Commonwealth Edison Company
Energy Efficiency/Demand Response Plan
Plan Year 1 (6/1/2008-5/31/2009)
Evaluation Report:
Appliance Recycling

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Final Report

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EXECUTIVE SUMMARY – APPLIANCE RECYCLING

Evaluation Objectives

The goal of this report is to present a summary of the findings and results from the evaluation of the Program Year 1 (PY1) Residential Appliance Recycling (AR) program. The objectives of the evaluation are to: (1) quantify net energy and peak demand savings impacts from the program during Program Year 1 (PY1); and (2) to determine key process-related program strengths and weaknesses and provide recommendations to improve the program.

Evaluation Methods

To estimate gross energy savings, we have relied heavily on data from secondary sources, including, for refrigerators and freezers, regression equations for estimating refrigerator and freezer Unit Energy Consumption (UEC) that are based on a large database of over 1,600 previously metered units in California based on the DOE lab metering approach. The regression equations estimate usage as a function of unit characteristics (age, size, configuration, and defrost mode). The characteristics of units collected by JACO for ComEd were then input into these models to estimate full-year UECs (representing kWh savings) that are specific to ComEd's program.

Our sole primary data collection activity for gross impact calculations was a telephone survey of program participants to determine a part-use factor. This factor was used to adjust these annualized UEC estimates to reflect the number of months the recycled unit would have been operated absent the program. This element of the calculation is particularly important for ComEd's program, since refrigerators and freezers located in garages may have been shut down during the winter months, when cold weather reduces or eliminates the need to run the unit. Similarly, room AC units may only have been operated during a few of the hottest days during the summer months. In addition to providing information on part-use, this phone survey also gathered information to support the net-to-gross and process evaluation elements of the evaluation.

Table 1 below summarizes the key data collection activities in support of this evaluation.

Table 1. Data Collection Activities

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	All Program Participants	Tracking Database	-	All	Ongoing
In-depth Phone Interviews	ComEd program manager	Contact from ComEd	AR program managers Sharon Madigan	2	April 14, 2009
	Program Implementers	Contact from ComEd	JACO program implementers – Sam Sirkin and Michael Dunham	2	Sam – Apr. 14,2009, Michael – May 6, 2009
CATI Phone Surveys	Program Participants	Tracking Database	Random Sample of AR Program Participants	100 Total – 70 Refrigerator, 30 Freezer Recyclers	August 2009

Key Findings and Recommendations

The Residential Appliance Recycling program began operation in June 2008. The program offers free pickup and recycling services for older, working refrigerators and freezers, and room air conditioners that households no longer want. Program savings are based on the accelerated removal, dismantling and recycling of these older, inefficient units. In exchange for participating in the program, ComEd pays participants $25 each for up to two recycled refrigerators or freezers. Operational room air conditioner (RAC) units are also eligible for pick up and recycling, but they can only be picked up from sites where the recycler, JACO, is already collecting a refrigerator and/or freezer (so the room AC unit can “ride for free”). Participants contributing these working room AC units also receive the $25 program rebate.

A total of 11,979 units were picked up by the program during PY1. About 70% of these units were refrigerators, another 26% were freezers, and the remaining 4% were room air conditioners. Table 2 below provides the breakdown of recycled units by measure type.

Table 2. Summary of Recycled Units by Appliance Type

Measure Type	Number of Units	Percent of Units
Refrigerators	8,437	70%
Freezers	3,076	26%
Room Air Conditioners	465	4%
Unlabeled	1	0%
Total Units Recycled	11,979	100%

Table 3 below provides the first-year evaluation-adjusted gross and net savings estimates for each measure and for the program overall. Table 4 shows the comparable values for kW savings.

Table 3. PY1 Gross and Net Impact Parameter and Savings Estimates (kWh)

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	8,438*	3,076	465	11,979
Verified Annual kWh Savings Impacts				
Verified annual Gross kWh savings per unit (full-load operating hours)	1,893	2,027		---
Part-Use Factor	75%	59%		---
Verified annual Gross kWh savings per unit *adjusted for part-use*	1,420	1,196	80	--
Verified Program Gross MWh	11,982	3,678	37	15,698
Net-to-Gross Ratio (1-Free Rider %)	0.70	0.83	1.00	
Total First-Year Evaluation-Adjusted Net MWh Savings	**8,388**	**3,053**	**37**	**11,478**

**Includes one unit that was unlabeled.*

Table 4, PY1 Gross and Net Impact Parameter and Savings Estimates (kW)

Gross and Net Impact Parameter and Savings Estimates	Verified kW Savings			
	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	8,438	3,076	465	11,979
Verified kW Savings Impacts				
Annual kW savings per unit (full-load operating hours)	0.30	0.26	0.04	---
Program Gross kW	2,531.4	799.8	18.6	3,350
Net-to-Gross Ratio (1-Free Rider %)	0.7	0.83	1.00	
Total PY1 Net kW Savings	**1,772**	**664**	**19**	**2,454**

Key Impact Findings

The PY1 net energy savings goal for this program was 8,159 MWh and the program-reported energy savings was slightly higher than this, 8,528 MWh[1]. The verified energy savings was actually significantly higher than this – 11,478 MWhs, for an overall realization rate of 135%. For year 1, the kW saved by the program are based on ComEd's ex-ante planning estimates for per-unit kW savings for Refrigerators, Freezers and Room AC units.

A comparison of program verified versus program-tracking system savings (as a proxy for the ComEd savings claim) is provided in Table 5 below. Please note that the program-tracking system savings value of 8,545 MWh is slightly higher than the savings reported by ComEd of 8,528 MWhs. The program tracking savings estimate was computed using the deemed savings formula provided by ComEd in its program plan. Although these numbers are very close, we were unable to completely match ComEd's reported savings estimate.

Gross savings per unit are fairly similar to the program planning estimate of kWh savings for refrigerators. The verified gross savings estimate is somewhat higher than the ex-ante estimate for freezers, which reflects the fact that the program collected more older units than anticipated in PY1. Fully 40% of the freezers picked up by the program are over 30 years old and another 42% are between 20 and 30 years old. Nearly all (92%) of the freezers collected by the program were manufactured before the 1993 standards change. The standards change resulted in a dramatic improvement in efficiency. Pre-1993 units are generally considered 'energy hogs' that use 3 to 4 times the energy of units made since the standards change.

[1] As reported in *Table 2: Program Savings and Costs versus Plan, Program Year 1* of ComEd's Annual Energy Efficiency report filed with the Illinois Commerce Commission.

Table 5. PY1 Program Tracking System Savings Versus Evaluation-Verified Savings (MWh and kW)

Gross and Net Impact Parameter and Savings Estimates	Program Tracking System Savings				Verified Program Savings			
	Refrigerators	Freezers	Room AC	Total Program	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	8,438	3,076	465	11,979	8,438	3,076	465	11,979
Annual kWh Savings Impacts								
Annual Gross kWh savings per unit (full-load operating hours)	1,946	1,662	80	---	1,893	2,027		---
Part-Use Factor	---	---		---	75%	59%		---
Annual Gross kWh savings per unit *adjusted for part-use*	1,946	1,662	80	--	1,420	1,196	80	--
Program Gross MWh	16,420	5,112	37	21,570	11,982	3,678	37	15,698
Net-to-Gross Ratio (1-Free Rider %)	0.35	0.54	1.00		0.70	0.83	1.00	
Total PY1 Net MWh Savings	**5,747**	**2,761**	**37**	**8,545**	**8,388**	**3,053**	**37**	**11,478**
Program Gross kW	2,531.4	799.8	18.6	3,350	2,531.4	799.8	18.6	3,350
Net-to-Gross Ratio (1-Free Rider %)	0.7	0.83	1.00		0.7	0.83	1.00	
Total PY1 Net kW Savings	**1,772**	**664**	**19**	**2,454**	**1,772**	**664**	**19**	**2,454**

The primary reason for this higher-than-expected performance was a verified value for the NTG ratio (**including** the part-use adjustment) of 0.52 that was considerably higher than the value assumed by the program for refrigerators of 0.35. This has a significant impact, since refrigerators are the largest source of energy savings for the program. The improvement in this factor alone is the main reason for evaluation-verified net savings that are significantly higher than those claimed by the program in PY1.

Evaluation verified NTG ratios (***excluding*** the part-use adjustment) are 0.70 for refrigerators and 0.83 for freezers. When compared with the ex-ante NTG ratios applied by the program, these values are considerably higher. However, the program applied NTG ratios also included the effect of the part-use factor, which has been decoupled from the evaluation-verified values, and has been reflected in the gross saving estimates (where it more appropriately belongs).

However, it is useful to provide an apples-to-apples comparison of the program assumed NTG values with the evaluation verified NTG values to provide insight into the magnitude of any ex-post adjustments. For this limited purpose, Table 6 below presents a comparison of the program NTG ratio assumptions and evaluation verified NTG values, assuming in both cases full inclusion of the part-use factor. While the refrigerator NTG value was dramatically improved from the planning estimate, the Freezer value was lower, and the Room AC value was the same as the program assumption.

