross peak demand (kW) savings were calculated as described in chapter four of this report per the Companies' interpretation of Ohio RC §4928.662. The details and results of these calculations are reported in this section. The table below shows the results:

Table 5-8: Gross Peak Demand (kW) Savings per Appliance

Appliance Type	Ex Ante kW per Unit	Ex Post kW per Unit	Overall Ex Ante kW	Overall Ex Post kW
Refrigerators	0.22	0.22	5,091	5,028
Freezers	0.20	0.20	1,213	1,186
RACs	1.07	0.21	1,422	277
Dehumidifiers	0.17	0.15	192	167
Total			7,918	6,659

The summer coincident peak demand savings formula, which incorporates a temperature adjustment factor and a load shape adjustment factor, was used to estimate the average kW reduction occurring during the PUCO defined on-peak period, for refrigerators and freezers.

For RACs, the summer coincident peak demand savings formula from the TRM was used to calculate the average kW reduction occurring during the PUCO defined on-peak period. The calculation was shown below:

$Recycled\ RAC\ Annual\ kW$[22]
$$= ((10000(BtuH) * (1/6.94\ (EER_{exist})) /1000) - (76\%(\%replaced)$$
$$* ((10000(BtuH) * (1/10.18EER_{newbase}))/1000 * 0.3(Coincidence\ Factor)$$
$$= 0.21$$

For dehumidifiers, the summer coincident peak demand savings for recycling a dehumidifier was taken to be equal to the peak demand of the recycled unit. The table below shows the peak demand savings by capacity:

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[22] The formula and methodology were defined on page 74 in Ohio TRM.

Table 5-9: Dehumidifier Retirement Peak Demand Reduction (kW)

Capacity in Pints per day	kW Reduction
≤25	0.1393
≤30	0.1458
≤35	0.1523
≤40	0.1588
≤45	0.1653
≤50	0.1718
≤60	0.1848
≤65	0.1913
≤70	0.1979
≤110	0.2499

Using the TRM methodology, ADM calculated an average on-peak demand reduction of 0.22 kW per recycled refrigerator, 0.20 kW per recycled freezer, 0.15 kW per recycled dehumidifier, and 0.21 kW per recycled RAC.

5.4 Lifetime kWh Savings per Appliance

Lifetime kWh savings were calculated by multiplying the gross annual kWh savings by assumed RULs for each appliance type. Based on the assumptions in the TRM, EUL values of eight years for refrigerators and freezers, three years for RACs and dehumidifiers. Table 5-10 shows the resulting per-unit lifetime kWh savings estimates.

Table 5-10: Per-Unit Lifetime kWh Savings

Appliance Type	Ex Post Per-Unit Annual kWh Savings	EUL (years)	Ex Post Per-Unit Lifetime kWh Savings
Refrigerators	1,376	8	11,008
Freezers	1,244	8	9,952
RACs	162	3	486
Dehumidifiers	835	3	2,505

5.5 Low-income Program Participation

The Companies expanded their evaluation, measurement and verification effort to identify participation and savings from low-income customers in the residential programs. A "low-income" customer was defined by household income below 150% of Federal Poverty Level. Table 5-11 shows the quantity of units, kWh, and kW that can be attributed to low-income population participant in the EE Products program.

Table 5-11: Savings Attributable to Low-income Customers

Appliance Turn-in	Percentage of Low-income Participants	Quantity	kWh Savings	kW Savings
CEI	15.8%	1,484	2,195,864	366
OE	11.6%	1,649	2,460,202	409
TE	16.8%	549	814,366	136
Total	**14.7%**	**3,965**	**5,893,210**	**981**

6. Detailed Process Evaluation Findings

This chapter presents the process evaluation findings for the Appliance Turn-In Program administered by 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"). These findings are based on in-depth interviews with program and implementation staff and quantitative participant surveys conducted by VuPoint Research. The evaluation team (ADM Associates and Tetra Tech) designed the research plan and identified implementation staff to interview in collaboration with the Companies.

6.1 Surveyed Participant Characteristics

Participant surveys were completed with 285 customers who participated in the Appliance Turn-In Program by recycling an appliance between February and October 2017. These respondents were evenly distributed across the three EDCs with 95 completed surveys for each.

The vast majority of respondents only recycled one appliance through the program (89%) and most of those were refrigerators (75%). Table 6-1 below shows the distribution, across EDC, of the number and type of appliances that were recycled by survey respondents.

Table 6-1: Number and Type of Appliances Recycled by EDC

Item Name	CEI	OE	TE	Overall
One appliance				
One refrigerator	78.8%	72.6%	72.6%	74.7%
One freezer	11.5%	14.6%	14.7%	13.6%
Two appliances				
One refrigerator and one freezer	2.1%	4.2%	2.1%	2.8%
One refrigerator and one dehumidifier	2.1%	4.2%	2.1%	2.8%
Two refrigerators	1.1%	1.1%	3.2%	1.7%
One refrigerator and one RAC	1.1%	1.1%	4.2%	2.0%
One freezer and one dehumidifier	0.0%	1.1%	0.0%	0.4%
Three appliances				
Two refrigerators and one RAC	0.0%	0.0%	1.1%	0.4%
One refrigerator, one dehumidifier, and one RAC	1.1%	0.0%	0.0%	0.4%
One refrigerator and two RACs	0.0%	1.1%	0.0%	0.4%

Item Name	CEI	OE	TE	Overall
One refrigerator and two dehumidifiers	1.1%	0.0%	0.0%	0.4%
One freezer and two RACs	1.1%	0.0%	0.0%	0.4%
Respondents (n)	**95**	**95**	**95**	**285**

6.2 Program management: Implementation and Oversight

In 2017, the Companies contracted with the implementation contractor, Recleim. While Recleim is new to the utility industry, a number of key staff members were previously employed by the former implementation contractor, resulting in an "almost seamless" transition. According to the Companies' staff, the program was up and running in "record speed" in 2017. Most of the processes in place under the previous implementation contractor have remained the same with the Companies' program manager working closely with the program manager at Recleim to ensure protocols and goals are being met by the program.

Recleim is involved in most aspects of the program. They run the call center where customers can call in to sign up for the program or ask questions. They also manage web enrollment in the program and coordinate appliance pick-ups with their pick-up contractor. Recleim is responsible for all marketing material which is carried out through their marketing subcontractor, RSE. Recleim provides the Companies with a monthly report containing call center statistics, the number of appliances recycled, average number of days for appliance pick-up, and "how heard" data with information on how customers found out about the program. Similar to the previous implementation contractor, the Companies also have access to Recleim's dashboard system, so they can monitor program activity in real time.

Staff at the Companies and Recleim both report an excellent working relationship with each other. Both are receiving the support, resources, and information that they need and neither party could think of anything they would change or improve.

6.3 Marketing and Program Awareness

Recleim is responsible for marketing the Appliance Turn-In Program which is implemented through their marketing subcontractor, RSE. They use a variety of marketing efforts, including bill inserts, TV, radio, newspaper, digital advertising, and press releases. All marketing materials are approved by the Companies' internal marketing team. Fliers for the program are also distributed at various retailers and provided in conjunction with other programs, including the Energy Efficient Products, Energy Conservation Kits, and Behavioral Modification programs.

Recleim collects data from each customer describing how the customer first heard about the program. This information is shared with RSE who develops annual reports to report the effectiveness of the various marketing campaigns and give recommendations for future marketing efforts. During staff interviews, both the Companies and Recleim reported bill inserts were their most effective marketing effort. The shift towards online billing was not seen by program staff as a hurdle for the program, but if that changes in the future, online advertising might become a more relevant way to market the program to customers.

While not currently being used as a marketing strategy, program staff interviews indicated including promotional materials for the program in move-in packets might be a good way to promote the program. The program caters to new movers because it gives them the opportunity to recycle and get money for an old appliance left by the previous owner. If the utility is already providing materials to the new homeowner, advertising for this program might be good to include as well.

Supporting the feedback from staff interviews, the majority of participant respondents indicated they heard about the program from bill inserts (47%). This is followed by word-of-mouth and TV advertisements (17% and 12%, respectively). TV advertisements were most prevalent among CEI respondents with 18% reporting they heard about the program that way, compared to 7% in OE and 12% in TE territory. A full summary of sources of awareness are shown in the figure below:
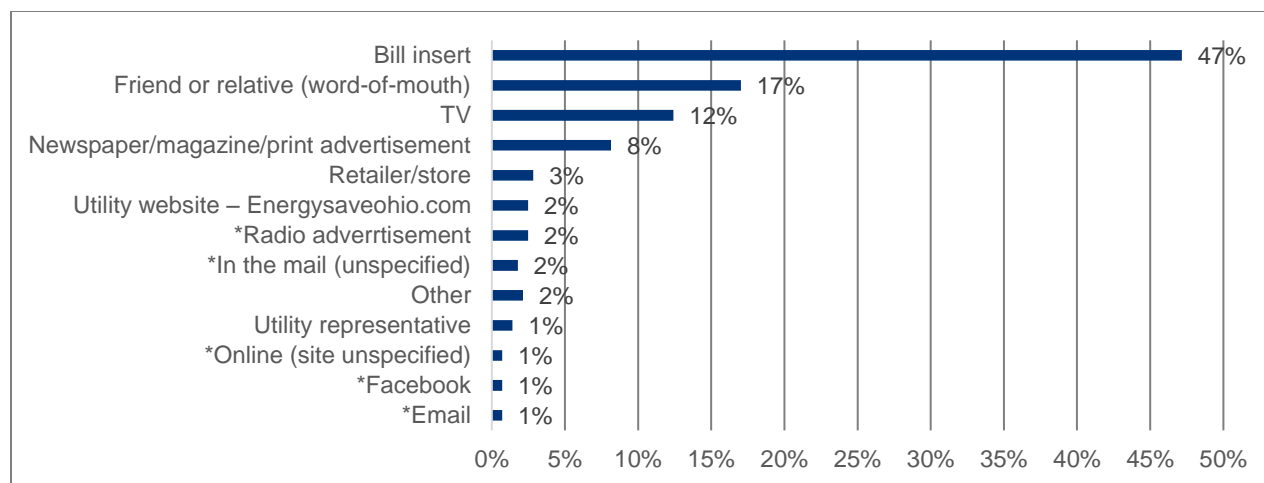
Figure 6-1: Sources of Program Awareness[23]

