APPENDIX C

IMPACT AND PROCESS EVALUATION OF 2011 APPLIANCE TURN-IN PROGRAM

Final Report

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1. EXECUTIVE SUMMARY

On May 2, 2011, the Ohio operating companies The Cleveland Electric Illuminating Company (CEI), Ohio Edison (OE), and The Toledo Edison Company (TE) (collectively "Companies") implemented the Appliance Turn-In Program. This program offered residential customers rebates for the recycling of refrigerators, freezers, and room air conditioners (RACs) during the 2011 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 14,209 households in the service territories of the Companies received appliance collection and recycling services through the Appliance Turn-In Program in 2011. Program design allows for an individual household to recycle up to two refrigerators or freezers 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	5,045
OE	7,617
TE	1,547
All Companies	14,209

Ex post gross electric savings were estimated through detailed analysis of program tracking data and participant survey data. ADM Associates, Inc. (ADM) conducted analyses of these data using statistical and engineering models that have been utilized to evaluate similar recycling programs.

Ex post verified electric savings was 15,185,191 kWh annually (a realization rate of 73 percent) and 4,958,867 kWh during the 2011 calendar year (first-year pro-rata savings). *Ex post* verified peak demand reduction was 1,969 kW. For detailed tables listing energy savings and demand reductions by measure type, please refer to Appendix A. *Ex post* gross energy savings (kWh) and peak demand reduction (kW) for the program in the three service territories are reported in Table 1-2.

[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.

Table 1-2. Overall Evaluation Results

Utility	*Ex Ante Expected Gross Savings*		*Ex Post Verified Gross Savings*	
	Gross kWh	*Gross kW*	*Gross kWh*	*Gross kW*
CEI	7,427,561	1,720	5,387,402	699
OE	11,190,120	2,602	8,118,951	1,055
TE	2,286,040	507	1,678,838	215
All Companies	20,903,721	4,829	15,185,191	1,969

Key findings from the process evaluation of the 2011 Appliance Turn-In program include:

- **Participants of the Appliance Turn-In Program are highly satisfied.** Respondents to the participant survey reported very positive satisfaction ratings for numerous program elements including the scheduling process, the actual pick-up, communication with program staff, the incentive amount and the time to receive the rebate check. There were very few instances of dissatisfaction, and the majority of these were anecdotal in nature. These results suggest that the program has developed into a reliable entity that is capable of meeting customer expectations and goal targets.
- **The Companies' Appliance Turn-In program is operating smoothly – especially given it is still early in the implementation cycle – and is running better than many like programs other utilities are offering.** One JACO program staff commented, *"The Companies' programs in Ohio are running as or more smoothly compared to other programs in other jurisdictions. We were surprised that the program exploded from inception. It was great to see, there was no ramp-up period. It is a popular program in Ohio, the volume is there and goals are met. It's getting the results."*
- **Quality Assurance and Quality Control (QA/QC) procedures are in place.** The Companies' program staff and the JACO staff both described various QA/QC checks in place to ensure appliance chain-of-custody, high customer satisfaction, and quality data collection.
- **The Companies' Appliance Turn-In staff is confident in the information and data received from the program implementer.** The Companies' program staff has near real-time access to detailed levels of information needed to effectively manage and monitor program operations.
- **Program incentive levels are appropriate.** Both the Companies' staff and JACO staff report that based on experience in Ohio and in other states, the current incentive levels for the program eligible products are appropriately set. Additionally, almost half of the participants who responded to the telephone survey indicated that the incentive was the main reason they participated in the program over other appliance disposal methods.

- **The pick-up and recycling process is being performed in accordance with program design.** JACO has an effective system in place to ensure chain of custody for participating appliances. Unit characteristics and other data are entered into the program tracking database throughout the recycling process using a barcode system.
- **Retail partnerships are wisely in development as a method to expand program effectiveness and outreach.** Partnering with retailers provides additional convenience to the customer by removing the potential barrier of two separate home visits – once for delivery of the new appliance and again for the removal of the appliance to be recycled.

2. INTRODUCTION AND PURPOSE OF THE STUDY

Under contract with the Companies, ADM is performing measurement and verification (M&V) activities to confirm the energy savings and demand reduction being realized through the energy efficiency programs that the Companies are implementing in Ohio in 2011. 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 through the Appliance Turn-In Program during 2011. Additionally, this report presents the results of the process evaluation of the program focusing on participant and program staff perspectives regarding the program's first year of 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, and room air conditioners were collected for recycling?
- 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?
- How many of the room air conditioners were replaced and how many represent a net removal from the grid?

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, therefore, by the following four research questions.

- How effective were the marketing efforts for the program? Which marketing methods were most effective?
- How well did the Companies' 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?
- What changes can be made to the program's design or delivery to improve its effectiveness in future program years?

3. DESCRIPTION OF PROGRAM

First launched on May 2, 2011, the Appliance Turn-In program is designed to help customers reduce their energy consumption by removing old, working refrigerators, freezers, and room air conditioners (RACs) from their homes for recycling. There is a limit of two refrigerators or freezers per household per calendar year. A maximum of two room air conditioners can be picked up at the same time as the refrigerator and/or freezer. The Companies benefit because the old appliances, which are generally inefficient, are permanently removed from the system. The environment also benefits from the recycling process through safe disposal of environmentally harmful material.

The goal of the program is to reduce the number of old, inefficient refrigerators and freezers that customers have moved to their garages or other locations such as basements and patios. Many areas in which spare units are placed are not space conditioned and most refrigerators used in that environment operate under a heavy thermal load during the summer. This is exacerbated by the fact that the appliances are usually quite old and inefficient. Previous studies by the Environmental Protection Agency (EPA), the Department of Energy (DOE) and other utilities have determined that removing these appliances, and properly recycling them, performs an energy saving service.

The Companies contract with JACO, Inc. (JACO) to implement the program. The program is designed as a turnkey, stand-alone energy efficiency initiative. The program targets existing multi- and single-family households, renters and homeowners who have old, inefficient refrigerators, freezers, or RACs. Marketing for the program consists of newspaper, radio, and TV ads; bill stuffers; and community events. There is an additional marketing channel for low-income participants, who may become aware of the program from auditors from other low-income specific energy efficiency programs. To be eligible for the program, appliances to be recycled must be in working condition, plugged in and cooling at the time of pick-up. The customer receives pick-up and removal service in addition to a $50 rebate per recycled refrigerator or freezer. Customers with inefficient, working RAC units receive a $25 rebate for each recycled unit.

Removing old, inefficient refrigerators, freezers and RACs prevents them from being resold or transferred to another utility customer. The program provides annual electric energy savings for the remaining life of the unit by permanently removing the appliance from service. As an added environmental benefit, 95% of the materials from these units are able to be recycled (metals, plastic, glass, oil, etc.) and disposed of in an environmentally responsible manner, thus preventing the materials from reaching landfills and contaminating the environment.

4. METHODOLOGY

This chapter provides a description of the methodology applied by ADM in the evaluation of the 2011 Appliance Turn-In Program. The chapter is divided into two sections: impact evaluation methodology and process evaluation methodology.

4.1 IMPACT EVALUATION METHODOLOGY

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, and room air conditioners were collected for recycling?
- 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?
- How many of the room air conditioners were replaced and how many represent a net removal from the grid?

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

4.1.1 Verification of Units Recycled

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

- Validating program tracking data provided by JACO by checking for duplicate or erroneous entries;
- Verifying that refrigerators, freezers, and RACs are recycled according to the agreed-upon process between JACO and the Companies; and
- Conducting verification 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 JACO were reviewed. The numbers of refrigerators, freezers, and RACs reported in the program tracking data that were recycled during 2011 are shown in Table 4-1.

Table 4-1: Appliances Recycled in 2011

Utility	***Number of Refrigerators Collected***	***Number of Freezers Collected***	***Number of RACs Collected***
CEI	4,156	1,324	597
OE	6,139	2,129	911
TE	1,295	392	159
All Companies	11,590	3,845	1,667

As the table above shows, the vast majority of program participation was represented by recycled refrigerators. Freezer units were a distant second while RACs represented the smallest portion of program participation. Refrigerators represent approximately 76% of the *ex ante* kWh savings claimed for the program; freezers represent approximately 23% while RACs represent approximately 1%. Based on the disproportionate contributions to program level kWh savings, ADM determined that it was appropriate to use a sampling plan that was proportionally stratified by measure type. ADM conducted telephone interviews with a sample of program participants to verify participation and obtain information with which to determine the percentage of units that were still operable when picked up by the recycler. A random sample, proportionally stratified as described above, 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.[2] On this assumption, a minimum sample size of 68 participants per utility was required, as shown in the following formula:

[2] 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.

As set out in the *Model Energy Efficiency Program Impact Evaluation Guide*:

> *"Until the actual mean and standard deviation of the population can be estimated from actual samples, 0.5 is often accepted as an initial estimate for cv. The more homogenous the population, the smaller the cv."*

Using a cv = 0.5 is also in accordance with California Evaluation Protocols for homogenous measures.

Minimum Sample Size Formula for 90 Percent Confidence Level

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

Where:

n_0	=	minimum sample size
CV	=	Coefficient of Variation (assumed to be 0.5)
RP	=	Relative Precision (0.10)

ADM conducted phone surveys with 73 participants in the CEI service territory and 72 participants each in the OE and TE service territories. The questionnaire that was the instrument for the survey interviews is provided in Appendix B. Survey respondents were asked a number of appliance specific questions. Based on the proportional stratification scheme outlined above, appliance specific information was collected for the following: 53 refrigerators, 18 freezers and one RAC in the OE service territory; 53 refrigerators, 17 freezers and three RACs in the CEI service territory; and 53 refrigerators, 16 freezers and three RACs in the TE service territory. The results of this survey effort were used to verify the number of program eligible appliances recycled in 2011.