Table 6. Comparison of the Ex-Ante and Evaluation Verified NTG Values

Net-to-Gross Ratio Adjusted for Part-Use	Refrigerators	Freezers	Room AC
Evaluation Net-to-Gross Ratio (1-Free Rider %) *unadjusted for Part Use*	0.70	0.83	1.00
Part-Use Factor	75%	59%	100%
Program Verified NTG ratio *adjusted for Part-Use*	0.53	0.49	1.00
Program Applied Ex-Ante Value	0.35	0.54	1.00

Key Process Findings

The amount of marketing that was done for this campaign was sufficient to achieve the target goal for the number of appliances picked up. The primary marketing tool, bill inserts, was also effective. When asked unprompted where they had heard of the program, nearly three of four participants (74%) recalled seeing the program mentioned in a bill insert with over two-thirds (69%) saying that was where they first learned of the program. When prompted, another 11% recalled seeing the program in a bill insert bringing both unprompted and prompted recall of bill inserts to 85%.

Participants were asked, unprompted, why they chose the ComEd Appliance Recycling Program to dispose of their appliance instead of some other disposal method. The convenience of the home pick-up was the main selling point of the program for more participants than any other reason. An additional 13% said the home pick-up was a secondary reason. The $25 cash incentive was also a factor, but it plays more of a secondary role with 25% saying it was the main reason and an additional 28% a secondary reason. Overall, 96% of participants were satisfied with their experience with the Appliance Recycling Program, with 86% saying they were “very satisfied”.

The program was well-administered. Participants reported a high degree of satisfaction with the sign-up process and appliances were picked up and payments processed in timely fashion. The implementation plan stipulates that 90% of customers will not have to wait for more than 14 days to have their appliance

to be picked up. A large majority of participants surveyed (84% of those who could recall) scheduled a pick-up date within two weeks of when they called. Nearly all participants surveyed (98%) said they were able to schedule a pick-up date that was convenient for them.

Overall, 92% of respondents were satisfied with the collection team who came to pick up the appliance, with 80% reporting that they were “very satisfied”. Only two respondents said they were dissatisfied, with the reason being that the collection team was not careful removing the appliance.

Three of four respondents (74%) said that they were very satisfied with the amount of the incentive payment. No respondents reported being dissatisfied with the size of the payment. Of the participants who recalled when they received their incentive check, 91% said that they received payment within four weeks of pickup. Only one respondent was dissatisfied with the amount of time it took to receive payment (4 weeks).

1 INTRODUCTION TO THE PROGRAM

1.1 Program Description

The Residential Appliance Recycling program was designed to achieve energy savings through the retirement and recycling of older, inefficient refrigerators, freezers, and room air conditioners. The primary objectives of the program are to:

Decrease the retention of high energy-use refrigerators and freezers; and
Deliver long-term energy savings.

A secondary objective is to dispose of these older refrigerators and freezers in an environmentally safe manner by offering comprehensive toxic material recycling and disposal that conforms with applicable environmental laws and regulations and permitting requirements.

The Residential Appliance Recycling program began operation in June 2008. The program offers free pickup and recycling services for older, working refrigerators and freezers, and room air conditioners that households no longer want. Program savings are based on the accelerated removal, dismantling and recycling of these older, inefficient units. In exchange for participating in the program, ComEd pays participants $25 each for up to two recycled refrigerators or freezers. Operational room air conditioner (RAC) units are also eligible for pick up and recycling, but they can only be picked up from sites where the recycler, JACO, is already collecting a refrigerator and/or freezer (so the room AC unit can "ride for free"). Participants contributing these working room AC units also receive the $25 program rebate.

ComEd hired JACO to be the program implementer for the Appliance Recycling program. JACO is responsible for the following functions:

Appliance pickups and related scheduling
Processing program enrollments
Deconstructing and recycling program units
Responding to customer questions and complaints
Program tracking and reporting functions

The program is marketed through a combination of methods – bill stuffers, radio and TV spots, newspaper ads, and word-of-mouth.

1.2 Evaluation Questions

The evaluation sought to answer the following key researchable questions. Some of the researchable questions will be addressed in Program Years 2 and 3.

<u>Impact Questions</u>

1. What are the gross impacts from this program?

2. What are the net impacts from this program? What is the level of free ridership with this program? What is the level of participant spillover? How can free ridership be reduced?

3. Did the program meet its energy and demand goals? If not, why not?

Process Questions

1. Has the program as implemented changed from the plan filed on November 15, 2007? If so, how, why, and was this an advantageous change?

2. What are key barriers to participation in the program for eligible ComEd customers? How can they be addressed by the program?

3. How do customers become aware of the program? What marketing strategies could be used to boost program awareness?

4. Is the program outreach to customers and program partners effective in increasing awareness of the program opportunities?

    a. What is the format of the outreach?

    b. How often does the outreach occur?

    c. Are the messages within the outreach clear and actionable?

5. Are program incentive levels appropriate to encourage participation?

    a. What is the influence of the incentive level versus the marketing effort on program participation levels?

    b. How should the budget allocation between incentive spending and marketing spending be adjusted to maximize participation?

2 EVALUATION METHODS

This section describes the analytic methods and data collection activities implemented as part of the 2008 process and impact evaluation of the Appliance Recycling program, including the data sources and sample designs used as a base for the data collection activities.

2.1 Analytical Methods

Gross Program Savings

Refrigerators and Freezers. Gross energy savings are expressed in terms of Full-year Unit Energy Consumption (UECs). UEC estimates were made using a regression-based approach that models full-year energy savings as a function of unit age, size, configuration, and defrost mode. These regression equations are based on a large body of impact evaluation work that has already been completed in California, which rely on DOE lab metered results for over 1,600 units. The regression equations were applied to the characteristics of the population of units actually collected by JACO. In addition, gross savings estimates were adjusted for part-use, by applying findings from the phone survey of program participants.

The regression equation that was used to estimate gross unit savings for recycled refrigerators and freezers is shown below in Table 7. This equation is from the recently completed evaluation of California's 2004-05 Appliance Recycling programs, and is based on a large database of over 1,600 previously metered units in California based on the DOE lab metering approach. The regression equation estimates usage as a function of unit characteristics (age, size, configuration, and defrost mode). All of the required data inputs to this equation were obtained from the program tracking data, except for the label amps which was imputed from other unit characteristics using a simplified computer model.

Table 7. Regression Relating DOE Test Annual UEC for Recycled Appliances to Explanatory Variables

Variable Description	Coefficient	t-value
Intercept	-422.4106	-0.77
Freezer dummy (=1 if freezer)	169.0536	1.84
Bottom freezer dummy (=1 if unit is bottom freezer)	595.3794	2.91
Side by side dummy (= 1 if unit is side-by-side)	-129.3553	-0.34
Single door dummy (= 1 if unit is single door)	-417.1026	-4.73
Frost free dummy (= 1 if unit is frost free)	-445.0348	-1.00
Natural log of unit age	405.2134	2.15
Cubic Feet of unit (per tracking system data)	43.6478	4.59
Label Amps	104.1018	4.83
Freezer dummy x frost free dummy	319.1097	1.94
Bottom freezer dummy x frost free dummy	-302.0484	-1.28

Variable Description	Coefficient	t-value
Side by side dummy x frost free dummy	1451.3206	3.80
Side-side dummy x amps	-126.4332	-2.88
Frost free dummy x ln(age)	299.8206	2.09
Dummy if unit age is 15 years or greater	1197.8349	2.61
Ln age x age 15 up dummy	-524.9782	-3.08

These estimates reflect the full-year Unit Energy Consumption or UEC.

Part-Use Adjustment. This full-year UEC value was then adjusted for part-use, based on self-reported findings from the completed telephone surveys. This adjustment pro-rates the full-year value for the proportion of the year that the unit would have been operated in the program's absence. The value of this adjustment was calculated directly from phone survey responses regarding the number of months during the year that the participant indicated the appliance would have been operated if the program had not picked it up. Average part-use factors were calculated across all respondents, separately for refrigerators and freezers.

Room Air Conditioners. The deemed savings memo and procedure called for the energy consumption of residential room AC units to be estimated using the following equation.

kWh = unit capacity x load x FLEH / (efficiency x 1000)

where:

unit capacity [BTU/h] is a nameplate value
load [dimensionless] is assumed to be 1.0 with partial loading accounted for in FLEH
FLEH (full-load equivalent hours) [hours] is basically the compressor run-time if we assume window AC units are generally a two-state device – on or off.
Efficiency [Btu out / Watts in] or EER for equipment of this type
1000 is the conversion factor from Watts to kW

Net Savings Analysis

The primary objective of the net savings analysis for the Appliance Recycling program is to determine the program's net effect on customers' electricity usage. This requires estimating what would have happened in the absence of the program. Thus, after gross program impacts adjusted for part-use have been assessed, net program impacts are derived by estimating a Net-to-Gross (NTG) ratio which quantifies the percentage of the gross program impacts that can reliably be attributed to the program. A customer self-report method, based on data gathered during participant phone surveys, was used to estimate the NTG ratio for this evaluation.

For PY1, the net program impacts were based solely on the estimated level of free-ridership in the program. In this program, free ridership is defined based on the percentage of program participants that would have disposed of their units absent the program in a manner that would have permanently removed the unit from the grid. This includes participants who indicated they would have otherwise:

Sent the unit to a recycling facility, or
Taken the unit to a landfill

Participant spillover was not assessed and does not fall within the scope of this program or this evaluation.