6.4 Pick-Up Process

To enroll in the program, customers can either call a toll-free number or enroll online on the Companies' websites. They are then given an appointment date along with access to an online customer portal to access information regarding their appointment. Two days

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[23] Response categories with an asterisk indicate that the category was computed during analysis

prior to their appointment, they receive an email or phone call with a four-hour window in which their appliance will be picked up, along with a confirmation phone call on the day of their appointment when the pick-up crew is close. A two-person pick-up crew will go to the home, remove the unit, record important information regarding the unit (i.e., make, model, size, age), and confirm that the unit is functioning. The crew will then disassemble the unit at the home and take the unit to a warehouse where it will go to the recycling plant. The customer will receive their rebate in the form of a VISA gift card in four to six weeks, depending on when the appliance was picked up, as rebates are issued at the end of the month. The process for picking up appliances remains largely the same as it was under the previous implementation contractor.

Using the VISA gift card instead of a check was a change for program year 2017. The gift card is a more cost-effective way of distributing rebates and allows the utility to brand the gift card with their logo. Customers are given the opportunity to request a check instead of a gift card, but less than 1% of participants requested a check this year, according to Recleim. See Section 6.7 for information on customer satisfaction with the rebate and the method of receiving it.

The pick-up experience reported by customers was very consistent with what was reported by program staff with all but one respondent reporting that they were called to confirm the pick-up date and 98% reporting that they were contacted by a representative on the actual day of their pick-up. The average reported number of days that passed before the appliance pick-up was 10 days, with 38% reporting only seven days passed from scheduling to pick-up. All surveyed customers reported that their pick-up crew behaved professionally.
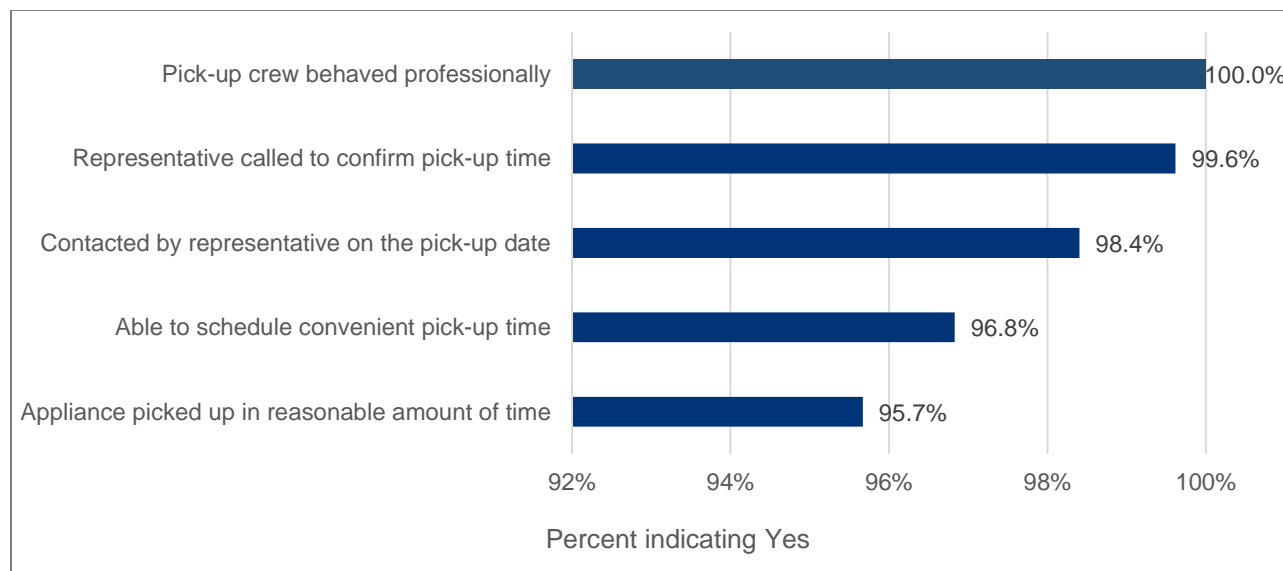

Figure 6-2: Pick-Up Experience

Customer satisfaction with the pick-up process was very high. Almost everyone was either "very satisfied" or "somewhat satisfied" with the scheduling of their pick-up (98%).

In addition to indicating that they behaved professionally, 95% of respondents reported that they were "very satisfied" with the crew, and another 4% indicated that they were "somewhat satisfied". Overall, 100% of respondents said they were either very satisfied or somewhat satisfied with the pick-up process overall.

6.5 Appliance Description

As the program is designed, recycled appliances tended to be older. Average ages of recycled appliances ranged between 20 and 17 years old for recycled freezers and refrigerators and between 15 and 12 years old for room air conditioners and dehumidifiers. Over half of refrigerators recycled were functioning as the primary unit. Almost all dehumidifiers were replaced with a new unit, along with almost three-fourths of refrigerators. A little over half of room air conditioners were replaced and less than half of freezers.

Recycled appliances also got a fair amount of use before they were recycled. Over three-fourths of refrigerators were running all the time in the year prior to being recycled, along with over two-thirds of freezers. They were also in fairly good condition with almost 90% of refrigerators and freezers and 100% of room air conditioners in good physical condition or needing only minor repairs prior to recycling. Dehumidifiers tended to need maintenance with a little over 60% needing minor repairs or in good condition. See Table 6-2 below for additional detail regarding recycled appliances.

Table 6-2: Recycled Appliance Characteristics[24]

Item Name	Refrigerator	Freezer	Room Air Conditioner	Dehumidifier
Average age	16.9	20.1	15.4	11.9
Function prior to recycling				
Primary	51%	NA	NA	NA
Secondary	49%	NA	NA	NA
Replaced with new unit	72%	41%	56%	91%
Location prior to recycling				
Garage	40%	39%	22%	0%
Kitchen	38%	8%	22%	0%
Basement	12%	33%	0%	100%
Porch/patio	7%	4%	0%	0%
Hallway	0%	2%	0%	0%
Bedroom	0%	0%	33%	0%

[24] All values in this table are self-reported.

Item Name	Refrigerator	Freezer	Room Air Conditioner	Dehumidifier
Living room	0%	0%	11%	0%
Other	2%	14%	11%	0%
How often used prior to recycling				
All of the time	78%	69%	NA	NA
During certain months of the year only	2%	6%	NA	NA
For special occasions only	11%	10%	NA	NA
Never plugged in or running	9%	15%	NA	NA
Condition prior to recycling				
Worked and was in a good physical condition	44%	61%	78%	27%
Worked but needed minor repair	45%	27%	22%	36%
Worked but needed major repair	10%	10%	NA	18%
It did not work	1%	2%	NA	18%
Respondents (n)	**242**	**49**	**10**	**12**

Respondents who indicated that their appliances needed at least minor repairs were asked to explain the problems that they were having with the appliance and these responses varied based on equipment type. For refrigerators and freezers, the most common response was that there was some sort of cosmetic damage to their unit. Other popular responses included not cooling properly and leaky units. See Table 6-3 below for the top five responses for each equipment type.

Table 6-3: Problems with Recycled Appliance (Top five responses)

Problem[25]	Percent
Refrigerator (n=125)	
*Cosmetic damage to the unit	20%
Would not cool consistently	16%
Would not keep food/room cold enough	12%
*Unit was leaking	8%
*Seal was broken/not working	7%
Freezer (n=19)	
*Cosmetic damage to the unit	21%
Would not keep food/room cold enough	21%
Would not keep food/room cold at all	16%
Do not know, but would not produce cold air	5%
Too Loud	5%
Room AC (n=2)	
Too Loud	50%
*Rained on and missing parts	50%
Dehumidifier (n=8)	
Too Loud	25%
Would not remove moisture	25%
Other[26]	50%

6.6 Decision Making Process

Most participant respondents found out about the program before deciding to recycle their appliances. Bill inserts and other advertising can contribute to the awareness of the program and respondent's decisions to participate in the program and recycle their old appliance. The Figure 6-3 below shows the distribution of when participants first heard about the program.

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[25] Response categories with an asterisk indicate that the category was computed during analysis.