4.1.2 Calculating Gross Annual kWh Savings per Appliance

Ex ante savings for the Companies' Appliance Turn-In program were assumed to be 1,376 kWh per refrigerator, 1,244 kWh per freezer, and 103.6 kWh per RAC recycled through the program. These estimates are taken directly from the draft *State of Ohio Energy Efficiency Technical Reference Manual*[3] (TRM). For the impact evaluation effort, these savings estimates were assessed by developing separate gross unit energy consumption (UEC) estimates for refrigerators, freezers and RACs recycled through the program in 2011.

4.1.2.1 Refrigerators and Freezers

In evaluation research performed under contract for the California Public Utility Commission (CPUC), the Cadmus Group refined the use of linear multiple regression methodology for estimating energy savings resulting from refrigerator recycling.[4] This research consisted of a dual metering study to determine energy savings associated with refrigerators recycled throughout California between 2006 and 2008. For its study, Cadmus used data on refrigerator energy use obtained through two in situ monitoring efforts:

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

[4] The Cadmus Group, Inc. "Residential Retrofit High Impact Measure Evaluation Report", prepared for the California Public Utilities Commission. February 7, 2010.

- A dual monitoring study that ADM conducted in support of the evaluation of the California 2004-2005 Statewide Residential Appliance Recycling Program (RARP)[5]; and
- Additional in situ monitoring that Cadmus conducted as part of its study.

The product of these efforts was a database that contained energy use obtained through both Department of Energy (DOE) testing and in situ monitoring for a sample of 321 units, 184 of which were from the 2004-2005 evaluation and 137 from the 2006-2008 evaluation. Cadmus used the data from this dual monitoring sample to develop regression models that relate the annual unit energy consumption (UEC) of refrigerators - metered both *in situ* and according to DOE testing protocols – to various characteristics of the appliance and the household in which the appliance was used. The estimated coefficients from these models have been used in numerous subsequent studies to evaluate refrigerator degradation and to estimate appropriate UECs for appliances recycled through similar programs. As examples, the results of the Cadmus study were used by ADM in its evaluation of the 2010 and 2011 Nevada Energy Second Refrigerator Recycling Program[6,7], and by NMR Group, Inc., in its recent evaluation of the the 2009-2010 Massachusetts Appliance Turn-in Program.[8]

ADM used the DOE-based multiple regression model developed by Cadmus 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 Cadmus model and summed to produce an estimated average UEC for refrigerators recycled through the program. However, this UEC represents the annual energy consumption of the average refrigerator under conditions identical to the DOE testing procedure. To account for differences between the DOE testing environment and conditions in participants' homes, an adjustment for *in situ* conditions was necessary.

As part of its study, Cadmus compared the *in situ* and DOE based UEC's using an additional regression model which accounted for environmental factors that have the potential to affect refrigerator energy consumption. The results of this analysis indicated that there are three significant environmental factors affecting *in situ* refrigerator energy consumption that are not captured by DOE testing. Specifically, climate zone, household size, and whether the refrigerator is a primary or secondary unit. Cadmus used the dual monitoring data to develop a series of modification factors based on these three environmental variables. ADM used these modification factors, along with results from the participant survey, to determine appropriate adjustments to the DOE based refrigerator UEC estimate.

It is important to note that the Cadmus model only considers refrigerators. Accordingly, ADM used a refrigerator-to-freezer ratio factor to determine the average UEC for freezers. This

[5] ADM Associates, Inc., Athens Research, Hiner & Partners, Innovologie LLC, "Evaluation Study of the 2004-05 Statewide Residential Appliance Recycling Program" April 2008.

[6] ADM Associates, Inc., "2010 Second Refrigerator Recycling Program, NV Energy—Southern Nevada, Program Year 2009, Measurement & Verification Report." June, 2011

[7] ADM Associates, Inc., "2011 Second Refrigerator Recycling Program, NV Energy—Southern Nevada, Program Year 2010, Measurement & Verification Report." March, 2012

[8] NMR Group, Inc., "Massachusetts Appliance Turn-in Program Impact Evaluation" June 2011.

refrigerator-to-freezer factor methodology is similar to that used by the NMR Group, Inc. in their recent evaluation of the Massachusetts Appliance Turn-in Program.[9] 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.[10]

Finally, a partial use factor was developed for refrigerators and freezers to adjust UEC estimates to reflect the gross savings of appliances that were recycled through the program. The partial use factor is designed to account for the fact that not all refrigerators and freezers are plugged in year round. 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 Cadmus DOE based model was used to predict the average UEC for participating refrigerators in 2011 based on the average refrigerator characteristics established from JACO records.
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. The estimated UECs are adjusted to represent *in situ* operating conditions.
4. Partial use factors were applied to the UEC estimates to account for some of the appliances that were not being used throughout the entire year prior to being recycled.
5. The estimated average UECs for refrigerators and freezers were extrapolated to the population of program participating units to obtain a program level estimate of gross kWh savings resulting from refrigerator and freezer recycling.

4.1.2.2 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.[11] 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%

9 Ibid.

10 Ibid.

11 http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/CalculatorConsumerRoomAC.xls?7e02-5075

based on assumptions presented in the TRM. The following formula was used to calculate kWh savings for the average RAC recycled through the program:

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

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.[12] Specifically, the following equation was used to degrade the existing room air conditioners' at-manufacture EER value:

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

Where:

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

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

M = Maintenance Factor (0.01)

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

[12] NREL (2006). "*Building America Performance Analysis Procedures for Existing Homes.*" http://www.nrel.gov/buildings/pdfs/38238.pdf

The program tracking database was not as detailed for RACs as it was for refrigerators and freezers. Information regarding the age of collected RACs was provided in the tracking database, but there was no information regarding capacity or EER. Additionally, the model numbers provided in the tracking database could not easily be used to find capacity and EER information in any systematic way. However, the Association of Home Appliance Manufacturers (AHAM) maintains sales weighted average capacity and EER data going back to 1972.[13] The most recent year that the data was available was 2010. 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. 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. This 10,000 BtuH capacity assumption is greater than the 8,500 BtuH assumption in the TRM. However, it is in line with the AHAM average sales-weighted capacity of RACs recycled through the program in 2011 based on vintage.

4.1.3 Calculating Gross Peak Demand (kW) Savings

Gross electric peak demand savings were calculated based on the critical peak demand definition specified in the TRM. Specifically, the PUCO established summer on-peak period, 3:00-6:00 p.m. on weekdays during the months of June through August, was used. Measure specific normalized 8,760 load shapes were used to identify the average demand during this summer on-peak period. These load shapes assign a portion of estimated gross kWh savings to each hour of the year. After identifying the total kWh savings that fall into the defined summer on-peak hours, dividing by the total number of hours in the peak period results in the average gross peak demand reduction. There are a total of 198 hours that meet the criteria of the PUCO on-peak period definition in 2011. Appliance load shapes developed as part of the End-Use Load and Consumer Assessment Program (ELCAP)[14] were used to estimate the percentage of kWh savings occurring during those 198 on-peak hours.

[13] This AHAM data was accessed from two sources:
1. http://www.nwcouncil.org/energy/rtf/meetings/2011/0301/LED_MF_RAC_supporting%20files.zip
2. http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=5.7.7

[14] Pratt RG, CC Conner, EE Richman, KG Ritland, WF Sandusky, and ME Taylor. 1989. Description of Electric Energy Use in Single-Family Residences in the Pacific Northwest. (End-Use Load and Consumer Assessment Program [ELCAP]). DOE/BP-13795-21, prepared for Bonneville Power Administration by Pacific Northwest Laboratory, Richland, Washington.

4.1.4 Calculating First-Year Pro-Rata and Lifetime kWh Savings

First-year pro-rata kWh savings are defined as gross kWh savings occurring during the 2011 calendar year. First-year pro-rata savings were calculated by determining the percentage of the 2011 year that was remaining from the date when each unit was picked-up for recycle. The remaining time that the unit could have potentially been in service was used along with normalized ELCAP load shapes for refrigerators, freezers, and room air conditioners in determining the share of annual kWh savings realized in the 2011 program year. After first-year pro-rata kWh savings was calculated for each unit individually, they were then summed in order to determine program-level first-year pro-rata kWh savings.

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

4.2 PROCESS EVALUATION METHODOLOGY

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

- How effective were the marketing efforts for the program? Which marketing methods were most effective?
- How well did the Companies' staff and the implementation team work together?
- How complete and how accurate was the program tracking database?
- 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?
- What changes can be made to the program's design or delivery to improve its effectiveness in future program years?

The methodologies used to answer these researchable questions are discussed in the following sections.

4.2.1 Participant Telephone Interviews

ADM completed a total of 217 participant telephone interviews that addressed a number of process related issues. Survey respondents were asked a series of questions that identified the marketing channels through which they became aware of the program. They were also asked a series of questions aimed at determining the reasons for disposing of the appliance. These questions were aimed at determining how effective the marketing materials are at inducing program participation. Customers were also asked to identify the main reason they chose to participate in the program as opposed to other disposal methods. The influence of the incentive amount on program participation was also explored.

The participant survey was also used to determine customer satisfaction with the Appliance Turn-In program. In particular, respondents were asked about their level of satisfaction with the scheduling process, pickup process, incentive amount, and interaction with program staff. Additionally, respondents were asked a number of demographic questions including those recommended by the Statewide Evaluator (SWE) for purposes of consistency across Ohio utilities, as relevant to the Appliance Turn-In program.

4.2.2 Program Staff Interviews

ADM conducted in-depth interviews with program staff from the Companies and JACO, Inc. The interviews were conducted between March 22, 2012 and April 3, 2012. Through the interviews with the initial JACO staff member, four additional JACO staff members were identified and contact information was provided. In total, five in-depth interviews were conducted with six interviewees for this qualitative assessment.