1.1 Data Sources

Table 8 below summarizes the key data collection activities in support of this evaluation.

Table 8. Data Collection Activities

Data Collection Type	Targeted Population	Sample Frame	Sample Design	Sample Size	Timing
Tracking Data Analysis	All Program Participants	Tracking Database	-	All	Ongoing
In-depth Phone Interviews	ComEd program manager	Contact from ComEd	AR program managers Sharon Madigan	2	April 14, 2009
	Program Implementers	Contact from ComEd	JACO program implementers – Sam Sirkin and Michael Dunham	2	Sam – Apr. 14,2009, Michael – May 6, 2009
CATI Phone Surveys	Program Participants	Tracking Database	Random Sample of AR Program Participants	100 Total – 70 Refrigerator, 30 Freezer Recyclers	August 2009

Below is a summary of how each of these data sources was used in the specific components of the evaluation study.

- **Impact Evaluation**

  Estimation of gross savings/UECs. All of the required data inputs to the regression equation used to develop final estimates of gross unit energy consumption for refrigerators and freezers were obtained from the program tracking database, except for the label amps which were imputed from other unit characteristics using a simplified computer model. The phone survey also obtained several of these same characteristics. However, because they were based on self-reported information, rather than the results of a visual inspection of the units picked up by the program, they were deemed less reliable than the tracking data which was ultimately used for the calculation.

  Estimation of the Part-use factor and Net-to-gross ratio. Self-reported findings from the telephone survey were the sole data source for both the part-use factor and the net-to-gross ratio.

- **Process Evaluation**

  The process evaluation relied primarily on two data sources, program staff interviews, and telephone surveys of program participants.

- **Program Staff interviews.** The interview with the Appliance Recycling Program Manager focused on program processes in order to better understand the goals of the program, how the program was implemented, the perceived effectiveness of the program, and also verified evaluation priorities. The interviews with the JACO managers focused on the recycling process and the details of the appliance pickup.

- **Telephone surveys.** The process evaluation component of the surveys obtained information on sources of program awareness, program satisfaction, rebate satisfaction, and awareness of program features (e.g., rebates, technical assistance, marketing materials).

2.2 Sampling Plan

The sample of Appliance Recycling participants was randomly selected from the *Program Tracking Database* provided by ComEd. Basic data cleaning steps were undertaken before the sample was pulled from the database so that for example, records with missing or invalid phone numbers were removed. These records could not be included in the surveying efforts but were included in the final impact results. The sample was stratified by appliance type and quotas were set based on the proportion of each appliance in the general population. Therefore, no weights are necessary for the data analysis. In total, 9,936 pieces of sample were sent to ODC in order to complete the survey. ODC was then instructed to randomly select and dial participants until they had reached the following quotas – 70 refrigerator recyclers and 30 freezer recyclers, for a total of 100 completed surveys. A small portion of those in each of these quotas was also expected to have recycled a room air conditioner.

2.3 Sampling Error

Table 9. PY1 Sample Size and Population Level Sampling Error

Population	Population Size (N)	Sample Size (n)	Sampling Error (90% CI)
Recycled Refrigerators	8,437	70	8.5%
Recycled Freezers	3,076	30	12.9%
Totals	11,513	100	7.1%

Survey Disposition

Table 10 shows the final dispositions for the 498 program participants we attempted to contact for this evaluation. As the table shows, we completed interviews with 100 participants, or 20%. We were unable to reach 44% for a variety of reasons such as a no one answering, an answering machine, or a busy signal. Another 19% requested to be called back later to complete the survey but did not end up doing so.[2] There

[2] Often, participants who are not inclined to participate do not outright refuse. Instead they agree to be called back, but when called back, the time is once again inconvenient. These participants are typically called a number of times, but many never complete a survey so that their final disposition is "call back".

were problems with the phone number, such as a disconnected number, for 8%. Only 4% of participants who answered refused to participate in the survey.

Table 10. Sample Disposition

Sample Disposition	Customers	%
Participants Attempted to Contact	498	100%
Completes	100	20%
Appliance not picked up	5	1%
Electric company not ComEd	2	<1%
Quota on refrigerator met	13	3%
Respondent unaware of appliance details	1	<1%
Refusal	19	4%
Unable to Reach	220	44%
Language Barrier	3	1%
Phone Number Issue	38	8%
Non-Specific Callback/Appointment Scheduled	97	19%
Participants Attempted to Contact	498	100%

As outlined in Table 11, interviews were attempted with 129 participants with 100 completed surveys. The remaining 29 did not complete full surveys for several reasons including the quota was filled on refrigerators (n=13), participants terminated mid-interview (n=8), the participant claimed they signed up for the program but the appliance was never picked up because they chose not to participate (n=5), or ComEd was not their electric utility (n=2). For these latter two categories, we cannot say if the participant database included some people in error or, more likely, these respondents had recall problems.

Table 11. Survey Contacts Disposition

Survey Contacts Disposition	Customers	%
Customers Surveyed	129	100%
Completed Interview	100	78%
Appliance not picked up	5	4%
Electric company not ComEd	2	2%
Quota on refrigerator met	13	10%
Respondent unaware of appliance details	1	1%
Mid-Interview Terminate	8	6%

3 PROGRAM LEVEL RESULTS

This section presents the results of the impact and process evaluations of the Appliance Recycling program.

3.1 Impact Evaluation Results

3.1.1 Verification and Due Diligence

This section provides the results of the evaluation of ComEd's Verification and Due Diligence of the Appliance Recycling program. Under this task, we explored the quality assurance and verification activities currently carried out by program and implementation staff. We compared these activities to industry best practices[3] for similar residential and C&I programs to determine:

1. If any key quality assurance and verification activities that should take place are currently not being implemented.
2. If any of the current quality assurance and verification activities are biased (i.e., incorrect sampling that may inadvertently skew results, purposeful sampling that is not defendable, etc.).
3. If any of the current quality assurance and verification activities are overly time-consuming and might be simplified or dropped.

Data Collection

This assessment primarily relied on in-depth interviews with program and implementation staff and documentation of current program processes, where available.

Results

Customer Eligibility

Appliance Recycling Program applications are collected electronically through the ComEd website, JACO's call center, and Abt Appliance's staff members. During the customer application process, customers provide their name, address, phone number, ComEd account number, make, model, size, age, and color of appliance. The customer's address, phone number, and account number is then used to verify eligibility. While collecting participant information electronically will cut down on human error, data still needs to be verified through quality assurance and control checks. Currently, Appliance Distribution collection staff performs quality checks on participant information when they have participants read and sign the Appliance Turn-In Order (ATO) form.

[3] See the Best Practices Self Benchmarking Tool developed for the Energy Efficiency Best Practices Project: http://www.eebestpractices.com/benchmarking.asp.

Assessment: ComEd verifies that an applicant is a ComEd customer during the application process using the customer's contact information and account number. In addition, customer information is verified during the collection process. ComEd's procedures for the verification of customer eligibility are successful in ensuring only specified customers participate in the programs. No changes are needed in this area.

Appliance Eligibility

Product eligibility for the Appliance Recycling Program is clearly defined in the Program Manual. Eligible refrigerators and freezers have to be:

- Between 10 to 30 cubic feet
- Empty
- In working condition
- Accessible for removal by the collection team

Room AC units must also be operational and can only be picked up when and where a refrigerator or freezer is already being harvested. There is a limit of two refrigerators and/or freezers and two room AC units in order to avoid "junkyard" customers who are not actually using the appliances.

The appliance collection is performed by a minority subcontractor, Appliance Distribution. Collection staff from Appliance Distribution ensures that these four requirements are met when they arrive for collection. If any of the requirements are not met, the collection team does not remove the appliance. If the issue is accessibility, the program participant may reschedule a collection time after they have provided a clear path for removal.

ComEd and Appliance Distribution management separately go on "ride-alongs" and observe the collection staff during pick-ups to ensure that the pick-up staff is adhering to these collection requirements. However there is no formal documentation of these quality assurance checks. At this time, it is unknown whether Appliance Distribution staff formally document their "ride-alongs."

Assessment: Moving forward, it is recommended that collection "ride-alongs" be scheduled periodically and with regularity to ensure eligibility requirements are being met consistently throughout the life of the program. In addition, formal documentation is suggested including a record of how the routes were sampled and when and where the "ride-alongs" occurred, as well as a review of the collection procedures performed. Ideally, the routes for a "ride-along" would be sampled on a random basis, but with thought to the different locations within ComEd's service territory.

Appliance Collection Procedures

The Appliance Recycling Program collection process is handled by the minority subcontractor, Appliance Distribution. Each step in the collection process is outlined in the program manual. After enrollment, a participant's pick-up wait time should be no longer than two weeks. Wait times are monitored through tracking data and evaluated on a monthly basis as one of the program's key performance indicators.

Daily collection routes are optimized through Microsoft Streets and Trips Software. Once the Appliance Distribution collection staff arrives they check the customers information by having them review and sign an Appliance Turn-In Order (ATO). The ATO form verifies the customer's name, address, phone number, ComEd account number, appliance type, make, model, size, pick-up date, and the customer's ownership of the appliance. The crew then verifies the eligibility of the appliance and removes it from the home.