[26] "Other" responses included: "did not work", "had a recall" and "bucket started to back up"
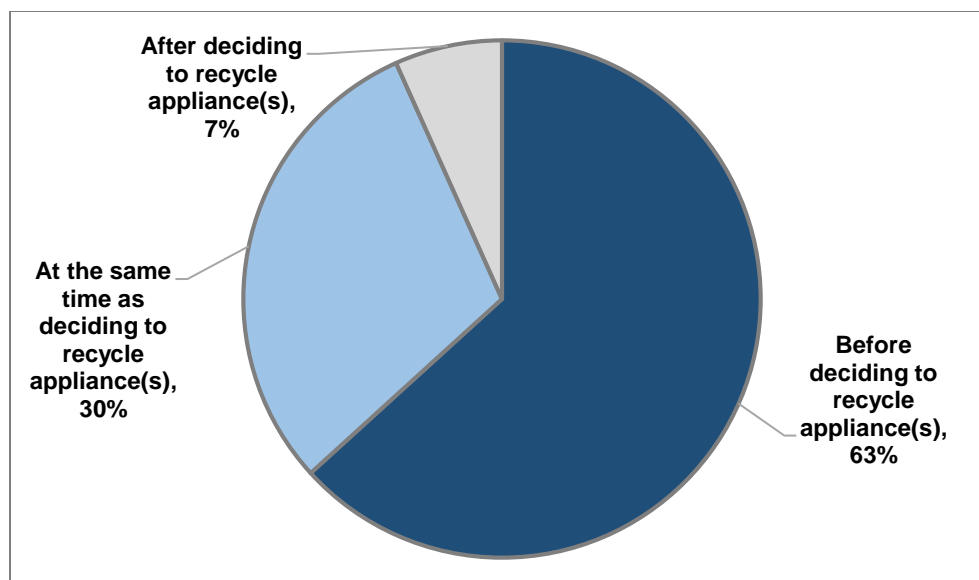
Figure 6-3: When First Heard About Program

While 63% of respondents reported that the decision was not made to recycle their appliance until they heard about the program, when asked about the specific appliances recycled, a majority of respondents said they had considered getting rid of their appliance before hearing about the program, with the highest proportion amongst those who recycled refrigerators. See the figure below for the distribution of these responses across equipment type.
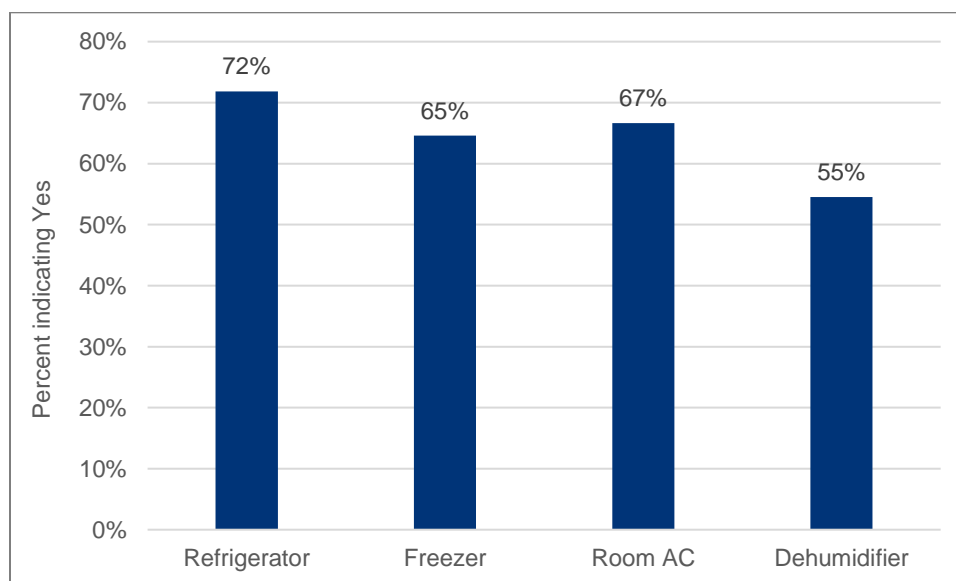
Figure 6-4: Considered Disposing of Appliance before Hearing about Program

When asked how they would have disposed of their appliance if they had not used the program, one of the most common responses across all appliance types was that they would have taken it to a dump or recycling center (27%). Other common responses were

that they would have sold it or given it away (21%), put in on the curb with a "Free" sign on it (13%), or hired someone to pick it up (7%).

The incentive and convenience of the program were indicated as the main reasons for disposing of the appliance through the program instead of the ways mentioned above. Other popular responses were the free pick-up and the environmentally safe disposal of the appliances. See Figure 6-5 below for the top responses across all four appliance types.
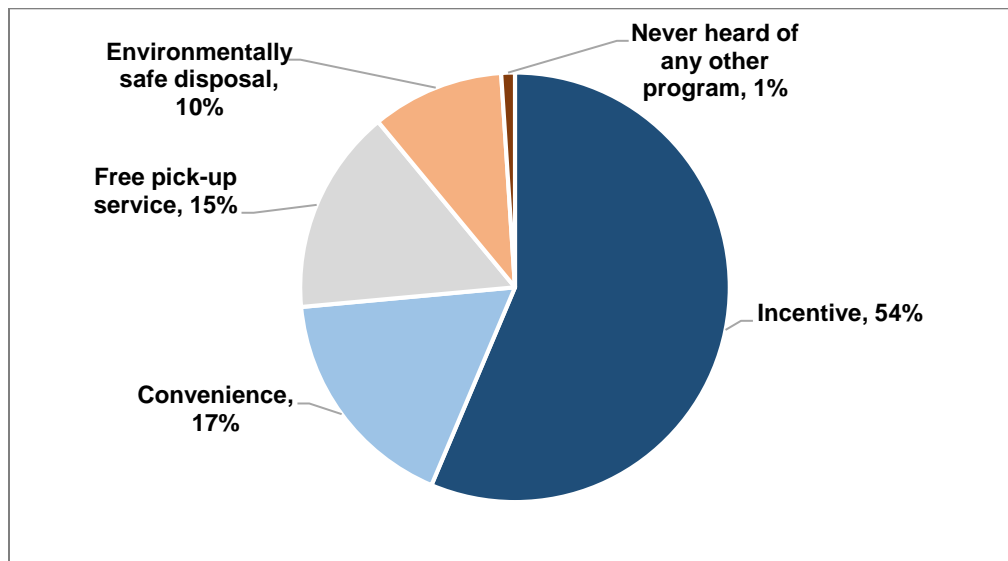
Figure 6-5: Top Five Reasons for Using the Program

6.7 Program Satisfaction and Participant Recommendations

Overall, satisfaction with the Appliance Turn-In Program was extremely high. When asked about their satisfaction with the program, almost all respondents indicated that they were either "very satisfied" (88%) or "somewhat satisfied" (11%). To further support their satisfaction with the program, over three-fourths of respondents (79%) indicated that they had recommended the program to others and, of those who had not, all of them indicated that they would if provided the opportunity.
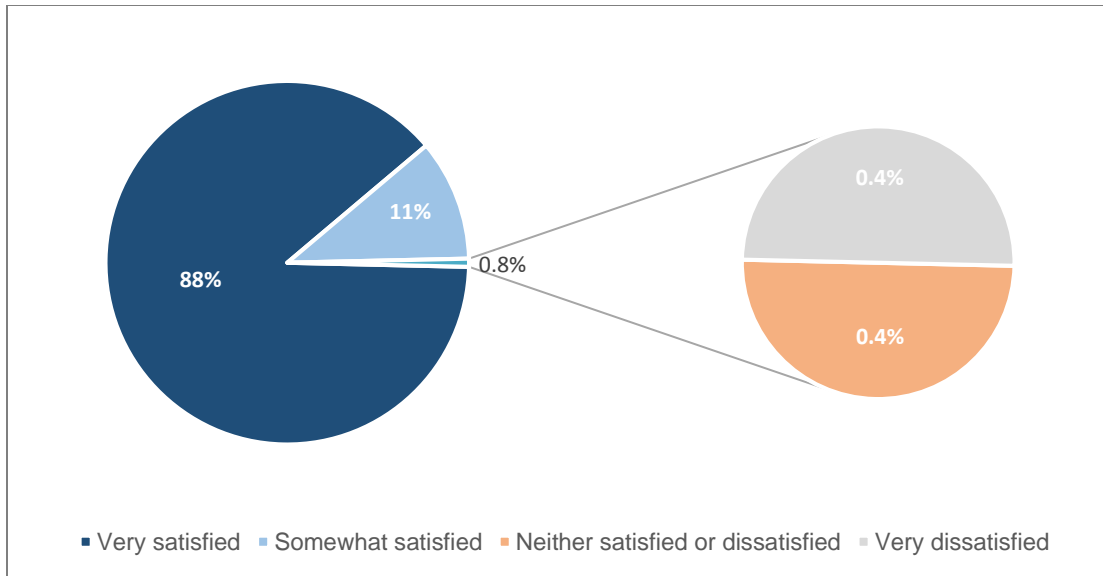
Figure 6-6: Overall Program Satisfaction