The objective of these interviews was to gather feedback from the Appliance Turn-In program and implementation staff to determine how the program is operating and to collect suggestions for program improvements.

4.2.3 Recycling Center Visit and Pick-Up Shadowing

ADM field staff toured the JACO recycle facility in Stow, Ohio in April of 2012. Additionally, ADM field staff "shadowed" JACO pick-up staff as they collected a total of 14 refrigerators and freezers from customer's homes. The purpose of this recycling center visit and pick-up shadowing activity was to document the chain of appliance custody along with the recycling process. These activities also served as additional verification that units were being collected and recycled in accordance with the procedures agreed upon between the Companies' and JACO.

5. DETAILED IMPACT EVALUATION FINDINGS

This chapter presents the findings of the impact evaluation of the 2011 Appliance Turn-In Program.

5.1.1 Verification of Units Recycled

As a first step toward estimating program level kWh and kW impacts, ADM reviewed program tracking data provided by JACO 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.

All 217 respondents who completed the participant survey verified that they had in fact participated in the program during 2011. All survey respondents also indicated that the number of appliances recycled was identical to the claims in the JACO tracking database. However, 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. One respondent in the CEI service territory and one respondent in the OE territory indicated that their appliance was not in working condition at the time of pick-up. Both of these respondents were referencing a refrigerator that was recycled. All other survey respondents indicated that their units were in working condition at the time of pick-up. Based on these results, the verification rates shown in Table 5-1 for each utility and each appliance were determined:

Table 5-1: Verification Rates by Utility and Appliance Type

Utility	***Appliance Type***		
	Refrigerator	***Freezer***	***RAC***
CEI	98.1%	100%	100%
OE	98.1%	100%	100%
TE	100%	100%	100%

Based on these verification rates, Table 5-2 reports the numbers of refrigerators, freezers, and RACs recycled through the program during 2011 that were verified as being in working condition when recycled and therefore program-eligible.

Table 5-2. Recycled Appliances Verified to be in Working Condition

Unit Type	*Quantity Reported as Recycled*	*Verification Rate*	*Quantity of Recycled Units Verified as Program Eligible*
CEI			
Refrigerator	4,156	98.1%	4,078
Freezer	1,324	100%	1,324
RAC	597	100%	597
OE			
Refrigerator	6,139	98.1%	6,024
Freezer	2,129	100%	2,129
RAC	911	100%	911
TE			
Refrigerator	1,295	100%	1,295
Freezer	392	100%	392
RAC	159	100%	159

5.1.2 Gross Annual kWh Savings per Appliance

Gross annual kWh savings were calculated as described in chapter four of this report. The details and results of these calculations are reported in this section.

5.1.2.1 Refrigerators and Freezers

For refrigerators, Unit Energy Consumption (UEC) estimates were derived using the DOE-based regression model developed by Cadmus in the evaluation of the California Statewide Appliance Recycling Program. The model specification and estimated coefficients of the Cadmus model are shown in Table 5-3.

Table 5-3: Cadmus DOE based UEC Regression Details[15]
(Dependent Variable – DOE Estimated UEC, R^2=0.41)

Independent Variables	***Coefficient***	***t-Value***
Intercept	491.83	1.9
Dummy: Side-by-Side Configuration	98.96	0.5
Size (Cubic Feet)	35.3	2.9
Age (Years)	25.25	4.7
Interaction: Side-by-Side x Age	19.98	2.2
Dummy: 2006-2008 Metering Sample	-413.99	-6.3

The program tracking database included information regarding configuration, size, and age[16] for 11,170 out of the 11,590 refrigerators collected in 2011. Of these 11,170 refrigerators, 18.7% were side-by-side models; the average size was 18.1 cubic feet and the average age was 26.3 years old. Table 5-4 shows all of the relevant refrigerator characteristics.

Table 5-4: 2011 Program Refrigerator Characteristics

Appliance Characteristics	***Refrigerators***
Sample Size	11,170
Side-by-Side Percentage	18.7%
Average Size (Cubic Feet)	18.1
Average Age (Years)	26.3
Interaction: Side-by-Side x Age	4.2

The refrigerator characteristics shown in Table 5-4 were used in conjunction with the model coefficients in Table 5-3 to calculate annual energy consumption estimates for program participating refrigerators. The refrigerator-to-freezer factor of 0.85 was applied to develop annual energy consumption estimates for freezers. These calculations are shown below:

Refrigerator UEC (kWh)

$$491.83 + 98.96 * 0.0187\ (Side - by - Side) + 35.3 * 18.1\ (Size) + 25.25 * 26.3\ (Age) + 19.98 * 4.2\ (Interaction) - 413.99 = 1{,}483\ kWh$$

Freezer UEC (kWh)

[15] Source: Cadmus et al. (2010). *Residential Retrofit High Impact Measure Evaluation Report.*. February 8th, 2010.

[16] 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.

$$1{,}483 * 0.85\ (refrigerator - to - freezer\ factor) = 1{,}261\ kWh$$

It is important to note that these UEC estimates are based on the DOE testing procedure, and therefore estimate the energy usage of units of appliances in the DOE testing environment. An adjustment is necessary to reflect in situ usage environments. ADM used the modification factors estimated by Cadmus as shown in Table 5-5 below.

Table 5-5. DOE to In Situ Adjustment Factors[17]

Primary	***Household Size***	***Climate Zone***	***N***	***% In Situ Delta***[18]
Yes	1-2	Cool	29	-30.8%
		Warm	18	-19.2%
	3+	Cool	50	-16.0%
		Warm	32	-6.4%
No	1-2	Cool	86	-21.3%
		Warm	42	-15.8%
	3+	Cool	59	-6.8%
		Warm	31	1.3%

For the purposes of this study, Ohio is treated as a Cool Climate. Estimates of primary vs. secondary appliances for refrigerators were derived from responses to the participant survey. These responses indicated that 49.6% of refrigerators collected in 2011 were primary appliances, while the other 50.3% were secondary appliances. All freezers were assumed to be secondary appliances. Estimates of household size were developed using data from the 2008-2010 American Community Survey for Ohio residents.[19] Based on this data, it was determined that 41.9% of Ohio households have one or two occupants, while 58.1% have three or more occupants. These values were used as proxies for program participating households. Using this information to weight the "% In Situ Delta" results in adjustment factors of:

Refrigerators: *[(0.419 * -0.308 + 0.581 * -0.16) * 0.496] + [(0. 419 * -0.213 + 0. 581 * -0.068) * 0.503] = -17.5%*

Freezers: *(0.419 * -0.213 + 0.581 * -0.068) = -12.9%*

Applying these adjustment factors to the DOE based UEC estimates above results in the following *in situ* UEC estimates for refrigerators and freezers:

- Refrigerators: 1,223 kWh
- Freezers: 1,098 kWh

[17] Source: Cadmus et al. (2010). *Residential Retrofit High Impact Measure Evaluation Report.*. February 8th, 2010.
[18] A negative in situ delta represents an *in situ* UEC that is lower than the DOE UEC.
[19] The American Community Survey Data can be accessed for free via the Integrated Public Use Microdata Series (IPUMS) website at: http://www.ipums.org/

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 "use factors" based on three categories into which recycled appliances fall:

1. Some units that were recycled were not being used at all before being sent for recycling. The use factor for such units therefore would be zero. That is, these units were not being used even before recycling and therefore had no baseline energy usage.

2. Other units were being used, but for only part of the year. For these units, the 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 partly used was 3.84 months, implying a use factor of 0.320 (i.e., 3.84/12). For freezers in this category, the use factor was calculated to be 0.233, reflecting an average of 2.8 months in use for freezers being partly used.

3. Units used all of the time have a use factor of one (1).

The overall 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. Table 5-6 shows the calculation of the overall UES for refrigerators and freezers when partial use is taken into account.

Table 5-6: Unit Energy Savings Adjusted for Partial Use

Operating Status of Unit	***Percentage of Recycled Units in Category***	***Use Factor***	***Calculation of UES to Adjust for Part Use***
	Refrigerators		
Not running	6.29%	0	0
Running part time	17.61%	0.320	391
Running all time	76.10%	1	1,223
Weighted Average UES for Refrigerators			1,000
	Freezers		
Not running	9.80%	0	0
Running part time	11.76%	0.233	256
Running all time	78.43%	1	1,098
Weighted Average UES for Freezers			892

Based on the findings detailed in this section, the *ex post* gross per-unit annual kWh savings for refrigerators recycled through the program is estimated to be 1,000 kWh; the *ex post* gross per-unit annual kWh savings for freezers recycled through the program is estimated to be 892 kWh.

5.1.2.2 Room Air Conditioners (RACs)

AHAM Sales-weighted average EER values were applied to each RAC recycled through the program in 2011 based on the reported vintage. The resulting average EER value was 7.68. Appliance degradation was taken into account 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 5.97. Based on the assumptions presented in the TRM, EFLH were assumed to be 233 and 76% of units were assumed to be replaced. Average capacity for the average existing and baseline replacement RAC was assumed to be 10,000 BtuH based on the assumptions in the Energy Star Room Air Conditioner Savings Calculator. This assumption was in line with the AHAM data implied average of 10,287 BtuH for RACs recycled in 2011. 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 2011 was calculated to be 216.2 kWh as follows:

$$RAC\ Annual\ kWh\ Savings = \frac{233 * \left(\frac{10{,}000}{5.97}\right)}{1000} - \left(0.76 * \frac{233 * \left(\frac{10{,}000}{10.18}\right)}{1000}\right) = 216.2\ kWh$$

5.1.3 Gross Peak Demand (kW) Savings per Appliance

Appliance load shapes for refrigerators, freezers, and RACs were used to estimate the average kW reduction occurring during the PUCO defined on-peak period. These load shapes were normalized versions of load shapes originally developed as part of the End-Use Load and Consumer Assessment Program (ELCAP).[21] The average daily load profile for each of the three appliances recycled through the program is shown in Figure 5-1. Note that the load profile for RACs is the average daily load profile during the months of June through September.