Once outside the crew disables the appliance by cutting the power cord and destroying the cold control as well as cutting part of the gaskets out. If the appliance is not eligible, the customer is provided with an Appliance Recycling Program "spec sheet" which indicates the reasons for the unit not being eligible.

Similar to the quality assurance checks for appliance eligibility, "ride-alongs" are performed by ComEd and Appliance Distribution to ensure that the collection crew is properly following all Appliance Recycling Program collection procedures.

In addition, JACO's Appliance Recycling program manager conducted 10-15 customer interviews at the beginning of the program to confirm that customers were satisfied with the application and collection process.

Assessment: ComEd has sufficient procedures in place for verifying appliance eligibility. Customer satisfaction with the program and collection procedures could be strengthened, which we understand will happen for Program Year 2. JACO will be distributing such a survey when doing pick-ups in August, September and October of 2009.

With regards to "ride-alongs" please see the assessment provided in the *Appliance Eligibility* section.

Appliance Recycling Procedures

JACO properly disposes of Appliance Recycling Program appliances using SEG's approach and equipment. JACO documents at the recycling center all disposal materials including the disposal of hazardous materials through waste management centers and Univar.

In addition, JACO's staff performs quality assurance checks by visiting the recycling center unannounced approximately once a month. ComEd performs similar quality assurance checks through unannounced recycling center visits. While ComEd and JACO both indicate having performed these checks since the start of the program neither of them have formally documented their visits.

Assessment: In the future, ComEd and JACO should formally document their visits to the recycling center as part of their regular quality assurance and control procedures. This would allow them to determine how frequently these visits are currently occurring and if additional visits would be useful to assure proper recycling procedures were being followed. The Summit Blue team reviewed ComEd's quality control and verification procedures for the Appliance Recycling Program and found them to be good overall.

Summary and Recommendations

Overall, ComEd's quality control and verification procedures for the Appliance Recycling Program are good. Table 12 below summarizes the quality assurance and verification activities currently carried out by the Appliance Recycling Program. It also features recommended changes to current procedures, as well as suggestions regarding additional activities that ComEd could implement to enhance current quality assurance and verification.

Table 12. Summary of Quality Assurance Activities in Place and Recommendations

Quality Assurance Activities in Place	Recommended Change
Eligibility Checks	Formal documentation
Collection “ride-alongs”	Periodic collection "ride-alongs" with a specified frequency
Unannounced recycling center visits	Periodic unannounced recycling center visits with a specified frequency
Customer data checks	Periodic data quality reviews for data quality and completeness
Customer satisfaction interviews	Scheduled customer satisfaction interviews every six months or on-going customer satisfaction survey

Source: Program manager interviews conducted in April and May 2009. Program documentation.

3.1.2 Tracking System Review

The Appliance Recycling tracking data for 2008 contained 11,979 records, one for each appliance that was picked up and recycled. This is consistent with the claimed savings estimate which was also based on this same total of recycled appliances.

Distribution by Appliance Type

About 70 percent of these units were refrigerators, another 26% were freezers, and the remaining 4% were room air conditioners. Table 13 below provides the breakdown of recycled units by measure type.

Table 13. Summary of Recycled Units by Appliance Type

Measure Type	Number of Units	Percent of Units
Refrigerators	8,437	70%
Freezers	3,076	26%
Room Air Conditioners	465	4%
Unlabeled	1	0%
Total Units Recycled	11,979	100%

Table 14 below provides a further breakdown of the population stratified by appliance type, of the number of appliances turned in as reported by the tracking data.

Table 14. Appliance Recycling Program: Appliance Type Versus Number Turned In

Refrigerators	Freezers	Room AC Units	Number of Applications	Number of Participants
		1	1	2
	1		1	2,470
	1	**1**	2	86
	2		2	36
	2	**1**	3	7
1			1	7,078
1		**1**	2	291
1	**1**		2	332
1	**1**	**1**	3	29
2			2	205
2		**1**	3	29
2	**1**		3	1

From these data, we observe the following patterns in terms of the distribution and count by appliance type:

- There are 10,567 unique participants, and most recycled one unit (7,078 refrigerators, 2,470 freezers).
- Approximately 600 participants recycled 2 major units (defined as a refrigerator and/or freezer), and of these, about 10% also recycled a room AC unit.
- For room ACs, the majority of participants had AC units that were picked up at the same time as a refrigerator or freezer, in accordance with program procedures.

In terms of anomalies, we found two types, neither of which resulted in any adjustment to the tracking data:

- There were 2 participants who recycled only a room AC, which the program managers had indicated would not be allowed.
- There was also one participant who recycled 3 major appliances, which exceeded the program limit of 2. We assume they did not receive a rebate for the 3rd unit.

Problems Found

Our review of the tracking data provided to the evaluation team also uncovered some relatively minor problems, including:

Incomplete records for a number of tracked fields. Most fields were well-populated, and particularly the most important fields for evaluation (appliance brand, model number, size, age/year manufactured, defrost type, location at the time of pick up). However, some of the tracked fields were sparsely populated, or the entry was designated ‘unknown’ or ‘N/A’. These included:

Unit configuration. This refers to whether a refrigerator is a side-by-side unit, has a freezer at the top, or at the bottom, or has one door with a freezer inside.

Recycled appliance unit details. This field provides information on the configuration of the recycled unit – whether it was a side-by-side, top freezer, or bottom freezer unit. It is one of

the key parameters that is used in the regression equation to estimate gross savings, and unfortunately, it was only populated for a small fraction of the recycled units.

Information on the characteristics of the replacement unit (whether it was new or used, larger or smaller than the recycled unit).

Information on Room AC model number. In a significant number of cases, the model number was listed as N/A or 'unknown' (typically nameplate was missing, per JACO). This made it impossible to develop independent savings estimates based on an engineering algorithm for all units collected by the program.

Lack of data on label amps. One of the types of data needed to calculate gross savings impacts is the rated amperage of the recycled unit. It was discovered that this data was not formally tracked, but that JACO has a separate dataset with this information.

Although we were able to complete the evaluation without these incomplete data, it would be better if they could be more fully populated in the future. We recommend the program tracking data receive periodic data quality reviews for data quality and completeness. In addition, we recommend that the rated amperage data be merged with the historical tracking data, and that this value be collected going forward. Data exported for the evaluation team should also be checked for anomalies.

3.1.3 Gross Program Impact Parameter Estimates

Refrigerators and Freezers

Annualized Unit Energy Consumption (UECs)

As detailed in Section 1, regression based Unit Energy Consumption (UEC) estimates were made for both refrigerators and freezers. The regression equation estimates usage as a function of unit characteristics (age, size, configuration, and defrost mode). All of the required data inputs to this equation were obtained from the program tracking data, except for the label amps which was imputed from other unit characteristics using a simplified computer model.

Applying the regression coefficients to the full population of units collected through the program during PY1 and their associated characteristics yielded the following UECs for each type of appliance (Table 15).

Table 15. Estimated UECs

Annualized UECs	Refrigerators	Freezers
kWh	1,893	2,027

Both age (in years) and size (in cubic feet) are key explanatory variables that drive these estimates. In general, the older a unit is, the larger it is and the more electricity it uses. This is the case for 2 reasons:

1. Because of a change in standards in 1993, units built since that time are much more energy efficient and generally smaller than units made prior to the standards change.
2. There is degradation of a unit's efficiency over time, as the unit ages.

Because this is a brand-new program, the appliances collected during PY1 have been primarily older and larger units than those collected via a more established program (as in California). Table 16 and Table 17 below provide the age and size characteristics of the units collected in PY1 through ComEd's program.

Table 16. Age Characteristics of Recycled Appliances

Appliance Type	Age in Years									N
	0 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	31 to 35	36 to 40	Over 40	
Refrigerators	0%	5%	10%	21%	20%	19%	9%	4%	12%	70
Freezers	0%	3%	5%	13%	19%	22%	16%	10%	13%	30
Room Air Conditioners	0%	5%	7%	18%	37%	18%	5%	6%	5%	—

Table 17. Size Characteristics of Recycled Appliances

Appliance Type	10 cubic feet and smaller	11 to 15 cubic feet	16 to 20 cubic feet	21 cubic feet and larger	N
Refrigerators	9%	26%	41%	25%	70
Freezers	13%	37%	39%	10%	30

From these data, the following observations can be made:

- **Age**

  Fully 64% of refrigerators and 79% of freezers are over 20 years old

  Approximately 40% of refrigerators and freezers are between 21 and 30 years old

  One-fourth of refrigerators (25%) and nearly 40% of freezers are over 30 years old

  The following percentages of appliances collected by the program were made before the 1993 standards change: 85% of refrigerators and 92% of freezers

- **Size**

  The majority of units collected are 16 cubic feet and larger, one fourth of refrigerators are larger than 20 cubic feet

  Recycled refrigerators tend to be larger on average than recycled freezers

  The size distribution of freezers collected by the program is more diverse than refrigerators. The most common freezer sizes are between 11 and 20 cubic feet, while those for refrigerators range from 11 cubic feet to over 20 cubic feet.