In addition to the program overall, respondents were asked about their satisfaction with different components of the program. All respondents reported being satisfied with the pick-up process while the item with the lowest satisfaction was the length of time to receive the rebate. Although rated the lowest, 90% reported that they were "very satisfied" or "somewhat satisfied" with the length of time to receive the rebate. Customers who had their appliance picked up earlier in the month (the 1st to the 14th) were slightly less satisfied than customers whose pickup occurred later in the month (15th to the 31st). See figure below for the distribution of all items that were rated for satisfaction.
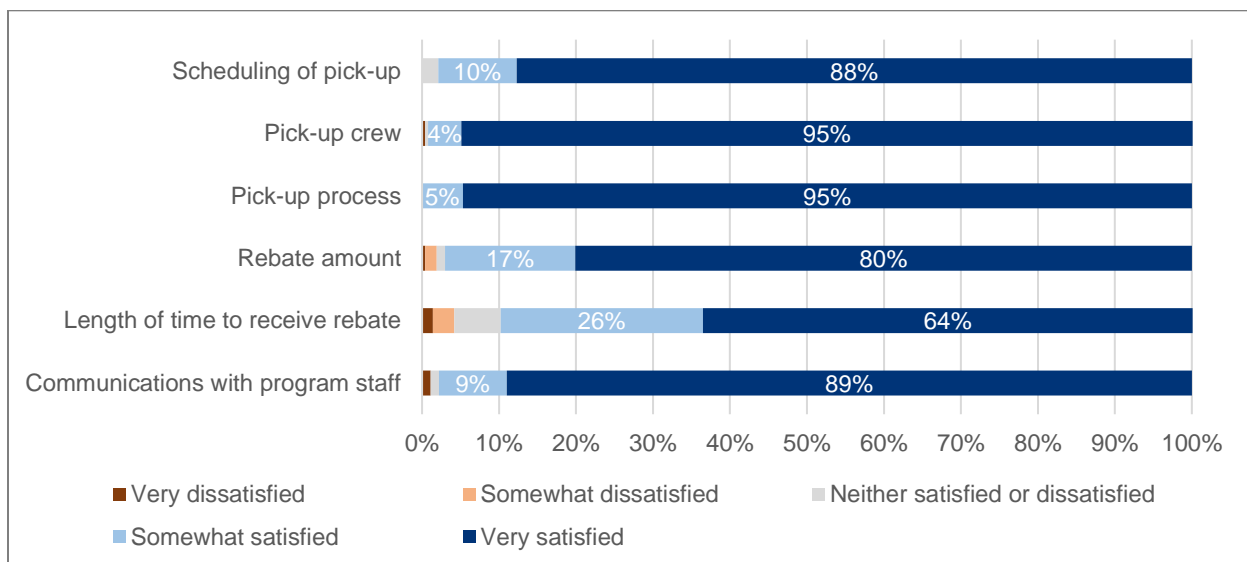
Figure 6-7: Areas of Program Satisfaction

Satisfaction with the rebate received through the program was also very high with almost all respondents reporting that they were "very satisfied" (80%) or somewhat satisfied (17%) with the rebate received through the program. Most respondents seemed to be satisfied with the way they received their rebate as well. When asked what their preferred rebate method was, 60% indicated the VISA gift card, while 39% preferred a check. See the Figure 6-8 below for a distribution of these responses.
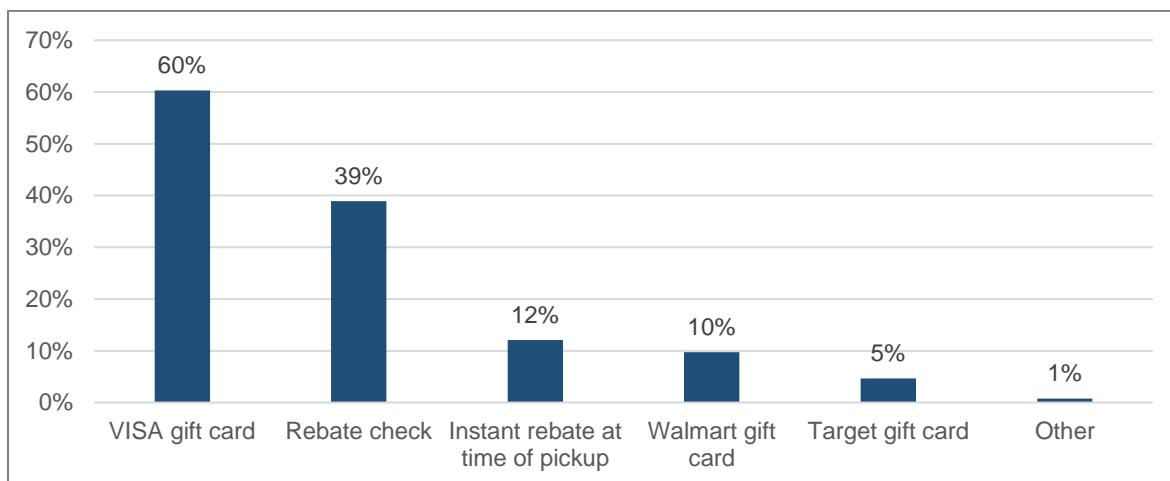
Figure 6-8: Preferred Rebate Method[27]

In addition to the aspects of the program respondents like best, respondents were also asked what they would change. Most respondents could not think of anything they would change about the program, with 63% indicating that there was nothing they would change. Of those who mentioned an aspect to change, most responses were related to the rebate, including wanting a larger rebate (17%), a shorter length of time to receive the rebate (9%), or a different method of receiving the rebate—i.e. a check instead of the VISA gift card (4%).

6.8   2017 Program Changes

The program included a few additional offerings during the 2017 program year. Appliances picked up between September 1 and November 30 were offered an increased incentive of $75 for refrigerators and freezers. Also, at the beginning of September, the program began providing a four-pack of LED bulbs to those customers who recycled an eligible appliance.

LED Four-Pack

Respondents whose appliances were picked up between mid-September and November were asked questions about the LED four-pack that was offered. The majority of

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[27] Percentages do not sum to 100 as respondents could select more than one option

respondents (84%) reported being offered the LED bulbs. The respondents that reported not being offered the bulbs had appliance pick-ups towards the beginning of September, so it is possible the LED four-packs had not started being distributed yet.

Of those who were offered the bulbs (84% of total survey respondents), all of them reported accepting them and 84% reported installing at least some of them. Of those who had installed them, everyone reported that they were still installed in their home. People who had not installed them cited not needing them yet (90%) and not having time to install them (10%) as reasons. Satisfaction with respondents who accepted the bulbs was high with 90% reporting they were "very satisfied" and 10% reporting they were "somewhat satisfied." Figure 6-9 below displays the results.
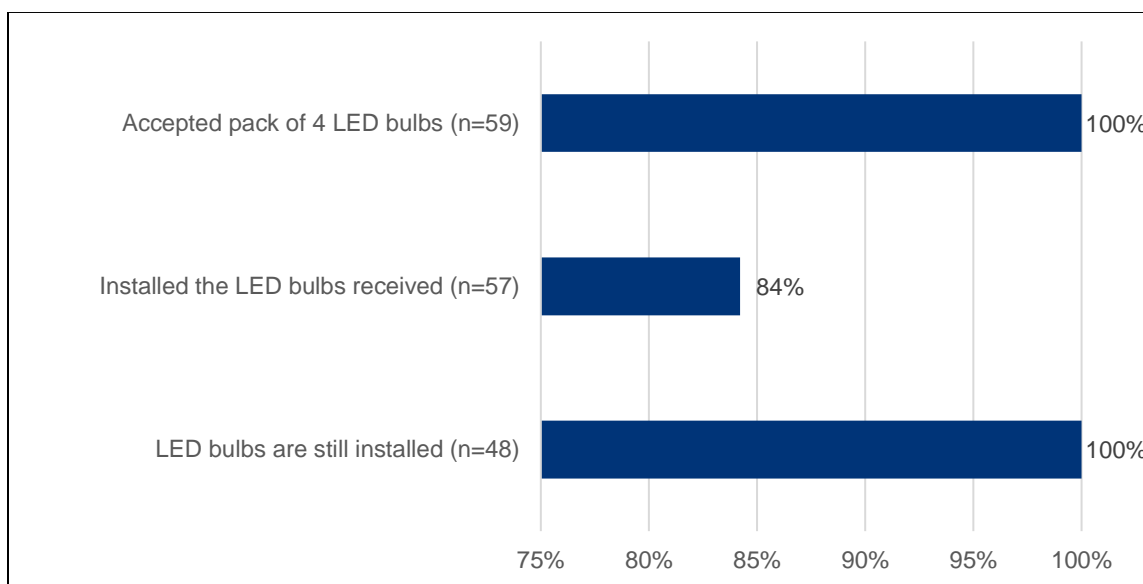
Figure 6-9: Customers' Experiences with LED Bulbs

Bonus Incentive

The bonus incentive of $75, for refrigerators and freezers, was offered as a way to boost participation at the end of 2017 to help meet program goals. Of the 285 survey customers that responded to our survey, 79 (28%) received a bonus incentive.

Table 6-4: Bonus Incentive Experience

Item Name	CEI	OE	TE	Overall
Aware that incentive amount was increased				
Yes	54%	52%	62%	56%
No	42%	48%	38%	43%
Not sure	4%	0%	0%	1%
Respondents (n)	**24**	**29**	**26**	**79**
How customers were made aware of $75 promotional rebate				
Bill insert	50%	67%	43%	54%
FirstEnergy website	17%	13%	14%	15%
Other	8%	13%	7%	10%
Friend or relative (word-of-mouth)	17%	0%	7%	7%
FirstEnergy representative	0%	0%	14%	5%
TV advertisement	0%	0%	14%	5%
Retailer/store	8%	0%	0%	2%
Newspaper/magazine/print media	0%	7%	0%	2%
Respondents (n)	**12**	**15**	**14**	**41**

6.9   Participant Demographics

To help understand the types of customers who participate in the program, respondents were asked questions about their homes and households. Survey respondents are most likely to live in single-family detached homes and own their home. Homes tended to be older with 44% constructed before 1960. Households tended to be smaller with 46% reporting two household members and 23% reporting only one household member. Homes in CEI tended to be older than those in the OE territory and homes in TE had a slightly larger average household size than the other two territories. See Table 6-5 below for more detail.