[20] NREL (2006). "*Building America Performance Analysis Procedures for Existing Homes.*" http://www.nrel.gov/buildings/pdfs/38238.pdf

[21] Ibid.

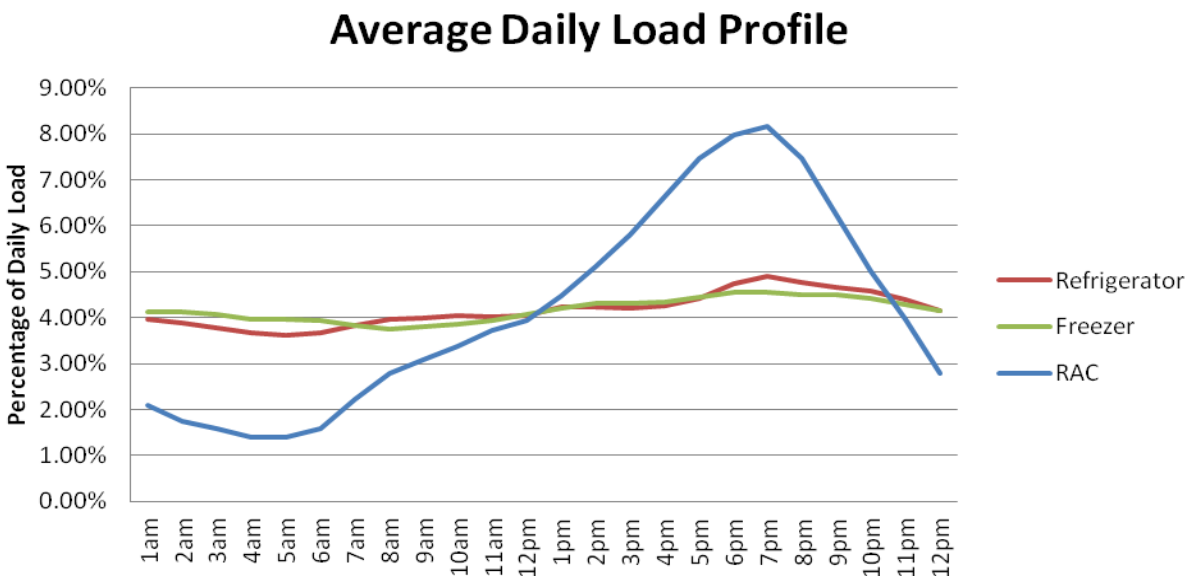


Figure 5-1: Average Daily Load Profiles

Using these normalized ELCAP load shapes, ADM determined that approximately 2.3% of the annual gross kWh savings attributable to a recycled refrigerator occurs during the on-peak period. This is equivalent to 23.3 kWh; dividing by the number of on-peak hours (198) results in an average on-peak demand reduction of 0.12 kW per recycled refrigerator.

Similarly, it was determined that approximately 2.4% of a freezer's energy consumption occurs during on-peak hours (21.4 kWh). Average on-peak demand reduction is thus 0.11 kW per recycled freezer.

The load shape for RACs indicated that approximately 11.9% of the gross annual kWh savings occur during on-peak hours (21.9 kWh). This is equivalent to an average on-peak demand reduction of 0.130 kW per recycled RAC. It is worth noting that the *ex ante* peak demand reduction estimate taken directly from the TRM is listed as a considerably higher value – 0.906 kW per recycled RAC. This value is actually a miscalculation. If you perform the calculation exactly as described by the TRM algorithm, the resulting estimate of per-unit peak demand reduction is actually 0.133 kW; this is approximately the same as the *ex post* per-unit demand reduction estimated in this analysis.

5.1.4 First-Year Pro-Rata and 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, RUL values of three years for RACs and eight years for refrigerators and freezers were used. Table 5-7 shows the resulting per-unit lifetime kWh savings estimates.

Table 5-7: Per-Unit Lifetime kWh Savings

Appliance Type	***Ex Post Per-Unit Annual kWh Savings***	***RUL (years)***	***Ex Post Per-Unit Lifetime kWh Savings***
Refrigerators	1,000	8	8,000
Freezers	892	8	7,133
RACs	216.2	3	648

First-year pro-rata savings were calculated by determining the percentage of the 2011 year that was remaining from the date when each unit was picked-up for recycle. To calculate this percentage, ADM determined the number of days left in the year following the collection of each appliance and then divided that number by 365 days. The remaining time that the unit could have potentially been in service was used along with normalized ELCAP load shapes for refrigerators, freezers, and room air conditioners in determining the share of annual kWh savings realized in the 2011 calendar year. The average per-unit first-year pro-rata kWh savings value by utility and appliance type is shown in Table 5-8.

Table 5-8: Average Per-Unit First-Year Savings by Appliance Type and Utility

Utility	***Refrigerators***	***Freezers***	***RACs***
CEI	327.8	306.2	63.9
OE	320.3	294.4	56.4
TE	303.3	274.4	50.8

6. DETAILED PROCESS EVALUATION FINDINGS

This chapter provides the findings of the process evaluation component of this report. This section is broken down into three sections, representing the three data collection activities performed.

6.1 PARTICIPANT SURVEY FINDINGS

A telephone survey was conducted to collect data about customer decision-making, preferences, and opinions of the Appliance Turn-In Program. The survey focused on various aspects of the customer experience, including the program application process, the pickup process, and the program rebate. The customer survey was conducted in March of 2012 with customers who had participated in the 2011 program year. In total, 217 customers who had recycled at least one appliance through the program responded to the survey.

6.1.1 Customer Awareness of the Program

Participants were initially asked how they first learned about the Appliance Turn-In Program. As shown in Figure 6-1, respondents most commonly reported that they heard about the program through a bill insert from the Companies. This was followed by newspaper or magazine advertisements with 16% of respondents citing this source. Another 13% of respondents indicated television advertisements. These results are consistent with the findings obtained from multiple customer inquiries conducted by JACO, where program participants commonly cited bill inserts as their initial source of program information.

Eleven percent of respondents reported hearing about the Appliance Turn-In Program from friends or relatives, which suggests that at least some customers are recommending the program to others through word of mouth. It is likely that this word of mouth element will continue to increase over the course of the program, and that eventually a higher percentage of customers will hear about the program from friends or relatives who have participated.

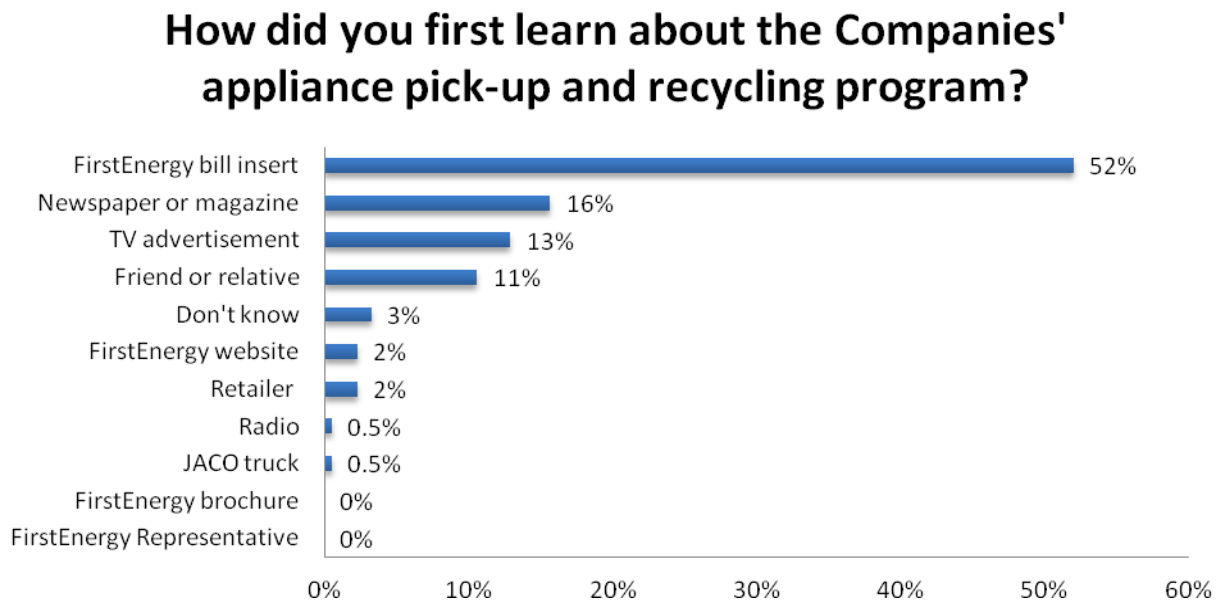


Figure 6-1: How Customers Learned about the Program

6.1.2 Customer Decision Making Characteristics

In order to understand customer values and potential motivations for participating in the program, survey respondents were asked why they chose to participate in the Appliance Turn-In program over other disposal methods. As shown in Figure 6-2, almost half of customers reported that they chose the program over other disposal methods because of the cash incentive offered. Another 33% indicated that convenience or no additional cost pick-up service was the reason they chose the program. Additionally, environmentally safe disposal of the old appliances was a main consideration for almost 10% of respondents.