One would expect the stock of these unwanted older appliances to decline over time, as the program matures and the base of these very old, inefficient units available for recycling is reduced. This has implications for the expected average UECs of units collected by the program in subsequent years, which would likely be somewhat less than in PY1.

Part use factors. The part-use factors account for the fact that a unit that would have stayed in use would have been in use only part of the time. For example, the savings due to removal of a unit that would have been used only three months of the year is only one-quarter (3/12) the savings associated with full-year use (assuming essentially constant use over the year for a full-use unit). The part-use factor is used to adjust gross savings UECs to yield estimates of annualized gross savings that can be attributed to the program. The part-use factors are taken from the results of the telephone survey of participants.

Refrigerators. The assumption is that any refrigerator that would otherwise have been kept in use would have been used as a secondary, not as a primary refrigerator. Therefore, the part-use for all primary refrigerators that would otherwise have been kept is set at the average part-use reported by participants who disposed of a secondary refrigerator. This part-use was the number of months, divided by 12, that the participant reported the unit would have been plugged in and running had the program not picked it up. This average was determined to be 75% or 0.75.

Freezers. For freezers, the average part-use is based on a similar question for all participants who disposed of a freezer. This average was determined to be 59% or 0.59. The supplemental data collected in the survey provide no further insight into the part-year usage, nor do the tracking data.

Table 18 below reports the distribution of unit usage by appliance type and frequency of use for both refrigerators and freezers. The majority of participants claim they would have used the unit 'always' if the program had not picked it up.

Table 18. Frequency of Usage in the Absence of the Program

Appliance Type	Never	1 to 3 months	4 to 6 months	7 to 9 months	10 to 12 months	Always	N
Refrigerators	10%	14%	7%	0%	1%	67%	70
Freezers	23%	20%	3%	0%	0%	53%	30

Gross Savings (UEC) Impacts Adjusted for Part-Use

The next step is to develop gross savings estimates for each type of appliance adjusted for part use. The application of the part-use factor reduces refrigerator savings/unit to 1,420 kWh per year, and freezer savings/unit to 1,196 kWh/year. These estimates are provided in Table 19 below.

Table 19. Gross Savings (UECs) Adjusted for Part Use

Appliance Type	Gross Savings (UECs)	Part-Use Factor	Adjusted Gross Savings (kWh/unit)
Refrigerators	1,893	75%	1,420
Freezers	2,027	59%	1,196

Room Air Conditioners

The deemed savings memo and procedure called for the energy consumption of residential room AC units to be estimated using an engineering algorithm. However, upon reviewing the program tracking data, it

was discovered that none of the required data are tracked. In addition, only one survey was completed with a participant that turned in a room AC[4]; meaning we had insufficient data to complete an analysis of partial use in the absence of the program, or to calculate the net-to-gross ratio.

Therefore, we have elected to accept ComEd's ex-ante savings estimation procedure and claimed savings for PY1 and to prioritize a room AC data collection effort in PY2 that provides robust enough data to perform the above calculation.

3.1.4 Gross Program Impact Results

Table 20 below provides the first-year evaluation-adjusted gross savings estimates for each measure. The resulting verified total program gross savings quantity is 15,698 MWh[5]. This value includes the application of the part-use factor. Verified gross kW savings are 3,350 kW. For year 1, these have been based on ComEd's ex-ante planning estimates for per-unit kW savings for each measure type.

Table 20. PY1 Gross and Net Impact Parameter and Savings Estimates

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	8,438[1]	3,076	465	11,979
Verified Annual kWh Savings Impacts				
Verified annual Gross kWh savings per unit (full-load operating hours)	1,893	2,027		---
Part-Use Factor	75%	59%		---
Verified annual Gross kWh savings per unit *adjusted for part-use*	1,420	1,196	80	--
Verified Program Gross MWh	11,982	3,678	37	15,698
Verified Gross kW Savings Impacts	2,531.4	799.8	18.6	3,350

[1] *Includes 1 unit that was unlabeled.*

[4] We had not set a quota for room AC telephone survey respondents, since the number of RAC turn-ins was small relative to refrigerators and freezers. We also were concerned about the excessive length of a survey for someone who needed to respond to questions pertaining to 2 or more appliances, as would be the case for a participant that turned in a room AC unit in addition to a refrigerator or freezer.

[5] The kW saved by the program were not examined in this report, but will be estimated in the future.

3.1.5 Net Program Impact Parameter Estimates

Once gross program impacts have been estimated, net program impacts are calculated by multiplying the gross impact estimate by the Program Net-to-Gross (NTG) ratio. The NTG ratio is equal to 1 minus the percentage of free riders.

In this program, free ridership is defined based on the percentage of program participants that would have disposed of their units absent the program in a manner that would have permanently removed the unit from the grid. This includes participants who indicated they would have otherwise:

Sent the unit to a recycling facility, or
Taken the unit to a landfill

In total, 21 out of 70 refrigerator respondents (30%) and 5 of 30 freezer respondents revealed they would have used a method to dispose of their unit that would have permanently destroyed it, indicating they are free riders. Resulting NTG ratios are 0.70 for refrigerators and 0.83 for freezers.

Comparison with NTG ratio applied by the program

When compared with the ex-ante NTG ratios applied by the program, these values are considerably higher. However, the program applied ex-ante values also included the effect of the part-use factor, which has been decoupled from the evaluation-verified values, and has been reflected in the gross saving estimates (where it more appropriately belongs).

However, it is useful to provide an apples-to-apples comparison of the program assumed NTG values with the evaluation verified NTG values to provide insight into the magnitude of any ex-post adjustments. For this limited purpose, Table 21 below presents a comparison of the ex-ante and evaluation verified NTG values, assuming in both cases full inclusion of the part-use factor.

Table 21. Comparison of the Ex-Ante and Evaluation Verified NTG Values

Net-to-Gross Ratio Adjusted for Part-Use	Refrigerators	Freezers	Room AC
Net-to-Gross Ratio (1-Free Rider %)	0.70	0.83	1.00
Part-Use Factor	75%	59%	100%
Program Verified NTG ratio adjusted for Part-Use	0.53	0.49	1.00
Program Applied Ex-Ante Value	0.35	0.54	1.00

This comparison reveals a program-verified value for the NTG ratio (including the part-use adjustment) that is considerably higher than the value assumed by the program for refrigerators, which are the largest source of energy savings for the program. The improvement in this factor alone is the main reason for evaluation-verified net savings that are significantly higher than those claimed by the program in PY1.

3.1.6 Net Program Impact Results

Table 22 below provides the program-level evaluation-adjusted net impact results for the PY1 Residential Appliance Recycling program. As this figure shows, the ex post program-level first-year net energy saving estimate resulting from this evaluation is 11,478 MWh, exceeding program claimed estimates by

nearly 3,000 MWh, and resulting in a net realization rate of 135%. Verified kW savings are based on ComEd's ex-ante planning assumptions and are therefore identical to tracking system savings.

Table 22. PY1 Net Impact Parameter and Savings Estimates

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Verified Program Gross MWh	11,982	3,678	37	15,698
Net-to-Gross Ratio (1-Free Rider %)	0.7	0.83	1.00	
Total First-Year Evaluation-Adjusted Net MWh Savings	**8,388**	**3,053**	**37**	**11,478**
Net MWh Savings Claimed by the Program				**8,528**
Net Realization Rate (MWh)				**135%**
Calculation of Verified Net kW				
Program Gross kW	2,531.4	799.8	18.6	3,350
Net-to-Gross Ratio (1-Free Rider %)	0.7	0.83	1.00	
Total PY1 Net kW Savings	**1,772**	**664**	**19**	**2,454**

3.2 Process Evaluation Results

The process evaluation component of the Residential Appliance Recycling evaluation focused on appliance usage data and satisfaction with program processes, including sign up, pickup and receipt of the refund check. Data sources for the process evaluation include the Participant CATI survey (n=100) and the in-depth interviews with program staff and program implementers (n=3).

3.2.1 Program Theory

This section contains the program theory, logic model, and performance indicators of the Appliance Recycling Program. We created this model based on discussions with program management and implementers as well as program documentation. The program theory and logic models is to be used:

As a communication tool by

- allowing the implementer to show reasoning to other stakeholders
- bringing common understanding between implementer and evaluator

As an evaluation tool to

- Focus evaluation resources

Clearly show what evaluation will do and expected answers from evaluation

Provide a way to plan for future work effort

The logic model (LM) is a graphic presentation of the intervention – what occurs and clear steps as to what change the activities undertaken by the intervention are expected to bring about in the targeted population. Logic models can be impact or implementation oriented. An impact model is sparse in terms of how the programs works, but clearly shows the outputs of the program and what they are aimed at affecting. Outcomes are changes that could occur regardless of the program and should be written as such. The implementation model is how the program works and typically resembles a process flow chart. The attached model is an impact model.

We use numbered links with arrows between each box in the logic model. These numbers allow us to:

Clearly discuss different areas of the model

Describe why moving from one box to the other brings about the description in the later box

Set up hypotheses for testing of specific numbered links

Explicate what we will and will not be testing within the evaluation

The program theory (PT) is a description of why the intervention is expected to bring about change. It may reference theories of behavioral change (e.g., theory of planned behavior, normative theory) or be based on interviews with the program managers as they describe their program.