Table 6-5: Household Demographics

Item Name	CEI	OE	TE	Overall
Average number of people in home	2.2	2.3	2.9	2.5
Respondents (n)	**83**	**88**	**92**	**263**
Type of Home				
Single-family home, detached construction	81%	85%	82%	82%
Single family home, factory manufactured/modular	7%	4%	10%	7%
Condominium—traditional structure	6%	4%	4%	5%
Single family, mobile home	2%	4%	1%	2%
Apartment (4+ families)—traditional structure	2%	2%	0%	2%
Two or three family residences—traditional structure	1%	1%	1%	1%
Row house	0%	1%	0%	0%
Other	0%	0%	1%	0%
Respondents (n)	**83**	**84**	**90**	**257**
Own or Rent Home				
Own	87%	85%	93%	88%
Rent	13%	15%	7%	12%
Respondents (n)	**83**	**84**	**90**	**257**
Year Home was Constructed				
Before 1960	53%	39%	42%	44%
1960–1969	15%	11%	13%	13%
1970–1979	11%	13%	13%	13%
1980–1989	10%	12%	8%	10%
1990–1999	4%	17%	12%	11%
2000–2005	4%	3%	11%	6%
2006 or later	3%	5%	0%	3%
Respondents (n)	**72**	**75**	**83**	**230**

7. Conclusions and Recommendations

This chapter reports the conclusions and recommendations resulting from the impact and process evaluation of the 2017 Appliance Turn-In Program.

7.1 Energy and Demand Impacts Findings

A total of 26,907 households in the service territories of the three Companies received appliance recycling services through the Appliance Turn-In Program in 2017. The numbers of participants for each service territory is shown in Table 7-1.

Table 7-1: Number of Participants by Company

Utility	Number of Participants[28]
CEI	9,401
OE	14,245
TE	3,261
All Companies	26,907

Estimated *Ex Post* electric impacts were 39,989,637 kWh saved annually, which represents a realization rate of 98 percent. Average on-peak *Ex Post* demand reduction was estimated to be 6,659 kW annually, which represents a realization rate of 84 percent. The program level realization rate for kW was primarily impacted by an order of operation error in the Ohio TRM for the Room AC measure.

For detailed tables listing energy savings and demand reductions by measure type, please refer to Appendix A. The realization rates by appliance type, the estimates of annual gross energy savings (kWh) and on-peak demand reductions (kW) for the program in the three Companies are reported in the table below.

Table 7-2: Realization Rate by Appliance Type

Appliance Type	Realization Rate of kWh	Realization Rate of kW
Refrigerators	99%	99%
Freezers	98%	98%
RACs	133%	19%
Dehumidifiers	78%	87%
Total	**98%**	**84%**

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[28] The number of participants was counted by identifying the number of unique account numbers in the program tracking database. A number of participants recycled more than one appliance.

Table 7-3: Overall Evaluation Results for Gross kWh and kW Savings

Utility	Ex Ante Expected Gross Savings		Ex Post Verified Gross Savings	
	Gross kWh	Gross kW	Gross kWh	Gross kW
CEI	14,166,114	2,771	13,907,138	2,318
OE	21,677,468	4,183	21,247,198	3,534
TE	4,922,369	965	4,835,300	806
All Companies	40,765,951	7,918	39,989,637	6,659

7.2 Process Findings

- Overall, the program is running very smoothly and effectively. Participation and satisfaction are both very high and the program is achieving its goal of moving old, inefficient appliances off the grid.

- Communication is strong. The program maintains open lines of communication between the Companies and the implementation contractor, Recleim. Additionally, responding customers are satisfied with the pick-up process and the program overall.

- Bill inserts are the primary means by which people learn about the Appliance Turn-In Program. It will be important to continue to monitor sources of program awareness as the Companies move more towards paperless billing. With bill inserts driving most of the participation, other marketing materials may be needed if fewer people are receiving physical bills.

- Customers reported a high level of satisfaction with the VISA rebate cards, although 39% of customers still prefer the option to receive a check. The primary source of dissatisfaction is the time it takes to receive the card which was typically from customers whose pickup occurred earlier in the month.

- Twenty-eight percent of survey respondents received the increased bonus incentive of $75 for recycling their refrigerator or freezer. Of those customers, 83% indicated they would have been either "very likely" or "somewhat likely" to recycle their appliance had the $50 rebate been offered.

7.3 Recommendations

Overall, the program ran smoothly during the 2017 implementation year. The Companies and Recleim staff are confident with their implementation procedures and data. The evaluation team offers the following recommendations for continuous improvement of the Appliance Turn-In Program:

- Continue to manage and operate the program in the same way. Based on program staff interviews, the program is operating smoothly as far as program management and operations.

- Continue using bill inserts to market the Appliance Turn-in Program. Bill inserts were mentioned the most by participant respondents. Staff also report this being the most effective source. Consider the use of online advertisements to reach those who go online to pay their bills.

- Continue to allow checks to be issued upon request. While satisfaction with the rebate was high and most indicated that they liked the VISA rebate card, there was feedback that 39% respondents would prefer to receive a check, if given the option. Allowing this upon request will continue to satisfy these customers. The Companies should also consider the cost/benefit associated with amending the application to provide customers with the option to receive a VISA rebate card or check.

- Consider issuing rebates twice a month. The item with the lowest satisfaction ratings was the length of time it took for the customer to receive their rebate. Since rebates are issued at the end of the month, customers who recycled their appliance at the beginning of the month could have fairly long wait times. Increasing the frequency of when rebates are issued will ensure shorter wait times and increase satisfaction.

Appendix A: Required Savings Tables

Tables showing measure-level participation counts and savings for the 2017 Appliance Turn-In Program were provided in various locations throughout this report. This appendix provides additional tables summarizing savings results.

- Table A-1 reports the annual *ex post* kWh savings by utility and measure.

- Table A-2 reports the average annual *ex post* on-peak kW reductions by utility and measure.

- Table A-3 reports the lifetime *ex post* kWh savings by utility and measure.

Table A-1: Annual Ex Post Energy Savings (kWh)

Appliance Type	CEI	OE	TE	All Companies
Refrigerators	11,170,862	16,448,446	3,831,447	31,450,755
Freezers	2,359,730	4,134,393	885,507	7,379,629
RACs	77,698	110,073	27,356	215,128
Dehumidifiers	298,848	554,287	90,990	944,125
Total	13,907,138	21,247,198	4,835,300	39,989,637

Table A-2: Annual Ex Post On-Peak Demand Reductions (kW)

Appliance Type	CEI	OE	TE	All Companies
Refrigerators	1,786	2,630	613	5,028
Freezers	379	665	142	1,186
RACs	100	142	35	277
Dehumidifiers	53	98	16	167
Total	2,318	3,534	806	6,659

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

Appliance Type	CEI	OE	TE	All Companies
Refrigerators	89,366,898	131,587,565	30,651,574	251,606,037
Freezers	18,877,838	33,075,140	7,084,055	59,037,033
RACs	233,095	330,218	82,069	645,383
Dehumidifiers	896,543	1,662,862	272,970	2,832,376
Total	109,374,375	166,655,786	38,090,667	314,120,829

Appendix B: Participant Survey Instrument

FirstEnergy's Ohio utilities

2017 Appliance Turn-In Program

Participant Survey

EMAIL SURVEY INTRODUCTION

Hello. I'm contacting you on behalf of [UTILITY]. According to our records you recently recycled a [Equipment] through [UTILITY]'s Appliance Turn-In Program. We would appreciate if you would complete a short online survey to tell us about your experience.

Your response will be kept anonymous and will be used to improve the program in the future. We are surveying program participants to verify information about the products and services received and to assess customer satisfaction. Upon completion of this survey, you will receive a $5 gift card for Walmart.

You can access the survey at:

Your password is:

Thank you in advance for your time!

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

PHONE SURVEY INTRODUCTION

1. Hello. My name is _____ and I am calling on behalf of [UTILITY]'s Appliance Turn-In Program. May I speak with [CUSTOMER'S NAME]?

[If the customer is not available, ask for another adult that is familiar with household's participation in the Appliance Turn-In Program]

1. Yes
2. No

[If Q1=2, terminate survey]

PROGRAM PARTICIPATION VERIFICATION

2. Do you recall having a refrigerator, freezer, dehumidifier, or room air conditioner picked up for recycling during 2017?

1. Yes
2. No

[If Q2=2, terminate survey]

PROGRAM AWARENESS

3. How did you first learn about [UTILITY]'s Appliance Turn-In Program?
[Do not read, prompt if necessary]

1. Newspaper/magazine/print advertisement
2. Bill insert
3. Friend or relative (word-of-mouth)
4. TV
5. [UTILITY] representative
6. [UTILITY] website – Energysaveohio.com
7. Information provide through a Home Energy Report
8. Retailer/store
9. Community event
10. Other (Specify) _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

4. When did you first learn about [UTILITY]'s Appliance Turn-In Program? Was it…? **[Read responses]**

1. Before deciding to recycle your appliance(s)
2. After deciding to recycle your appliance(s)
3. At the same time as deciding to recycle your appliance(s)
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

PICK-UP SATISFACTION

5. Starting with the first time you contacted the program about recycling your appliance, about how many days passed before the pick-up occurred?

1. Number of days _____
98. Don't know
99. Refused

[If Q5=1, show Q6]

6. Do you think that it was a reasonable amount of time?

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

7. Were you able to schedule the pick-up time that was convenient for you?

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

99. Refused

8. How satisfied were you with the scheduling of the pick-up? **[Read responses]**

   1. Very satisfied
   2. Somewhat satisfied
   3. Neither satisfied or dissatisfied
   4. Somewhat dissatisfied
   5. Very dissatisfied
   98. Don't know **[Don't read]**
   99. Refused **[Don't read]**

[If Q8=4 or 5, show Q9]

9. Why were you dissatisfied with the scheduling process?

   1. Record verbatim:

   _____
   98. Don't know
   99. Refused

10. Before the pick-up date, did the program representative call to confirm the date and time of your scheduled pick up?

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

11. On the pick-up date, were you contacted by the program representative to inform you that the technician would be arriving soon?