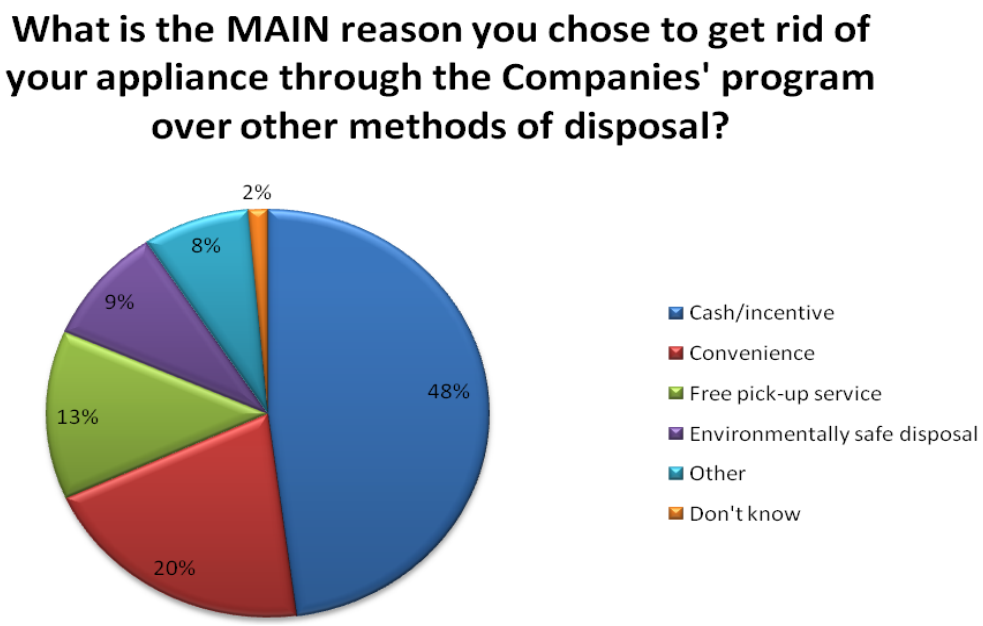


Figure 6-2: Reason for Program Participation over other Disposal Methods

The convenience of haul away and the rebate incentive are typically the two most common motivations for customers to participate in appliance recycling programs such as the Appliance Turn-In Program, and it is often unclear whether some customers would be interested in participating in the absence of a rebate. To further investigate the importance of the rebate in the customer's decision to participate, respondents were asked if they would have still participated in the program if the incentive amount had been less. As shown in Figure 6-3, only 19% of respondents indicated that a lower incentive amount would have surely discouraged them from participating.

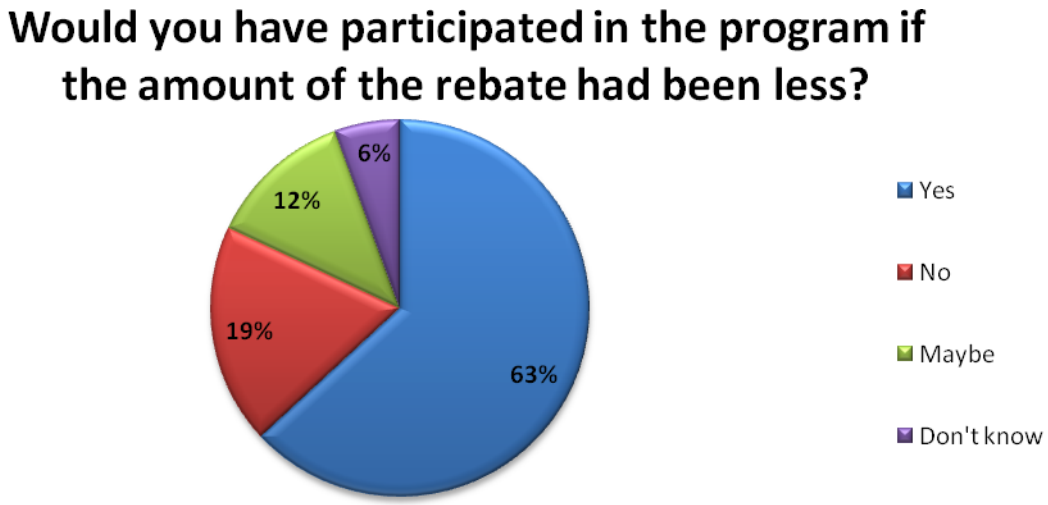


Figure 6-3. Willingness to Participate at Lower Incentive Level

Respondents who indicated they would/might still participate in the program with a lower incentive level (n=176) were then asked a follow up question: would you have participated in the program with no rebate check at all? As shown in Figure 6-4, approximately 28% of these respondents would not participate if the rebate were removed entirely from the program. Taking these results together, approximately 42% of 217 survey respondents indicated that they would not have participated in the program if a rebate was not offered. It is worth noting that while approximately half of the respondents indicated that the cash rebate was the main reason they participated in the program over other disposal methods, almost 68% of respondents indicate that they would have participated even without the rebate. This highlights the fact that the convenience of the no additional cost pick-up service provided through the program is highly valued by respondents.

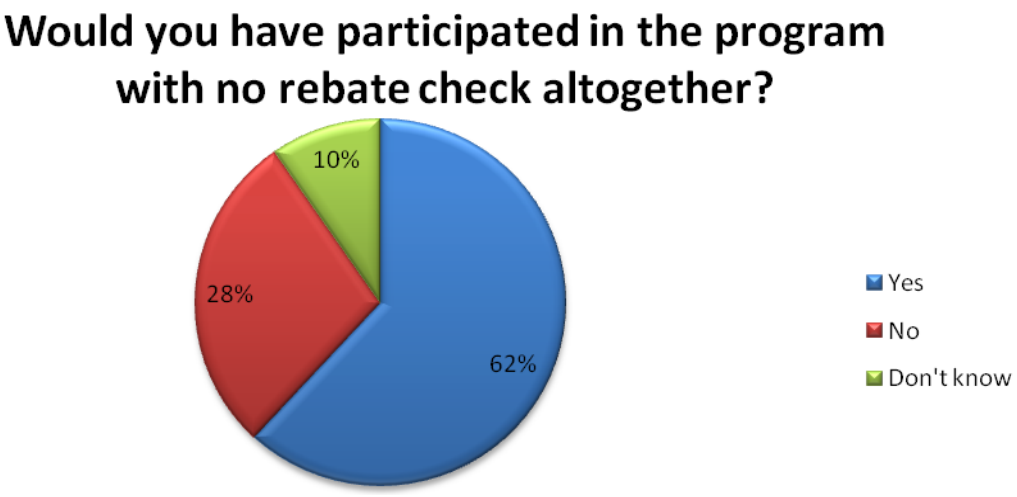


Figure 6-4. Willingness to Participate without Incentive

6.1.3 Customer Satisfaction with the Appliance Turn-In Program

The participant survey also asked customers about their satisfaction with several elements of the program. These elements included:

- Satisfaction with the program scheduling process;
- Satisfaction with the actual pick-up appointments;
- Satisfaction with the rebate amount received;
- Satisfaction with the time it took to receive the rebate after participating;
- Satisfaction with communication with program staff; and
- Satisfaction with the program overall.

Respondents were asked about their levels of satisfaction with these program elements, with the response options of "very satisfied", "somewhat satisfied", "neither satisfied nor dissatisfied", "somewhat dissatisfied", and "very dissatisfied". Figure 6-5 displays the distribution of participant satisfaction ratings for these aspects of the program. Overall, satisfaction ratings were very high, with few low scores reported by respondents.

Customer satisfaction with program scheduling process: Overall respondents were highly satisfied with the scheduling process. Ninety-five percent of respondents indicated that they were at least somewhat satisfied with this element of the program. Only two percent of respondents expressed dissatisfaction with the scheduling process. The open-ended explanations for dissatisfaction provided by this minority were mostly related to the length of time before pick-up or rescheduling needs.

One respondent commented that he could not schedule the pick-up at a time convenient to him, and had to take time off work to meet the pick-up crew. Another commented that it "was difficult to get through to schedule the pick-up. Then it was a long time before they actually picked it up." These findings reflect some of the challenges that exist with coordinating the haul away service for customers with busy schedules or uncertain availability. While these customers represent a small percentage of respondents, their concerns emphasize the importance of communicating with customers and ensuring that the pickup process is as straightforward as possible.

Customer satisfaction with the actual pick-up: Ninety percent of respondents reported being very satisfied with their actual pick-up appointment, and another 8% reported being somewhat satisfied. Only two respondents indicated that they were somewhat dissatisfied with the pickup; the open-ended explanations for their dissatisfaction were "the people were not very careful when they were removing the appliance" and "they arrived early and ended up not taking the unit."

For programs that require entering customer homes for installation or removal of equipment, some customers typically view the process as burdensome or uncomfortable. However, the full set of participant responses strongly suggests a high level of satisfaction with the JACO pickup team.

Customer satisfaction with rebate amount: When asked how satisfied they were with rebate amount they received for participating in the program, 71% of respondents reported that they were very satisfied, while another 21% reported they were somewhat satisfied. Less than 1% of respondents indicated that they were dissatisfied with the rebate amount. This result indicates that the program incentive is set at a level that is attractive and agreeable to program participants. This result is consistent with reports from the Companies and JACO staff that the current incentive levels are appropriately set based on experience with similar programs in Ohio and other states.

Customer satisfaction with time to receive program rebate: Three-quarters of respondents reported being very satisfied with the time it took to receive their rebate, while 19% of respondents indicated that they were somewhat satisfied with this aspect. These ratings reflect very high satisfaction levels for customers. Two percent of respondents rated the time to receive the rebate with a 'somewhat dissatisfied' response. Survey respondents were also asked to self-report how long it took to receive the rebate check after the pick-up. Out of 217 respondents, only five responded that the check took longer than the program goal of 4-6 weeks (all four of these responses were between 6 and 12 weeks). Conversely, 47 respondents indicated that the check arrived in 3 weeks or less.