3.2.2 Creation of the Logic Model

There are several different "looks" to logic models. For this evaluation, we are using a multi-level model that has a generic statement about resources in the header, activities in the first row, outputs of those activities in the second row, and outcomes in the third (proximal) and fourth (distal) rows. External factors are shown on the bottom of the diagram.

When we created the boxes in the logic model, we used the following "road-map."

3.2.3 Activities

These are discrete activities that roll up to a single "box" that is shown in the model. It separates out activities that may be performed by different groups. Each activity typically has an output. We used program documentation (implementation plans) and/or discussion with program managers to determine activities.

3.2.4 Outputs

These are items that can be counted or seen. It may be the marketing collateral of a marketing campaign, the audits performed by a program, or the number of completed applications. All outputs do not need to lead to an outcome. We used the same sources as for activities to determine outputs.

3.2.5 Proximal Outcomes

These are changes that occur in the targeted population that the program directly "touches." Multiple proximal outcomes may lead to one or more distal outcomes.

3.2.6 Distal Outcomes

These are changes that are implicitly occurring when the proximal outcome occurs. For example, an energy efficiency program may use marketing to bring about changes in Awareness, Knowledge, or Attitudes as a proximal outcome, which leads to the distal outcomes of: intent to take actions, which leads to actual installation of EE equipment, which leads to energy impacts.

3.2.7 External Factors

These are known areas that can affect the outcomes shown, but are outside of the programs influence. Typically, these are big areas, such as the economy, environmental regulations, codes/standards for energy efficiency, weather, etc. Sometimes these can arise from our discussions with the program managers, but often they were thought about and included based on our knowledge.

3.2.8 Expanding the Impact Logic Model

Once the impact logic model was drafted, a table was created that describes the links, the potential performance indicators that could be used to test the link, the potential success criteria that would indicate the link was successful, and potential data sources of the link.

When thinking about how to write each of the performance indicators, we asked ourselves “What would we look at to judge whether the link description actions are occurring” and wrote the answer as the performance indicator.

Success criteria were created by us and are thought to be reasonable.

Figure 1. Preliminary Logic Model

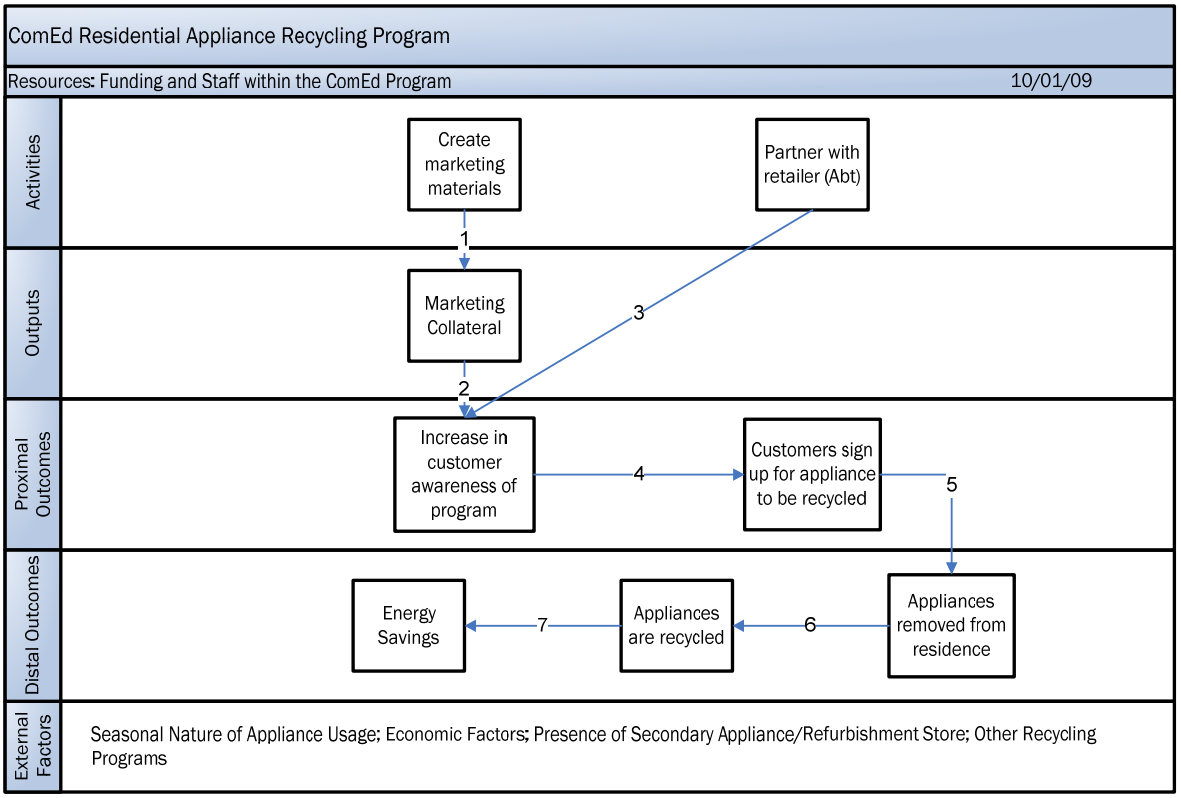

Table 23. Performance Indicators Table

Link	Description of Link	Potential Performance Indicator	Potential Success Criteria for Performance Indicator	Evaluator Data Collection Activities Associated with Link
1	The appliance recycling program was developed to ensure that when an appliance is disposed of, the appliance is taken off of the grid completely, not resold into a secondary market. In order to let customers know about this program, ComEd's marketing team develops and launches marketing and public relations efforts such as bill inserts, newspaper ads, and press releases. The program is also featured on the ComEd website. These marketing materials target ComEd homeowners ages 35-60, living in single family homes and also target those customers that are currently using their spare fridges or freezers a minimal amount.	1. Number of bill inserts 2. Number of press releases or PR events 3. Marketing collateral is effective	1. At least two bill inserts sent out to all ComEd residential customers during PY1 2. Press release sent out announcing the start of the program and another sent during the program year. At least one PR event. 3. All marketing materials, including web-site, are written clearly and in such a way that information is easy to understand.	Interview with program manager Review of program materials
2	Marketing collateral provides information in a manner which leads to awareness of the program and incentive to participate.	1. ComEd customers become familiar with program.	1. 90% of participants report learning of program opportunities via marketing collateral	Participant survey
3	At the retailer (Abt), employees advertise the program to eligible customers.	1. More customers made aware of the program through this retailer channel	1. 100% of eligible customers at the retailer are made aware of the program when purchasing a spare fridge or a freezer.	Due to the limited involvement of the retailer portion of this program, this evaluation will not be collecting data on Abt store customers.
4	Once a customer has applied for an appliance pick-up, a date for collection is scheduled and collection crews arrive on time for their appointment and pick up the appliance within 2 weeks from the application date. Employees leaves behind a flyer about other ComEd Efficiency Programs to give the customers exposure to other ways to save energy and save money.	1. Number of units collected 2. Participant satisfaction with collection process 3. Wait times are monitored through tracking data and evaluated on a monthly basis as one of the program's key performance indicators 4.Customer recall for additional ComEd energy efficiency program information.	1. 12,158 refrigerators and freezers collected; 1,596 room AC units collected. 2. 150 of the appliances were signed up through Abt. 3. 95% of participants are satisfied with the collection process. 4. 90% of participants have appliances picked up no more than 14 days after the customer requests a pick-up of the appliance. 75% of participants have the appliances picked up within 10 days of customer request.5. 90 % of customers recall information left behind by employee about other programs.	Program tracking data Participant survey

Link	Description of Link	Potential Performance Indicator	Potential Success Criteria for Performance Indicator	Evaluator Data Collection Activities Associated with Link
5	Appliances are collected from customers who had signed up for the program. They collect the number of units that they are scheduled to pick up and fill out necessary paperwork correctly.	1. Number of units collected 2. Paperwork is filled out correctly and completely	1. 98% of scheduled appliance pickups are collected. 2. 100% of forms are filled out correctly and completely	Program tracking data
6	Units picked up by the retailer's collection crew are delivered to JACO's recycling center and promptly recycled. Because units are recycled, they are permanently removed from the grid.	1. Number of units recycled 2. Documentation of the disposal of hazardous materials	1. 100% of units picked up are recycled 2. 100% of units have documentation of disposal of hazardous materials	Program tracking data Documentation and records from JACO recycling facility
7	Instead of being used as a spare appliance, or resold into secondary markets, used refrigerators, freezers, and room AC units are recycled and taken off of the grid. Customers do not purchase an additional replacement appliance. Energy savings is created because the appliances are no longer in use.	1. kWh savings	1. Program meets its kWh goals	Impact analysis

Changes to Program

There have been some slight changes to the program since the implementation plan was filed on November 15, 2007.

Between the initial ICC filing and program implementation, ComEd dropped the incentive level from $50 to $25 per appliance. Research done by JACO indicated that $25 was a sufficient incentive. In addition, the target quantity for the first year of the program was relatively low and ComEd wanted to control the number of appliances that would be enrolled in the program. This change to the program was an advantageous change as the program achieved the target quantity of appliances and adequately managed demand. This incentive level will be monitored at the end of each 12 month period in the program.