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

12. Did the crew who removed your appliance(s) behave professionally?

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

[If Q12=2, show Q13]

13. Please explain why you feel they did not behave professionally?
   1. Record verbatim:

   _____

14. Overall, how satisfied were you with the crew who picked up of the old appliance(s)? **[Read responses]**

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied or dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

[If Q14=4 or 5, show Q15]
    15. Why were you dissatisfied with the crew?

1. Record verbatim:

   _____
98. Don't know
99. Refused

16. How satisfied were you with the pick-up process of the old appliance(s)? **[Read responses]**

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied or dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

[If Q16=4 or 5, show Q17]
    17. Why were you dissatisfied with the appliance pick-up?

1. Record verbatim:

   _____
98. Don't know
99. Refused

[If appliance pick-up occurred between mid-September through November, show Q18 - Q25]
LED 4 PACK VERIFICATION

    18. At the time of pick-up, did the crew offer you a pack of 4 LED light bulbs?

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

[If Q18=1, show Q19]
     19. Did you accept the LED bulbs?

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

[If Q19=2, show Q20]
     20. Why did you not accept the LED bulbs?

        1. Did not need the LED bulbs
        2. Did not want the LED bulbs
        3. Do not like LED bulbs
        4. Other (Specify) _____
        98. Don't know

[If Q19=1, show Q21]
     21. Have you installed the LED bulbs that you received?

        1. Yes, all
        2. Yes, some
        3. No
        98. Don't know
        99. Refused

[If Q21=2 or 3, show Q22]
     22. Why have you not installed the bulbs?

        1. Do not need the LED bulbs yet
        2. Do not like LED bulbs
        3. Haven't had the time to install
        98. Other (Specify) _____
        99. Don't know

[If Q21=1 or 2, show Q23]
     23. Are they still installed?

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

[If Q23=2, show Q24]
     24. Why are the bulbs no longer installed?

        1. They burnt out

2. They were never installed
3. They were not bright enough
4. Did not like the color
5. Other (Specify) _____
98. Don't know

[If Q19=1, show Q25]

25. How satisfied were you with the LED bulbs you received? **[Read responses]**

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied or dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

APPLIANCE VERIFICATION

26. Our records indicate that you have recycled [NUMBER OF REFRIGERATORS FROM PROGRAM DATA] refrigerator(s)? Is this correct?

1. Yes
2. No

[If Q26=2, show Q27]

27. How many refrigerators did you recycle?

1. Zero
2. One
3. Two
98. Don't know
99. Refused

28. Our records indicate that you have recycled [NUMBER OF FREEZERS FROM PROGRAM DATA] freezer(s)? Is this correct?

1. Yes
2. No

[If Q28=2, show Q29]

    29. How many freezers did you recycle?

        1. Zero
        2. One
        3. Two
        98. Don't know
        99. Refused

    30. Our records indicate that you have recycled [NUMBER OF ROOM AIR CONDITIONERS FROM PROGRAM DATA] room air conditioner(s)? Is this correct?

        1. Yes
        2. No

[If Q30=2, show Q31]

    31. How many room air conditioners did you recycle?

        1. Zero
        2. One
        3. Two
        98. Don't know
        99. Refused

    32. Our records indicate that you have recycled [NUMBER OF DEHUMIDIFIERS FROM PROGRAM DATA] dehumidifier(s)? Is this correct?

        a. Yes
        b. No

[If Q32=2, show Q33]

    33. How many dehumidifiers did you recycle?

        1. Zero
        2. One
        3. Two
        98. Don't know
        99. Refused

REFRIGERATOR RECYCLING

[If Q26=1 or Q27=2 or 3, show Q34 - Q45]

    34. According to our records your refrigerator(s) was picked up on or around [DATE INSTALLED], does that sound accurate?

        Refrigerator #1: _____ (mm/yy)

Refrigerator #2: _____ (mm/yy)

35. Approximately how old was the refrigerator at the time you recycled it?
[Record response in years, enter "00" if less than one year]

Refrigerator #1

1. _____ **[Record years]**
98. Don't know
99. Refused

Refrigerator #2

1. _____ **[Record years]**
98. Don't know
99. Refused

36. At the time of recycling, was the old refrigerator your primary or main unit or was it a secondary unit that was used in addition to your primary unit?

Refrigerator #1

1. Primary
2. Secondary
98. Don't know
99. Refused

Refrigerator #2

1. Primary
2. Secondary
98. Don't know
99. Refused

37. Did you replace the old refrigerator with a new unit?

Refrigerator #1

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

Refrigerator #2

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

38. At the time of recycling, where in the house was the old refrigerator located?

Refrigerator #1

1. Kitchen
2. Garage
3. Porch/patio
4. Basement
5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other (Specify) _____
98. Don't know
99. Refused

Refrigerator #2

1. Kitchen
2. Garage
3. Porch/patio
4. Basement
5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other (Specify) _____
98. Don't know
99. Refused

39. During the 12 months prior to the recycling, how often did you use the refrigerator? **[Read all]**

Refrigerator #1

1. All of the time
2. For special occasions only
3. During certain months of the year only
4. Never plugged in or running
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

Refrigerator #2

1. All of the time
2. For special occasions only
3. During certain months of the year only

---

4. Never plugged in or running
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

[If Q39=2 or 3, show Q**Error! Reference source not found.**]
    40. During the 12 months prior to the recycling about how many months was the old unit running? **[Get nearest month]**

    Refrigerator #1

    1. Record number of months [1-11] _____
    2. All of the time
    98. Don't know
    99. Refused

    Refrigerator #2

    1. Record number of months [1-11] _____
    2. All of the time
    98. Don't know
    99. Refused

    41. Which of the following best describes the condition of the old unit? Was it …? **[Read list]**

    Refrigerator #1

    1. Worked and was in good physical condition
    2. Worked but needed minor repair
    3. Worked but needed major repair
    4. It did not work
    98. Don't know **[Don't read]**
    99. Refused **[Don't read]**

    Refrigerator #2

    1. Worked and was in good physical condition
    2. Worked but needed minor repair
    3. Worked but needed major repair
    4. It did not work
    98. Don't know **[Don't read]**
    99. Refused **[Don't read]**

[If Q**Error! Reference source not found.**=2, 3, or 4, show Q42]
    42. What was wrong with the unit? **[If respondent is unsure, ask "would it turn on and produce cold air?"]**

    Refrigerator #1

1. Wouldn't turn on
2. Would not produce cold air
3. Wouldn't keep food/room cold enough
4. Would not cool consistently
5. Wouldn't keep food/room cold at all
6. Too loud
7. Don't know, but would produce cold air
8. Don't know, but would not produce cold air
9. Other (Specify) _____
98. Don't know
99. Refused

Refrigerator #2

1. Wouldn't turn on
2. Would not produce cold air
3. Wouldn't keep food/room cold enough
4. Would not cool consistently
5. Wouldn't keep food/room cold at all
6. Too loud
7. Don't know, but would produce cold air
8. Don't know, but would not produce cold air
9. Other (Specify) _____
98. Don't know
99. Refused

43. Had you already considered disposing the refrigerator before you heard about this program? By disposing, I mean getting the appliance out of your home by any means including selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center yourself.

Refrigerator #1

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

Refrigerator #2

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

44. What would you have most likely done with the refrigerator if you had not recycled it through **[UTILITY]**'s program? **[Read list unless respondent**

---

indicates choice without reading the list]

Refrigerator #1

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement refrigerator from
9. Taken it to a dump or recycling center (note that there would have been a drop off fee)
10. Hired someone else to haul the used appliance away for junking, dumping or recycling
11. Gotten rid of it some other way (Specify)
   _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

Refrigerator #2

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement refrigerator from
9. Taken it to a dump or recycling center (note that there would have been a drop off fee)
10. Hired someone else to haul the used appliance away for junking, dumping or recycling
11. Gotten rid of it some other way (Specify)
   _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

45. What is the main reason you chose to get rid of your refrigerator(s) through [UTILITY]'s program over other methods?

[If multiple are mentioned, ask: "Of those, which is the main reason?" Do not read, accept one answer only.]

[If respondent says: "I didn't need or want the refrigerator/freezer," respond "Yes, but why did you choose to discard it through [UTILITY]'s program rather than through another method?"]

1. Cash/incentive payment
2. Free pick-up service/others don't pick up/don't have to take it myself
3. Environmentally safe disposal/recycled/good for environment
4. Recommendation of a friend/relative
5. Recommendation of retailer/dealer
6. Utility sponsorship of the program
7. Easy way/convenient
8. Never heard of any others/only one I know of
9. Other (Specify) _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

FREEZER RECYCLING

[If Q28=1 or Q29=2 or 3, show Q46-Q57]

46. According to our records your freezer(s) was picked up on or around [DATE INSTALLED], does that sound accurate?

Freezer #1: _____ (mm/yy)
Freezer #2: _____ (mm/yy)

47. Approximately how old was the freezer at the time you recycled it? **[Record response in years, enter "00" if less than one year]**

Freezer #1

1. _____ **[Record years]**
98. Don't know
99. Refused

Freezer #2

1. _____ **[Record years]**
98. Don't know
99. Refused

48. At the time of recycling, was the old freezer your primary or main unit or was it a secondary unit that was used in addition to your primary unit?