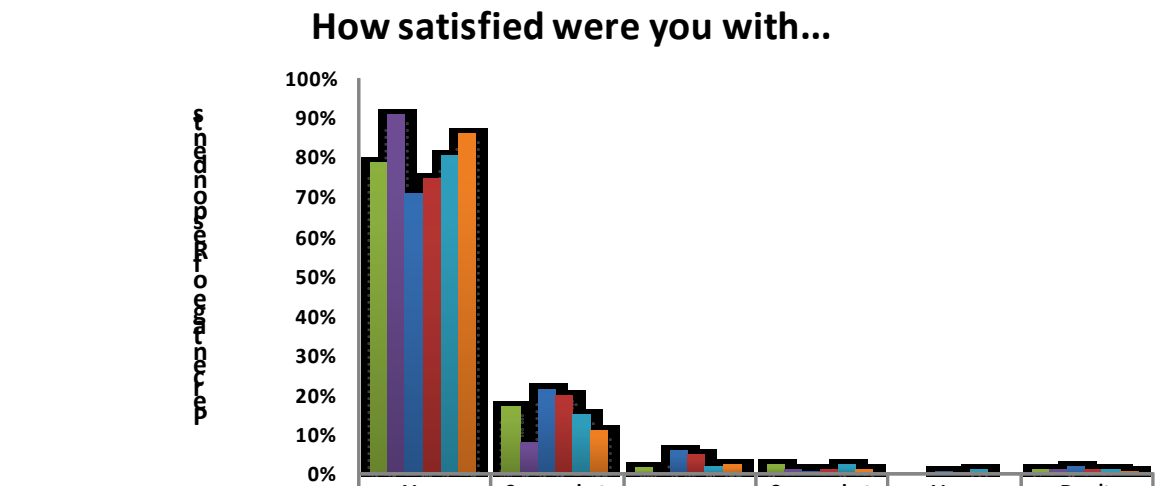
Customer satisfaction regarding communications with program staff: Survey respondents were asked to indicate how many times they contacted program staff with questions about the program. Forty percent of respondents said they did not need to contact program staff with questions. This high percentage is likely a result of the automated online scheduling system operated by JACO. Another two percent of respondents did not know if they contacted program

staff with questions, while the remaining 58% contacted program staff at least once. Of those who contacted program staff, all but two indicated they made contact via telephone (the other two used email or fax). Of the 131 respondents who did contact program staff at least once, 95% reported being at least 'somewhat satisfied' with the communication.

Only three percent of respondents reported dissatisfaction with their interactions with program staff. When asked to explain their dissatisfaction, these few respondents indicated that they were unhappy with an automated answering system and "never got to talk to a real person." One respondent also reported that "they told me the rebate was for one amount and it turned out to be less." Overall, survey responses indicate that the vast majority of participants are satisfied with their interactions with program staff.

Customer satisfaction with overall process of program experience: Eighty-six percent of respondents were very satisfied with the overall process of having their appliance recycled, from the time they called for a pickup to the time they received their rebate. Another 11% were somewhat satisfied. Only two of the 217 respondents indicated they were somewhat dissatisfied. When explaining the reasons for their dissatisfaction, these two respondents mainly restated the issues that they had experienced with the previously discussed program elements. Namely, one respondent was dissatisfied because the pick-up crew arrived later than scheduled, while the other was dissatisfied with the length of time it took from scheduling to pick-up.

The few issues discussed in the previous sections may be related to managing customer expectations, where some customers may anticipate very flexible appointment times or instant rebates. While these details are generally addressed within the customer-facing program documentation, unfulfilled expectations would likely be minimized by ensuring that participants understand the estimated timeframes of both the scheduling process and rebate delivery. As the previous sections demonstrate, customers are for the most part satisfied with all program elements.



	Very satisifed	Somewhat satisfied	Neither	Somewhat dissatisfied	Very dissatisfied	Don't know
Scheduling	78%	17%	1%	2%	0%	1%
Pick-up process	90%	8%	0%	1%	0%	1%
Rebate amount	71%	21%	6%	0.5%	0.5%	2%
Time to receive rebate	75%	19%	5%	1%	0%	1%
Communication w/ program staff	80%	15%	2%	2%	1%	1%
Overall	86%	11%	2%	1%	0%	0.5%

Figure 6-5 Customer Satisfaction with Selected Program Elements

In addition to satisfaction levels for specific program elements, survey respondents were asked whether they had any suggestions for program improvements. Seventy-four percent of respondents did not have any suggestions. The remaining 26% offered a number of positive suggestions such as: "Keep the program going. It is a very good program;" and "I think they should advertise more." Others suggested reducing the time between scheduling and pick up, increasing the incentive amount, shorting the four hour pick-up window, and including more appliance types in the program.

There were also a few suggestions that illustrate that some customers may not fully understand the purpose of the program. For example, one respondent reported that "when they picked it up, they cut the cord. I thought it was going to be recycled. It only needed a gasket." A couple other respondents said "they should do the program more frequently." These responses indicate that there may be some misunderstandings amongst customers as to the nature of the program.

6.2 COMPANY AND JACO STAFF INTERVIEW FINDINGS

ADM conducted in-depth interviews with program staff from the Companies and JACO, Inc. The interviews were conducted between March 22, 2012 and April 3, 2012. The following sections describe the findings from these interviews regarding a number of topics.

6.2.1 Company Program Staff Administration and Oversight

The Companies' program manager has several points of contact at JACO with whom they interact depending upon the question or issue topic. The Companies' program manager indicates that a single point of contact is preferred, but that the current model is working okay due to the quick response (in general) of the JACO program manager's support staff.

JACO uses an accessible online comprehensive and detailed tracking tool that provides the Companies with near-real time information. The online tool provides information and data such as: the number of calls and orders received by day; the daily pickup schedule; historical trends; projected call, unit, and schedule volumes; customer level data; and unit specific data. The Company program staff reports complete confidence in the information in the tracking tool.

6.2.2 Program Incentive Levels

The Companies' program staff believes that the incentive levels are appropriate for each of the three appliances included in the program. This belief is influenced by a lesson learned in a separate Ohio utility's service territory, where a similar program kicked off earlier. In that program, a lower incentive amount was tested for large appliances ($35). Although the program was moderately successful with the $35 incentive, an increase to $50 per unit increased program participation enough to warrant the additional incentive.

This belief is also supported by responses from JACO staff who indicate that the current incentive levels are appropriate and compare to those offered by other utilities in other states. Specifically, JACO reported that they have been working with AEP in Ohio for 3 years and have tried incentive rates ranging from $30 to $50 and have found that the $50 level is the most effective. They also indicated that the $50 incentive level for large appliances is typical in the Northeast.

6.2.3 Program Operations, Implementation Improvements, and Lessons Learned

Day-to-day operations appear to be running smoothly from both the Companies and the JACO program staff perspectives. One JACO program staff commented, *"The Companies' programs in Ohio are running as or more smoothly compared to other programs in other jurisdictions. We were surprised that the program exploded from inception. It was great to see, there was no ramp-up period. It is a popular program in Ohio, the volume is there and goals are met. It's getting the results."*

The Companies' Appliance Turn-In program launched its first retail store partnership with Sears on April 17, 2012. JACO provides training to all store employees who will be involved in the process. This training includes an explanation of the program criteria, the benefits to both the retailer and the customer, the customer enrollment process (customers are able to enroll in the program during the purchase transaction or at home), and what happens with the unit once it is collected. JACO program support staff visit partner retailers three times per year to re-train staff.

Additionally, Sears provides its personnel with an online refresher course that is available at all times. JACO also provides Sears stores with marketing materials and a marketing plan.

To maintain the chain-of-custody, customers recycling through a retail store are provided with an identification sticker to affix to the unit to be recycled. This sticker includes the customer name and a confirmation number. The retailer picks up the unit to be recycled and takes it to the Sears collection center where appliances that have the Companies' Appliance Turn-In program sticker are segregated. The JACO collection team collects the appliances with the sticker, scans the program stickers and verifies program eligibility, and the units are then tracked in the JACO tracking system.

Lessons learned discussed by the Companies' program staff involve establishing realistic goals and budgets – especially with TRM uncertainty - during the program design and planning phase; and, ensuring continued high customer satisfaction due to the added risk with the in-home removal of large appliances associated with this program.

6.2.4 Marketing

JACO uses a combination of earned media (press releases and public relations events), paid media (television, newspaper, radio, web banners, and optimized Google search), and utility channels (bill inserts). The JACO program staff sees the effort as a "three-legged stool", where each component is important and helps the success of the other components.

The JACO media team tracks the effectiveness of the marketing campaign through continuous monitoring. Data is collected from each customer pickup that describes how the customer first heard about the program and annual reports are developed that report on the effectiveness of each channel used to inform future marketing campaigns. The report findings support the need for all three marketing efforts.

6.2.5 Quality Assurance and Quality Control

It can be argued that the Appliance Turn-In program is more susceptible to customer complaints and issues than are other programs due to the sheer number of in-home appliance removals completed each month (two to three thousand units are removed each month). According to interviewees, customer complaints range from, *"JACO never arrived to pick up my appliance"* to *"the contractors tracked mud through my house"* to *"the contractors dropped the appliance and cracked my driveway"*. However, the number of complaints (reported to be one or two per month) in relation to the volume of units collected each month is very small.

This low complaint rate is due to the quality assurance and quality control procedures implemented by JACO (as reported by the Companies' program staff and JACO staff combined responses below):

- Management monitors and tracks drivers' schedule adherence track record (appliances collected within the 4-hour window customers are given) and customer complaints.