After the November 15, 2007 filing, ComEd also added a retailer partnership component to the program. ComEd partnered with ABT Electronics, a local appliance retailer. This channel accounted for a small number of units (150 of the 11,300) that were recycled through the program. JACO suggested the partnership based on other work they were doing with ABT. This was an advantageous change because partnering with ABT has allowed ComEd another avenue through which to reach customers with an appliance that could be recycled. ABT also allows for promotional signs to be hung in the stores so the program is advertised to customers who may have a spare appliance at home but are not purchasing a new unit. ABT already was in the practice of removing older appliances from customers' homes, so an added benefit to this partnership is that those appliances that were previously sold from ABT to a reseller are now taken off of the grid completely.

Barriers to Participation

Program Year 1 evaluation activities do not include a non-participant survey so it is somewhat difficult to assess barriers to program participation, particularly since the program met its goals in terms of number of appliances recycled. Customer awareness of the program is likely a key barrier to participation. This will be explored in PY2.

Another possible barrier is convincing people who have a spare refrigerator that they are using to give it up and use just a single refrigerator. We can look at some of the survey responses of the participants who were currently using their spare refrigerator or freezer to understand what barriers might need to be overcome to convince this group to participate.

A sizable majority of participants are recycling a spare appliance they are using at least at during part of the year if not all the time (77%). Looking just at these participants (refrigerator 53%, freezer 24%), we see that 21% of those recycling a refrigerator and 29% of those recycling a freezer had not been considering getting rid of their appliance when they learned of the ComEd program. When asked if they would have kept their appliance or gotten rid of it if the ComEd program did not exist, 40% said they would have kept the appliance (results are the same for refrigerators and freezers). This compares to 22% of the rest of the program participants. ComEd customers who are using their spare appliance chose the program first for the convenience of the home pick-up and second for the $25 incentive. These motivations for participating are the same as other participants, a topic discussed in more detail below.

Marketing and Promotion Strategy

The marketing and promotion of the Appliance Recycling Program is managed by ComEd, with JACO involved in an advisory capacity.

For the first year of the program, ComEd deliberately set a somewhat conservative goal for the number of appliances recycled compared to the potential demand that exists in the residential market. Because the recycling center was set up specifically for the program, participation levels needed to be carefully managed as the center began its operation. As a result, the program did not invest in an extensive marketing campaign. The roll-out of the program in Summer 2008 was ideal as it coincided nicely with the peak months for home improvement projects The main marketing vehicle for Program Year 1was through four bill inserts. Advertisements were also placed in the ComEd Energy at Home Newsletter when the bill inserts were not included. The program used newspaper ads sparingly, but did run some in the winter months when fewer people consider getting rid of old appliances.

A content review of the marketing material shows the messages to be clear and actionable and are also consistent among bill inserts, newspaper and newsletter advertisements. Advertisements and bill inserts are in full color, and with very clear language about the intent of the program (picking up old refrigerators with no cost to the customer) and prominently display the amount of the incentive ($25). The advertisements clearly show how to schedule the appointment and also give various explanations about why someone should get rid of the secondary fridge (“it’s probably costing you more money than you think.”)

The amount of marketing that was done for this campaign was sufficient given that ComEd reached the target goal of number of appliances picked up. The bill insert method was also effective. When asked unprompted where they had heard of the program, nearly three of four participants (74%) recalled seeing the program mentioned in a bill insert with over two-thirds (69%) saying that was where they first learned

of the program. When prompted, another 11% recalled seeing the program in a bill insert bringing both unprompted and prompted recall of bill inserts to 85%.

Other sources where participants heard of the program include word of mouth, advertising in the newspaper, TV, the internet and the ComEd Energy at Home Newsletter.

Table 24. Where Customers Have Heard of the Appliance Recycling Program

Source	First heard of program (n=100)	Additional sources (n=100)	Total (n=100)
Bill Insert	69%	5%	74%
Word of Mouth	7%	8%	15%
Newspaper	6%	2%	8%
TV/NEWS	2%	3%	5%
ComEd Energy at Home Newsletter	3%	1%	4%
Internet	2%	1%	3%
Other	6%	2%	8%
Don't know/No other sources	*5%*	*77%*	--

For Program Year 2, ComEd has suggested running a direct mail pilot using a profiling database to target customers with a similar demographic to those that have already participated in the program. They are also intending to send out six bill inserts and may also run more newspaper advertisements so that they are a more consistent component of the marketing strategy.

Incentive Level for Participation

The incentive level was dropped from a planned $50 to $25. At this lower level, the program was able to still successfully achieve the target quantity of appliances and adequately manage demand. The $25 incentive was a motivating factor for over half of participants surveyed (53%) said the $25 was one reason why they were using the program to dispose of their appliance.

Incentive amounts are reviewed at the end of each 12 month program cycle. Incentive amounts are in line with other Appliance Recycling Programs, such as PG&E and are adequate for the participation levels desired for this program.

Participation in the Program

Participants were asked, unprompted, why they chose the ComEd Appliance Recycling Program to dispose of their appliance instead of some other disposal method. The convenience of the home pick-up was the main selling point of the program for more participants than any other reason. An additional 13% said the home pick-up was a secondary reason. The $25 cash incentive was also a factor, but it plays more of a secondary role with 25% saying it was the main reason and an additional 28% a secondary reason. Some were just happy they did not have to pay for the pick-up (9% main, 13% secondary). Finally, the environmental benefits of the program were also a factor but not a large one.

Table 25: Reasons Why Customers Chose the Appliance Recycling Program

Reason	Main Reason	Add'l Reasons (Mult. Response)	Total
	Percent of Respondents (n=100)		
Convenience of home pickup	43%	13%	56%
$25 Cash Incentive	25%	28	53%
Recycling/environmentally friendly	16%	7%	23%
Pick up was free	9%	13%	24%
Other	5%	4%	9%
Don't know /no other reasons	2%	48%	--

Source: Participant Survey

Participant Sign-Up for Program

Participants had a few different options to sign up for the program. They could have called ComEd to set up an appointment, they could have gone through the ComEd website, or they could have signed up at an ABT Retailer. A majority of the participants surveyed signed up by telephone (69%) and most others signed up using the ComEd website (20%).One person reported participating through ABT while the rest did not recall how they signed up.

Customer satisfaction with the sign-up process is very high, with 92% of participants rating their satisfaction as a nine or ten on a 0 to 10 point scale where 0 is very dissatisfied and 10 is very satisfied. Furthermore, no customer surveyed rated the experience lower than a 7 on the 0 to 10 point satisfaction scale. Participants who signed up via the phone said that the representative was polite and courteous (100%), answered all of their questions about the program (95%), and that they only needed to call once to successfully sign up for the program (90%). Participants who signed up online reported that the sign up screen was easy to find (94% 17/18), and that they received confirmation that the sign up had been successful (100%).

ComEd strives to ensure that customers are able to schedule an appointment within 7 to 10 days of the initial contact, unless the customer requests otherwise. The implementation plan stipulates that 90% of customers will not have to wait for more than 14 days to have their appliance to be picked up. ComEd did an excellent job achieving this goal, as most customers were able to schedule a pickup date that was within 2 weeks of the appointment (84% of those who could recall) and were generally very satisfied with the amount of time between then time they made the appointment and the date it was picked up (82% very satisfied, 15% somewhat satisfied). Most importantly, 98% of participants said they were able to schedule a pick-up date that was convenient for them.

Table 26. Time Between Appointment and Pick-Up of Appliance

Amount of Time	Total (n=70)
Less than 1 week	9%
1 week	37%
2 weeks	39%
3 or more weeks	16%

The program is also supposed to promote the energy and environmental benefits of recycling an older appliance. When learning about the program, 63% of participants said they learned that older refrigerators and freezers are less efficient and use more energy than newer ones. Just under three of four (74%) said that they learned that the coolant in the unit would be safely removed and that material that makes up the appliance would be reused. There was no significant difference between the method used for sign-up and learning this information.

Appliance Collection Process

JACO Collection crews are instructed to call customers two days ahead to confirm appointments and remind customers that the appliances are supposed to be plugged in, defrosted and cleaned out. A second reminder call is to be delivered 30 minutes before the scheduled appointment to serve as a final confirmation and to also give customers an update if the time has changed due to traffic or weather conditions. JACO is doing an excellent job meeting this goal as 87% of respondents said that they received a call in advance to confirm the appointment. The rest of the participants said that either a confirmation call was not applicable to their situation (3%) or that they could not recall receiving a confirmation call (10%).

Employees arrived on time for the pickup with 94% of participants reporting that the collection crew arrived on time, and only two respondents said the crew was late arriving at the appointment.

Overall, 92% of participants were satisfied with the collection team who came to pick up the appliance, with 80% reporting that they were “very satisfied”. Only two participants said they were dissatisfied, with the reason being that the collection team was not careful removing the appliance.

Payment Process

The implementation plan stipulates that most incentive checks should be issued within 14 days of the actual pickup, with the customer receiving the check within four weeks of the pickup. The survey results indicate that JACO has done an excellent job meeting this goal. Of the participants who recalled when they received their incentive check, 91% said that they received payment within four weeks of pickup. Only one customer was dissatisfied with the amount of time it took to receive payment (4 weeks).