Freezer #1

1. Primary
2. Secondary

98. Don't know
99. Refused

Freezer #2

1. Primary
2. Secondary
98. Don't know
99. Refused

49. Did you replace the old freezer with a new unit?

Freezer #1

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

Freezer #2

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

50. At the time of recycling, where in the house was the freezer located?

Freezer #1

1. Kitchen
2. Garage
3. Porch/patio
4. Basement
5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other (Specify) _____
98. Don't know
99. Refused

Freezer #2

1. Kitchen
2. Garage
3. Porch/patio
4. Basement

5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other (Specify) _____
98. Don't know
99. Refused

51. During the 12 months prior to the recycling, how often did you use the freezer? **[Read all]**

Freezer #1

1. All of the time
2. For special occasions only
3. During certain months of the year only
4. Never plugged in or running
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

Freezer #2

1. All of the time
2. For special occasions only
3. During certain months of the year only
4. Never plugged in or running
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

[If Q51=2 or 3, show Q52]
52. If you were to add up the total amount of time it was running in the year prior to being picked up, how many months would that be? Your best estimate is okay. **[Get nearest month]**

Freezer #1

1. Record number of months [1-11] _____
2. All of the time
98. Don't know
99. Refused

Freezer #2

1. Record number of months [1-11] _____
2. All of the time
98. Don't know
99. Refused

53. Which of the following best describes the condition of the old unit? Was it …? **[Read list]**

Freezer #1

1. Worked and was in good physical condition
2. Worked but needed minor repair
3. Worked but needed major repair
4. It did not work

Freezer #2

1. Worked and was in good physical condition
2. Worked but needed minor repair
3. Worked but needed major repair
4. It did not work

[If Q53=2, 3, or 4, show Q54]

54. What was wrong with the unit? **[If respondent is unsure, ask "would it turn on and produce cold air?"]**

Freezer #1

1. Wouldn't turn on
2. Wouldn't keep food/room cold enough
3. Wouldn't keep food/room cold at all
4. Too loud
5. Don't know, but would produce cold air
6. Don't know, but would not produce cold air
7. Other (Specify) _____
98. Don't know
99. Refused

Freezer #2

1. Wouldn't turn on
2. Wouldn't keep food/room cold enough
3. Wouldn't keep food/room cold at all
4. Too loud
5. Don't know, but would produce cold air
6. Don't know, but would not produce cold air
7. Other (Specify) _____
98. Don't know
99. Refused

55. Had you already considered disposing the freezer before you heard about this program? By disposing, I mean getting the appliance out of your home by any

means including selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center yourself.

Freezer #1

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

Freezer #2

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

56. What would you have most likely done with the freezer had you not disposed of it through [UTILITY]'s program? **[Read list unless respondent indicates choice without reading the list]**

Freezer #1

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement freezer from
9. Taken it to a dump or recycling center (note that there would be a drop-off fee)
10. Hired someone to take it to a dump or recycling center
11. Gotten rid of it some other way (Specify)

_____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

Freezer #2

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor

---

6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement freezer from
9. Taken it to a dump or recycling center (note that there would be a drop-off fee)
10. Hired someone to take it to a dump or recycling center
11. Gotten rid of it some other way (Specify)
   _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

57. What is the main reason you chose to get rid of your freezer through [UTILITY]'s program over other methods of disposing of your appliance?

[If multiple are mentioned, ask: "Of those, which is the main reason?" Do not read, accept one answer only.]

[If respondent says: "I didn't need or want the freezer," respond "Yes, but why did you choose to discard it through [UTILITY]'s program rather than through another method?"]

1. Cash/incentive payment
2. Free pick-up service/others don't pick up/don't have to take it myself
3. Environmentally safe disposal/recycled/good for environment
4. Recommendation of a friend/relative
5. Recommendation of retailer/dealer
6. Utility sponsorship of the program
7. Easy way/convenient
8. Never heard of any others/only one I know of
9. Other (Specify) _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

ROOM AIR CONDITIONER RECYCLING
[If Q30=1 or Q31=2 or 3, show Q58-Q70]

58. According to our records your room air conditioner(s) was picked up on or around [DATE INSTALLED], does that sound accurate?

RAC #1: _____(mm/yy)
RAC #2: _____(mm/yy)

59. Approximately how old was your room air conditioner at the time you recycled it? **[Record response in years, enter "00" if less than one year]**

RAC #1

1. _____ **[Record years]**
98. Don't know
99. Refused

RAC #2

1. _____ **[Record years]**
98. Don't know
99. Refused

60. Did you replace the old room air conditioner with a new unit?

RAC #1

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

RAC #2

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

61. Before recycling the unit, how many room air conditioners were in operation in your home?

1. _____ Record number of units
98. Don't know
99. Refused

62. How many room air conditioners are currently in operation in your home?

1. _____ Record number of units
98. Don't know
99. Refused

63. Before recycling the unit, did your home have a central air conditioning system?

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

99. Refused

64. Does your home now have a central air conditioning system?

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

65. For the majority of the year prior to recycling, where within your home was the room air conditioner located?

RAC #1

1. Kitchen
2. Garage
3. Porch/patio
4. Basement
5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other (Specify) _____
98. Don't know
99. Refused

RAC #2

1. Kitchen
2. Garage
3. Porch/patio
4. Basement
5. Living room
6. Family room
7. Bedroom
8. Hallway
9. Other (Specify) _____
98. Don't know
99. Refused

66. Which of the following best describes the condition of the old unit? Was it …?
[Read list]

RAC #1

1. Worked and was in good physical condition
2. Worked but needed minor repair
3. Worked but needed major repair

4. It did not work

RAC #2

1. Worked and was in good physical condition
2. Worked but needed minor repair
3. Worked but needed major repair
4. It did not work

[If Q66=2, 3, or 4, show Q67]
    67. What was wrong with the unit? **[If respondent is unsure, ask "would it turn on and produce cold air?"]**

RAC #1

1. Wouldn't turn on
2. Wouldn't keep room cold enough
3. Wouldn't keep room cold at all
4. Too loud
5. Don't know, but would produce cold air
6. Don't know, but would not produce cold air
7. Other (Specify) _____
98. Don't know
99. Refused

RAC #2

1. Wouldn't turn on
2. Wouldn't keep room cold enough
3. Wouldn't keep room cold at all
4. Too loud
5. Don't know, but would produce cold air
6. Don't know, but would not produce cold air
7. Other (Specify) _____
98. Don't know
99. Refused

    68. Had you already considered disposing the room air conditioner before you heard about [UTILITY]'s appliance recycling program? By disposing, I mean getting the appliance out of your home by any means including selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center yourself.

RAC #1

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

99. Refused

RAC #2

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

69. What would you have most likely done with the room air conditioner had you not disposed of it through [UTILITY]'s program? **[Read list unless respondent indicates choice without reading the list]**

RAC #1

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement room air conditioner from
9. Taken it to a dump or recycling center (note that there would be a drop-off fee)
10. Hired someone to take it to a dump or recycling center
11. Gotten rid of it some other way (Specify)
   _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

RAC #2

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement refrigerator from
9. Taken it to a dump or recycling center (note that there would be a drop-off fee)
10. Hired someone to take it to a dump or recycling center

11. Gotten rid of it some other way (Specify)

_____

98. Don't know **[Don't read]**
99. Refused **[Don't read]**

70. What is the main reason you chose to get rid of your room air conditioner through [UTILITY]'s program over other methods of disposing of your appliance?

[If multiple are mentioned, ask: "Of those, which is the main reason?" Do not read, accept one answer only.]

[If respondent says: "I didn't need or want the room air conditioner," respond "Yes, but why did you choose to discard it through [UTILITY]'s program rather than through another method?"]

1. Cash/incentive payment
2. Free pick-up service/others don't pick up/don't have to take it myself
3. Environmentally safe disposal/recycled/good for environment
4. Recommendation of a friend/relative
5. Recommendation of retailer/dealer
6. Utility sponsorship of the program
7. Easy way/convenient
8. Never heard of any others/only one I know of
9. Other (Specify)

_____

98. Don't know
99. Refused

DEHUMIDIFIER RECYCLING
[If Q32=1 or Q33=2 or 3, show Q71 - Q80]

71. Approximately how old was your dehumidifier at the time you recycled it?
[Record response in years, enter "00" if less than one year]

Dehumidifier #1

1. _____ **[Record years]**
98. Don't know
99. Refused

Dehumidifier #2

2. _____ **[Record years]**
98. Don't know
99. Refused

72. Did you replace the old dehumidifier with a new unit?

Dehumidifier #1

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

Dehumidifier #2

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

73. Before recycling the unit, how many dehumidifiers were in operation in your home?

1. _____Record number of units
98. Don't know
99. Refused

74. How many dehumidifiers are currently in operation in your home?

2. _____Record number of units
98. Don't know
99. Refused

75. For the majority of year prior to recycling, where within your home was the dehumidifier located?

Dehumidifier #1

1. Garage
2. Porch/patio
3. Basement
4. Other (Specify) _____
98. Don't know
99. Refused

Dehumidifier #2

1. Garage
2. Porch/patio
3. Basement
4. Other (Specify) _____
98. Don't know

99. Refused

76. Which of the following best describes the condition of the old unit? Was it …? **[Read list]**

Dehumidifier #1

1. Worked and was in good physical condition
2. Worked but needed minor repair
3. Worked but needed major repair
4. It did not work

Dehumidifier #2

1. Worked and was in good physical condition
2. Worked but needed minor repair
3. Worked but needed major repair
4. It did not work

[If Q76=2, 3, or 4, show Q77]

77. What was wrong with the unit? **[If respondent is unsure, ask "would it turn on and produce cold air?"]**

Dehumidifier #1

1. Wouldn't turn on
2. Wouldn't remove moisture
3. Too loud
4. Other (Specify) _____
98. Don't know
99. Refused

Dehumidifier #2

1. Wouldn't turn on
2. Wouldn't remove moisture
3. Too loud
4. Other (Specify) _____
98. Don't know
99. Refused

78. Had you already considered disposing the dehumidifier before you heard about [UTILITY]'s appliance recycling program? By disposing, I mean getting the appliance out of your home by any means including selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center yourself.