- Drivers use cell phones and GPS devices to communicate with and locate customers.
- Chain-of-custody procedure ensures pickup-to-recycling process integrity and consists of:
    - Appliance data and digital pictures of all the units are collected.
    - After verification of a working unit, the pickup crew renders the appliance inoperable at the home – the power cord is cut, the seal is removed from the door, and the temperature control is broken. This activity often occurs in front of the customer so they can verify the unit is going out of service.
    - The customer's signature is collected electronically to verify that there was no damage done to the customer's property during appliance pickup.
    - A bar-coding system tracks the units from pickup to the recycling facility and links all data collected on the unit along with the photo.
- JACO implementers and support staff receive regular training and monitoring.
- Routine quality checks are performed on all drivers' vehicles and on day-to-day work.
- JACO support staff has performance goals based on specific role in the program. For example, drivers are evaluated on pickup schedule adherence and customer complaints while back office support management is evaluated on the availability of resources to keep the pickup schedule timeframes to within 7 to 10 business days from which a customer can select a date and time that best fits his or her schedule.

6.2.6 Current Program Performance

According to the Companies' program staff, the Appliance Turn-In program is meeting its internal goals. JACO staff also report this is the case and attribute this success to two key factors: (1) JACO set up operations to rollout the Companies' Appliance Turn-In program before the Ohio Commission approved the Companies energy efficiency plan and ahead of contract execution with the Companies in order to be able to begin implementation immediately once the final go-ahead was received; and, (2) early marketing campaign initiatives (big kick-off event, press coverage of new state-of-the art facility, and media buys). In comparison to other initial program rollout efforts, JACO reports that this is one of the most successful efforts this early on in program implementation. Typically, it takes more than a year for Appliance Turn-In programs to reach the level this program was able to accomplish in just seven months.

6.2.7 Current and Future Challenges

The Companies' program staff reports a current and future challenge is to determine how to handle technical reference manual (TRM) changes during program years. The Companies are now working on 2013 – 2015 plans and is grappling with ways to address the possibility of TRM changes occurring in the next plan cycle. Small changes in claimable savings per unit can have a large impact on the number of units required to meet savings targets. For example, if the TRM deemed value per refrigerator decreases by 25%, then a plan to collect 100,000 units to meet

savings targets must be increased to collect 125,000 units. This change can affect marketing campaigns and staffing levels along with Commission approved program spending levels. It is noteworthy that JACO staff also mentioned this as a current and future challenge.

6.3 RECYCLING CENTER TOUR AND PICK-UP SHADOWING FINDINGS

ADM field staff toured the JACO recycling facility in Stow, Ohio in April of 2012. During this tour, the recycling process was observed and documented. This recycling process is summarized as follows:

1. Appliances are taken off the truck and loaded into the warehouse.

2. Oils and refrigerants are removed from each appliance using a special machine. The amount of oil and refrigerant (along with refrigerant type) removed is recorded and stored in a database. The recovered Freon and oil is then sent to another facility where it is refined and re-sold. The objective is to minimize the impact on landfills and prevent the release of CO_2 and Freon into the atmosphere.

3. Shelves and glass components are removed. The glass and plastic components are separated into different bins.

4. The shell of the appliance is placed into a machine that cuts the shell into pieces, separating foam, metals, and plastics.

5. The foam insulation is then processed for removal of any oil or refrigerants then bagged to be properly disposed of.

6. Metals (aluminum compressors and other components, copper tubing and wiring, ect.,) are separated and taken to the scrap yard and sold.

On the same day of the recycling facility tour, ADM field staff also "shadowed" the JACO pick-up crew as they collected 14 refrigerators and freezers from customer's homes. During this process, it was observed that JACO crew would inspect each appliance to insure it was in working condition. In fact, one refrigerator that was scheduled to be picked up had a bad compressor and JACO staff did not collect the unit, letting the customer know that units must be in working condition to qualify for the program. After determining that units were program eligible, JACO staff would then disable the unit so that it could not be resold. To disable the unit, the JACO crew member would cut the power cord and either destroy the door seals or put a hole in the shell. Each unit also receives a special sticker with a barcode that identifies the unit throughout the recycling process. This barcode is used to store information such as the make and model, estimated age, and various other appliance and household characteristics. It is these characteristics that are entered into program tracking data. The entire process observed by ADM field staff was in line with program design, and structured to ensure proper chain of custody for participating appliances.

7. CONCLUSIONS AND RECOMMENDATIONS

This chapter reports the conclusions and recommendations resulting from the impact and process evaluation of the 2011 Appliance Turn-In Program.

7.1 ENERGY IMPACTS

A total of 14,209 households in the service territories of the three Companies received appliance recycling services through the Appliance Turn-In Program in 2011. The numbers of participants for each service territory were as follows:

- CEI 5,045
- OEC 7,617
- TEC 1,547

Estimated electric impacts were 15,185,191 kWh saved annually, which represents a realization rate of 72.6 percent; 4,958,867 kWh were saved during the 2011 calendar year (first-year pro-rata savings). Average on-peak demand reduction was estimated to be 1,969 kW. For detailed tables listing energy savings and demand reductions by measure type, please refer to Appendix A. Estimates of annual gross energy savings (kWh) and on-peak demand reductions (kW) for the program in the three Companies are reported in Table 7-1.

Table 7-1: 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	7,427,561	1,720	5,387,402	699
OE	11,190,120	2,602	8,118,951	1,055
TE	2,286,040	507	1,678,838	215
All Companies	20,903,721	4,829	15,185,191	1,969

7.2 PROCESS FINDINGS

Key findings from the process evaluation of the 2011 Appliance Turn-In program include:

- **Participants of the Appliance Turn-In Program provided very positive satisfaction ratings.** Respondents to the participant survey reported being highly satisfied with numerous program elements including the scheduling process, the actual pick-up, communication with program staff, the incentive amount and the time to receive the rebate check. There were very few instances of dissatisfaction, and the majority of these were anecdotal in nature. These results suggest that the program has developed into a reliable entity that is capable of meeting customer expectations and goal targets.
- **The Companies' Appliance Turn-In program is operating smoothly - especially given it is still early in the implementation cycle – and is running better than many like programs other utilities are offering.** One JACO program staff commented, *"The Companies programs in Ohio are running as or more smoothly compared to other programs in other jurisdictions. We were surprised that the program exploded from inception. It was great to see, there was no ramp-up period. It is a popular program in Ohio, the volume is there and goals are met. It's getting the results."*
- **Quality Assurance and Quality Control (QA/QC) procedures are in place.** The FirstEnergy program staff and the JACO staff both described various QA/QC checks in place to ensure appliance chain-of-custody, high customer satisfaction, and quality data collection.
- **The Companies' Appliance Turn-In staff is confident in the information and data received from the program implementer**. The Companies have near-real time access to detailed levels of information needed to effectively manage and monitor program operations.
- **Program incentive levels are appropriate.** Both the Companies staff and JACO staff report that based on experience in Ohio and in other states, the current incentive levels for the program eligible products are appropriately set. Additionally, almost half of the participants who responded to the telephone survey indicated that the incentive was the main reason they participated in the program over other appliance disposal methods.
- **The pick-up and recycling process is being performed in accordance with program design.** JACO has an effective system in place to ensure chain of custody for participating appliances. Unit characteristics and other data are entered into the program tracking database throughout the recycling process using a barcode system.
- **Retail partnerships are wisely in development as a method to expand program effectiveness and outreach.** Partnering with retailers provides additional convenience to the customer by removing the potential barrier of two separate home visits – once for delivery of the new appliance and again for the removal of the appliance to be recycled.

7.3 RECOMMENDATIONS

Overall, the program appears to be running smoothly. The Companies program staff report confidence in the data and information reported by the program implementer, JACO, and that no issues or concerns exist about program operations. JACO has been in the recycling business for more than a dozen years and administers appliance turn-in programs for 300 utilities in nearly 30

states. The evaluation team currently has the following recommendations for program improvement consideration.

- **As retail partnerships are developed, ensure the process meets program and retailer needs.** The Sears partnership is currently being launched and others are already following. This should be evaluated and future partnerships should consider any lessons learned. The Companies staff should have regular follow-ups with these retailers to ensure they have enough and appropriate program material and training.
- **Consider cross-marketing the Appliance Turn-In program with other programs, if not currently pursuing.** By cross-marketing the programs, the Companies will increase the awareness of their energy efficiency programs and increase the opportunities for program participants.
- **Continue the multi-pronged marketing effort.** The existing marketing efforts appear to be reaching a wide spectrum of customers. With the addition of the partnerships with retailers, this will be further enhanced.

8. APPENDIX A: REQUIRED SAVINGS TABLES

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

- Table 8-1 reports the annual Ex Post kWh savings by utility and measure.
- Table 8-2 reports the average annual Ex Post on-peak kW reductions by utility and measure.
- Table 8-3 reports the first-year pro-rata Ex Post kWh savings by utility and measure.
- Table 8-4 reports the lifetime Ex Post kWh savings by utility and measure.