Dehumidifier #1

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

Dehumidifier #2

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

79. What would you have most likely done with the dehumidifier had you not disposed of it through [UTILITY]'s program? **[Read list unless respondent indicates choice without reading the list]**

Dehumidifier #1

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement dehumidifier from
9. Taken it to a dump or recycling center (note that there would be a drop-off fee)
10. Hired someone to take it to a dump or recycling center
11. Gotten rid of it some other way (Specify)_____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

Dehumidifier #2

1. Sold it to a private party
2. Sold it to a used appliance dealer
3. Kept it and continued to use it
4. Kept it and stored it unplugged
5. Given it away to a private party, such as a friend or a neighbor
6. Given it away to a charity organization, such as Goodwill Industries or a church
7. Put it on a curb with a "Free" sign on it
8. Had it removed by the dealer you got your new or replacement dehumidifier from

9. Taken it to a dump or recycling center (note that there would be a drop-off fee)
10. Hired someone to take it to a dump or recycling center
11. Gotten rid of it some other way (Specify)_____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

80. What is the main reason you chose to get rid of your dehumidifier through [UTILITY]'s program over other methods of disposing of your appliance?

[If multiple are mentioned, ask: "Of those, which is the main reason?" Do not read, accept one answer only.]

[If respondent says: "I didn't need or want the dehumidifier," respond "Yes, but why did you choose to discard it through [UTILITY]'s program rather than through another method?"]

1. Cash/incentive payment
2. Free pick-up service/others don't pick up/don't have to take it myself
3. Environmentally safe disposal/recycled/good for environment
4. Recommendation of a friend/relative
5. Recommendation of retailer/dealer
6. Utility sponsorship of the program
7. Easy way/convenient
8. Never heard of any others/only one I know of
9. Other (Specify) _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

REBATE SATISFACTION

Now, we would like to ask you a few questions regarding the rebate that you received for recycling the appliance(s).

81. Did you receive the rebate for participation in [UTILITY]'s Appliance Turn-In Program?

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

[If Q81=1, show Q82-Q87]
82. How satisfied were you with the rebate amount? **[Read responses]**

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied

4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

83. Would you have participated in the program if the amount of the rebate had been less, but appliance pick-up and disposal was still provided at no cost?

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

[If Q83=1, show Q84]

84. Would you have participated in the program with no rebate, but appliance pick-up and disposal was still provided at no cost?

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

85. Which of these types of rebates would you most prefer to receive? **[Read list and check all that apply]**

1. . Rebate check
2. . VISA debit card
3. . Walmart gift card
4. . Target gift card
5. . Instant rebate at time of purchase (i.e., via Amazon)
6. . Other (Specify) _____
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

86. From the time you had the appliance(s) picked up, about how many weeks did it take to receive the rebate?

1. Record # of weeks _____
98. Don't know
99. Refused

[If Q86=1, show Q87]

87. How satisfied were you with how long it took to receive the rebate? **[Read responses]**

    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    98. Don't know **[Don't read]**
    99. Refused **[Don't read]**

PROGRAM SATISFACTION

88. In the course of participating in [UTILITY]'s program, how often did you contact [UTILITY] or program staff with questions?

    1. Never [Skip to Q91]
    2. Once
    3. 2 or 3 times
    4. 4 times or more
    98. Don't know
    99. Refused

[If Q88=2, 3, or 4, show Q89 to Q92]

89. For what reason(s) did you contact the [UTILITY] or program staff?

    1. Reschedule appointment/pickup
    2. Verify appointment time
    3. Other (Specify) _____

90. How did you contact them? **[Check all that apply]**

    4. Phone
    5. Email or fax
    6. Letter
    7. In person
    98. Don't know
    99. Refused

91. And how satisfied were you with your communications with program staff? **[Read responses]**

    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    98. Don't know **[Don't read]**
    99. Refused **[Don't read]**

[If Q91=4 or 5, show Q92]

92. Why were you dissatisfied with those communications?

    1. Record Verbatim:
    _____
    98. Don't know
    99. Refused

93. Have you noticed any savings on your electric bill since removing your old appliance(s)?

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

94. Overall, how satisfied were you with the Appliance Turn-In Program? **[Read responses]**

    1. Very satisfied
    2. Somewhat satisfied
    3. Neither satisfied nor dissatisfied
    4. Somewhat dissatisfied
    5. Very dissatisfied
    98. Don't know **[Don't read]**
    99. Refused **[Don't read]**

95. Have you recommended the program to others?

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

[If Q95 = 2, show Q96]

96. If provided the opportunity, would you recommend the program to others?

1. Yes
2. No

[If Q96 = 2, show Q97]
97. What is the main reason you would not recommend the program to anyone.

1. Record Verbatim:

   _____

98. What did you like best about the program?

1. Record Verbatim:

   _____

99. If you could change one thing about the program, what would it be?

1. Record Verbatim:

   _____

BONUS INCENTIVE
[Ask if Number of Refrigerators or Freezers >= 1 AND Rebate Amount = $75]
100. The $75 rebate that you received was a promotional rebate offered for a limited period of time. At the time you decided to recycle your [INSERT QUALIFYING EQUIPMENT], were you aware that the $75 rebate that you would receive was more than the $50 rebate that is typically offered?

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

[If Q100 = 1, show Q101]
101. How did you learn about the $75 promotional rebate?

1. Newspaper/magazine/print media
2. Bill insert
3. Friend or relative (word-of-mouth)
4. TV ad
5. FirstEnergy representative
6. FirstEnergy brochure
7. FirstEnergy website
8. Retailer/store
9. Community event
10. Other (Specify) _____
98. Don't know **[Don't read]**

99. Refused

102. Using a scale where 1 means not at all likely and 5 means very likely, how likely would you have been to recycle your [INSERT EQUIPMENT] if a $50 rebate was offered? **[Read responses]**

1. Very likely
2. Somewhat likely
3. Neutral
4. Somewhat unlikely
5. Very unlikely
98. Don't know **[Don't read]**
99. Refused **[Don't read]**

HOME AND DEMOGRAPHICS

Now, I have just a few final questions about your home and energy use.

103. How many people are in your household?

1. Number in household _____
98. Don't know
99. Refused

104. Including wages, salaries, pensions, Social Security and other sources of income for all members of your household, what was your total household income before taxes in 2016? Please select from the following categories. **[Read list, select one]**

1. Less than $10,000
2. $10,000 to less than $20,000
3. $20,000 to less than $30,000
4. $30,000 to less than $40,000
5. $40,000 to less than $50,000
6. $50,000 to less than $75,000
7. $75,000 to less than $100,000
8. $100,000 to less than $150,000
9. $150,000 to less than $200,000
10. $200,000 or more
88 Don't know
99 Refused

105. Which of the following best describes your home/residence?

1. Single-family home, detached construction (not a Duplex, Town Home, or Apartment; Attached Garage is ok)
2. Single family home, factory manufactured/modular
3. Single family, mobile home
4. Row house
5. Two or three family residences – traditional structure
6. Apartment (4+ families) – traditional structure
7. Condominium – traditional structure
8. Other (Specify) _____
98. Don't know
99. Refused

106. Do you own or rent this residence?

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

107. Approximately when was your home constructed?

1. Before 1960
2. 1960-1969
3. 1970-1979
4. 1980-1989
5. 1990-1999
6. 2000-2005
7. 2006 or later
98. Don't know
99. Refused

108. How many square feet is the above-ground living space for your home **[If necessary, this excludes walk-out basements]**?

1. Numerical open end [Range 0-99,999] _____
98. Don't know
99. Refused

[If Q108=98 or 99, show Q109]

109. Would you estimate the above-ground living space is about:

1. Less than 1,000 sq ft
2. 1,001-2,000 sq ft
3. 2,001-3,000 sq ft
4. 3,001-4,000 sq ft
5. 4,001-5,000 sq ft
6. Greater than 5,000 sq ft
98. Don't know
99. Refused

110. How many square feet of conditioned living space is below- ground for your home **[If necessary, this includes walk-out basements]**?

1. Numerical open end [Range 0-99,999] _____
98. Don't know
99. Refused

[If Q110=98 or 99, show Q111]

111. Would you estimate the below-ground living space is about:

1. Less than 1,000 sq ft
2. 1,001-2,000 sq ft
3. 2,001-3,000 sq ft
4. 3,001-4,000 sq ft
5. 4,001-5,000 sq ft
6. Greater than 5,000 sq ft
98. Don't know
99. Refused

CONCLUSION

We have finished all the questions for this survey. Thank you for your time in answering questions regarding the Appliance Turn-In Program. We would like to mail you a $5 gift card to Walmart for your participation. To do that I'll need your mailing information at this time.

Are you willing to provide your name and the address, so we can mail the gift card?

Name: _____

Address: _____

You can expect to receive the gift card in 4-6 weeks.

[UTILITY] appreciates your participation. Thank you again and have a good day/evening.