Table 8-1. Annual Ex Post Energy Savings (kWh)

Appliance Type	***CEI***	***OE***	***TE***	***All Companies***
Refrigerators	4,077,912	6,023,869	1,294,972	11,396,753
Freezers	1,180,448	1,898,167	349,498	3,428,113
RACs	129,043	196,914	34,368	360,325
Total	5,387,402	8,118,951	1,678,838	15,185,191

Table 8-2: Annual Ex Post On-Peak Demand Reductions (kW)

Appliance Type	***CEI***	***OE***	***TE***	***All Companies***
Refrigerators	479.7	708.7	152.3	1,340.7
Freezers	141.4	227.4	41.9	410.6
RACs	77.8	118.8	20.7	217.4
Total	699	1,055	215	1,969

Table 8-3. First-Year Pro-Rata (2011) Ex Post Energy Savings (kWh)

Appliance Type	***CEI***	***OE***	***TE***	***All Companies***
Refrigerators	1,362,455	1,966,218	392,786	3,721,459
Freezers	405,433	626,796	107,553	1,139,782
RACs	38,177	51,363	8,085	97,625
Total	1,806,065	2,644,377	508,424	4,958,866

Table 8-4. Lifetime Ex Post Energy Savings (kWh)

Appliance Type	***CEI***	***OE***	***TE***	***All Companies***
Refrigerators	32,623,293	48,190,956	10,359,776	91,174,024
Freezers	9,443,583	15,185,339	2,795,985	27,424,907
RACs	387,128	590,743	103,104	1,080,975
Total	42,454,004	63,967,038	13,258,865	119,679,906

9. APPENDIX B: PARTICIPANT SURVEY INSTRUMENT

The Illuminating Company, Ohio Edison Company, The Toledo Edison Company

Appliance Turn-In Program

Participant Telephone Survey

Interviewer: _____ Date of Interview: _____/_____/_____

Respondent: _____ Address: _____

May I please speak with **[CONTACT NAME]**: _____)?

*Hello. My name is _____ and I am calling on behalf of **[UTILITY]** about the Appliance Turn-In Program that your household participated in back in ___ **[Month/Year]**. Are you the person who is most familiar with having a refrigerator, freezer, and/or room air conditioner picked up for recycling through **[UTILITY]**'s program*?

(IF NOT RIGHT PERSON) *May I please speak to the person who would know the most about the appliance that was picked up for recycling?*

REPEAT INTRODUCTION AND CONTINUE

(IF RIGHT PERSON) *We are conducting a study to evaluate **[UTILITY]**'s Appliance Turn-In Program. **[UTILITY]** will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your opinions about the program in our evaluation. The interview will take approximately 15 minutes. May I ask you a few questions?*

IF REFUSAL: THANK AND TERMINATE

VERIFICATION

1. Our program records indicate that you had __ ***[MEASURES]*** **(quantity of refrigerators, freezers, and/or room air conditioners)** picked up for recycling through the Appliance Turn-In program around ***[Month/Year]***. Is that correct?

1. Yes
2. No

98. Don't know
99. Refused

[ASK IF Q1=2]

2. How many refrigerators, freezers, and/or room air conditioners did you have recycled through the Appliance Turn-In program?

1. _____ **[Record Quantity of Each Appliance] ->*[TOT_QTY]***

98. Don't know

99. Refused

AWARENESS

3. How did you first learn about **[UTILITY]**'s appliance pick-up and recycling program? **[Do not read, prompt if necessary. Choose One.]**

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. Retailer/store
8. Other **[Specify]**_____.

98. Don't know

99. Refused

4. Did you hear about the program from any other sources? If so, which sources? [Check all that apply.]

1. No other sources
2. Newspaper/magazine/print media
3. Bill insert
4. Friend or Relative (word-of-mouth)
5. TV ad
6. FirstEnergy Representative
7. FirstEnergy Brochure
8. Retailer/store
9. Other **[Specify]**_____.

98. Don't know

99. Refused

APPLIANCE DESCRIPTION AND RECYCLING DECISION

5. IF [TOT_QTY] = 1: Now I'm going to ask you some specific questions about the [**refrigerator, freezer, room air conditioner]** that was picked up and recycled by **<UTILITY>.**

IF [TOT_QTY] > 1: I'd like to focus on just one of the appliances you recycled through **<UTILITY>**'s program. It does not matter which appliance you choose, just that you respond only with that appliance in mind. Can you tell me which appliance you've selected to tell me about?

1. ____ Refrigerator
2. ____ Freezer
3. ____ Room air Conditioner

6. How old was your **[refrigerator, freezer, room air conditioner]**? **[Record response in years, enter "00" if less than one year]**?

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

7. Was the old **[refrigerator, freezer, room air conditioner]** your primary or secondary (spare, auxiliary) unit?

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

8. Did you replace the old **[refrigerator, freezer, room air conditioner]** with a new unit?

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

9. For the majority of 2011, where within your home was the **[refrigerator, freezer, room air conditioner]** located?

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

10. Thinking about the year prior to recycling the [**refrigerator, freezer, room air conditioner],** was it plugged in and running … **[Read all]**

1. . All the time **[Go to Q12]**
2. . For special occasions only
3. . During certain months of the year only, or
4. . Never plugged in or running **[Go to Q12]**
98. Don't know
99. Refused

11. 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]**

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

12. Was the **[refrigerator, freezer, room air conditioner]** still in working condition when it was picked up (by working condition I mean did the unit turn on and produce cold air)?

1. . Yes **[Skip to Q14]**
2. . No
3. . It worked but had some problems
98. Don't know **[Skip to Q14]**
99. Refused **[Skip to Q14]**

13. What was wrong with the unit? (If respondent is unsure, ask "would it turn on and produce cold air?")

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

14. Had you already considered disposing of the **[refrigerator, freezer, room air conditioner]** before you heard about **[UTILITY]**'s appliance recycling program? By dispose of, 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.

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

15. What would you have most likely done with the **[refrigerator, freezer, room air conditioner]** had you not disposed of it through **[UTILITY]'**s program?

[Read list unless respondent indicates choice without reading the list]

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
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
99. Refused

16. What is the MAIN reason you chose to get rid of your **[refrigerator, freezer, 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 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
99. Refused

17. Would you have participated in the program if the amount of the rebate had been less?

1. Yes
2. No **[Go to Q19]**
3. Maybe
98. Don't know
99. Refused

18. Would you have participated in the program with no rebate check altogether?
1. Yes
2. No
98. Don't know
99. Refused

PROGRAM SATISFACTION

"Now I have some questions about your satisfaction with your participation in the program."

19. How satisfied were you with the rebate amount? Would you say you were: Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied??
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

20. From the time you had the appliance(s) picked up, about how many weeks did it take to receive your rebate?**]**
1. Record # of weeks_____
98. Don't know [**Skip to Q22]**
99. Refused [**Skip to Q22]**

21. How satisfied were you with how long it took to receive the rebate? Would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

22. How satisfied were you with the scheduling of the pick-up of your old appliance(s)?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

23. How satisfied were you with the actual pick up of your old refrigerator/freezer?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

24. [IF UNSATISFIED FOR Q22 or Q23] Why were you dissatisfied?
1. Record Verbatim_____
98. Don't know
99. Refused

25. In the course of participating in **[UTILITY]'s** program, how often did you contact **[UTILITY]** or program staff with questions?
1. Never **[Skip to Q29]**
2. Once
3. 2 or 3 times
4. 4 times or more
98. Don't know
99. Refused

26. How did you contact them? **[CHECK ALL THAT APPLY]**
1. Phone
2. Email or fax
3. Letter
4. In person
98. Don't know
99. Refused

27. And how satisfied were you with your communications with **[UTILITY]** and program staff? Would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied?
1. Very satisfied **[Skip to Q29]**
2. Somewhat satisfied **[Skip to Q29]**
3. Neither satisfied nor dissatisfied **[Skip to Q29]**
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know **[Skip to Q29]**
99. Refused **[Skip to Q29]**

28. Why were you dissatisfied?
1. Record Verbatim_____
98. Don't know

99. Refused

29. Have you noticed any savings on your electric bill since removing your old appliance(s)?
1. Yes
2. No **[Skip to Q31]**
3. Not sure **[Skip to Q31]**
98. Don't know **[Skip to Q31]**
99. Refused **[Skip to Q31]**

30. [IF NOTICED SAVINGS]. How satisfied are you with any savings you noticed on your electric bill since removing your old appliance(s)? Would you say you were: Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied??
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

31. Finally, if you were rating your overall satisfaction with the **[UTILITY]** Rebate Program, would you say you were Very Satisfied, Somewhat Satisfied, Neither Satisfied nor Dissatisfied, Somewhat Dissatisfied or Very Dissatisfied?
1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. Don't know
99. Refused

32. Why do you give it that rating?
1. Record Verbatim_____
98. Don't know
99. Refused

33. Do you have any suggestions to improve **[UTILITY]'s** Appliance Turn-In Program?
1. Yes, Record Verbatim_____
2. No
98. Don't know
99. Refused

DEMOGRAPHICS

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

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

01. Single-family home, detached construction **[NOT A DUPLEX, TOWNHOME, OR APARTMENT; ATTACHED GARAGE IS OK]**
02. Single family home, factory manufactured/modular
03. Single family, mobile home
04. Row House
05. Two or Three family attached residence—traditional structure
06. Apartment (4 + families)---traditional structure
07. Condominium---traditional structure
08. Other: **[Specify]**_____
98. Don't know
99. Refused

35. Do you own or rent this residence?

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

36. Approximately when was your home constructed? **[DO NOT READ]**

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

37. How many square feet is the above-ground living space (IF NECESSARY, THIS EXCLUDES WALK-OUT BASEMENTS)?

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

38. [IF Q41=98,99] Would you estimate the above-ground living space is about:

1. Less than 1,000 sqft
2. 1,001-2,000 sqft
3. 2,001-3,000 sqft
4. 3,001-4,000 sqft

5. 4,001-5,000 sqft
6. Greater than 5,000 sqft

98. Don't know
99. Refused

39. How many square feet of conditioned living space is below- ground (IF NECESSARY, THIS INCLUDES WALK-OUT BASEMENTS)?

1. Numerical open end [Range 0-99,999]_____

98. Don't know
99. Refused

40. [IF 43=98,99] Would you estimate the below-ground living space is about:?

1. Less than 1,000 sqft
2. 1,001-2,000 sqft
3. 2,001-3,000 sqft
4. 3,001-4,000 sqft
5. 4,001-5,000 sqft
6. Greater than 5,000 sqft

98. Don't know
99. Refused

This completes the survey. [UTILITY] appreciates your participation. Thanks for your time. Have a good day/evening.