As reported earlier, a slight majority of participants said that the incentive payment was a reason why they participated in the program. Furthermore, three of four participants (74%) said that they were very satisfied with the payment. No participants reported being dissatisfied with the size of the incentive payment they received as a result of their participation in the program.

Table 27: Time Between Appointment and Receipt of Incentive Check

Amount of Time	Total (n=100)
1 week or less	10%
2 weeks	21%
3 weeks	14%
4 weeks	16%
5 weeks or more	6%
Don't know/Refused	*33%*

Overall Satisfaction

Overall, 96% of customers were satisfied with their experience with the Appliance Recycling Program, with 86% saying they were "very satisfied". Only one person said he or she was somewhat dissatisfied with the program due to how the appliance was removed.

Table 28: Aspects of Appliance Recycling Program Customers Liked

What people liked about the program (Mult. Response)	Total (n=98)
Did not have to remove appliance by myself	63%
$25 incentive payment	31%
Recycling of the appliance/environmental component	18%
Pick-up team did a nice job	15%
Short wait time between sign up and pick up of appliance	6%
Other	5%
Don't know/Refused	*3%*

Overall satisfaction with ComEd is also high, with 89% saying they are at least somewhat satisfied. Four customers said they were dissatisfied with ComEd, and two of those indicated that the reason was because their bill was too high. Participation in the program made 65% of the participants have a more favorable view of ComEd.

Only a third of customers said they have actually seen a reduction in their energy bill since their appliance was removed. Sixteen percent of customers were not sure if they had seen a decrease. These responses may indicate that people are not that attentive to changes in their electric bill. It is also possible that given seasonal variations in electric use, customers have a difficult time attributing changes in their bills to their own behaviors.

Additional Actions

Over half (57%) of the participants surveyed said that based on the participation in the program they have taken additional actions to save energy at their home. The most common changes that people have made are installing CFLs, installing energy efficient appliances and installing new energy efficient windows.

Other actions include turning off lights when not using them, reducing the running time of appliances unplugging appliances when not in use.

Six percent of customers said they have participated in other ComEd energy efficiency programs, namely the AC program and the energy audit programs. Those customers heard about these additional programs through bill inserts and the ComEd Energy at Home Newsletter.

3.3 Cost Effectiveness Review

This section addresses the cost effectiveness of the Appliance Recycling program. Cost effectiveness is assessed through the use of the Total Resource Cost (TRC) test. The TRC test is defined in the Illinois Power Agency Act SB1592 as follows:

> *" 'Total resource cost test' or 'TRC test' means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided electric utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of power and energy that an electric utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases."*[6]

ComEd uses DSMore™ software for the calculation of the TRC test.[7] The DSMore model accepts information on program parameters, such as number of participants, gross savings, free ridership and program costs, and calculates a TRC which fits the requirements of the Illinois legislation.

One important feature of the DSMore model is that it performs a probabilistic estimation of future avoided energy costs. It looks at the historical relationship between weather, electric use and prices in the MISO region and forecasts a range of potential future electric energy prices. The range of future prices is correlated to the range of weather conditions that could occur, and the range of weather is based on weather patterns seen over the historical record. This method captures the impact on electric prices that comes from extreme weather conditions. Extreme weather creates extreme peaks which create extreme prices. These extreme prices generally occur as price spikes and they create a skewed price distribution. High prices are going to be much higher than the average price while low prices are going to be only moderately lower than the average. DSMore is able to quantify the weighted benefits of avoiding energy use across years which have this skewed price distribution.

Table 29 summarizes the unique inputs used in the DSMore model to assess the TRC ratio for the Appliance Recycling program in PY1. Most of the unique inputs come directly from the evaluation

[6] Illinois Power Agency Act SB1592, pages 7-8.

[7] Demand Side Management Option Risk Evaluator (DSMore) software is developed by Integral Analytics.

results presented previously in this report. Measure life estimates and program costs come directly from ComEd. All other inputs to the model, such as avoided costs, come from ComEd and are the same for this program and all programs in the ComEd portfolio.

Table 29. Inputs to DSMore Model for Appliance Recycling Program

Item	Value Used
Measure Life	8 years
Participants	11,979
Annual Gross Energy Savings	15,698 MWh
Gross Coincident Peak Savings	3.35 MW
Net-to-Gross Ratio	73%
Utility Administration Costs	$285,166
Utility Implementation Costs	$1,301,348
Utility Other Costs	$422,302
Utility Incentive Costs	$297,475
Participant Contribution to Incremental Measure Costs	$0

Based on these inputs, the TRC for this program is 2.58 and the program passes the TRC test.

At this time, additional benefits related to reduction of greenhouse gas emissions have not been quantified in the calculation of the TRC. These additional benefits would increase the given TRC benefit/cost ratio.

4 CONCLUSIONS AND RECOMMENDATIONS

This section highlights the findings and recommendations from the evaluation of the Appliance Recycling Program implemented by JACO on behalf of ComEd. The objectives of the evaluation were to: (1) quantify net energy and peak demand savings impacts from the program during Program Year 1 (PY1); and (2) to determine key process-related program strengths and weaknesses and provide recommendations to improve the program.

Below are the key conclusions and recommendations.

4.1 Conclusions

4.1.1 Key Impact Findings

The PY1 net energy savings goal for this program was 8,159 MWh and the program-reported energy savings was slightly higher than this, 8,528 MWh. The verified energy savings was actually significantly higher than this – 11,478 MWhs, for an overall realization rate of 135%.

Gross savings per unit are fairly similar for refrigerators. The verified gross savings estimate is somewhat higher for freezers, which reflects the program's collection of primarily older units in PY1. Fully 40% of the freezers picked up by the program are over 30 years old and another 42% are between 20 and 30 years old. Nearly all (92%) of the freezers collected by the program were manufactured before the 1993 standards change, which resulted in a dramatic improvement in energy use of units made since that time. Pre-1993 units are generally considered 'energy hogs' that use 3 to 4 times the energy of units made since the standards change.

The primary reason for this higher-than-expected performance was a verified value for the NTG ratio (including the part-use adjustment) of 0.52 that was considerably higher than the value assumed by the program for refrigerators of 0.35, which are the largest source of energy savings for the program. The improvement in this factor alone is the main reason for evaluation-verified net savings that are significantly higher than those claimed by the program in PY1.

Because of inadequate tracking data and completion of only one survey with a participant that recycled a room AC unit in addition to a refrigerator or freezer, it was not possible to fully evaluate room AC savings. Program-claimed savings for room ACs are accepted as verified. This appliance contributes a very small proportion of the program savings (0.3%).

4.1.2 Key Process Findings

The amount of marketing that was done for this campaign was sufficient given that ComEd reached the target goal for the number of appliances picked up. The primary marketing took, bill inserts, was also effective. When asked unprompted where they had heard of the program, nearly three of four participants (74%) recalled seeing the program mentioned in a bill insert with over two-thirds (69%) saying that was where they first learned of the program. When prompted, another 11% recalled seeing the program in a bill insert bringing both unprompted and prompted recall of bill inserts to 85%.

Participants were asked, unprompted, why they chose the ComEd Appliance Recycling Program to dispose of their appliance instead of some other disposal method. The convenience of the home pick-up was the main selling point of the program for more participants than any other reason. An additional 13% said the home pick-up was a secondary reason. The $25 cash incentive was also a factor, but it plays more of a secondary role with 25% saying it was the main reason and an additional 28% a secondary reason.

Overall, 96% of customers were satisfied with their experience with the Appliance Recycling Program, with 86% saying they were "very satisfied".

The program was well-administered. Customers reported a high degree of satisfaction with the sign-up process and appliances were picked up and payments processed in timely fashion. The implementation plan stipulates that 90% of customers will not have to wait for more than 14 days to have their appliance to be picked up. A large majority of participants surveyed (84% of those who could recall) scheduled a pick-up date within two weeks of when they called. Nearly all participants surveyed (98%) said they were able to schedule a pick-up date that was convenient for them.

Overall, 92% of participants were satisfied with the collection team who came to pick up the appliance, with 80% reporting that they were "very satisfied". Only two participants said they were dissatisfied, with the reason being that the collection team was not careful removing the appliance.

Three of four participants (74%) said that they were very satisfied with the amount of the incentive payment. No participants reported being dissatisfied with the size of the payment. Of the participants who recalled when they received their incentive check, 91% said that they received payment within four weeks of pickup. Only one customer was dissatisfied with the amount of time it took to receive payment (4 weeks).

4.2 Recommendations

Impact-Related Recommendations

1. We recommend the program tracking data receive periodic data quality reviews for data quality and completeness. Incomplete data fields need to be populated, particularly those data fields that are critical to the evaluation, such as appliance brand, model number, age/year manufactured, size, configuration and location. In addition, we recommend that the rated amperage data be merged with the historical tracking data, and that this value be collected going forward. Data exported for the evaluation team should also be checked for anomalies.

Process Related Recommendations

2. Continue using the marketing approach as laid out. Using bill inserts as the main vehicle for marketing has worked well in the past. By increasing the number of bill inserts used, ComEd should be able to increase participation further. By increasing the number and maintaining the consistency of the newspaper advertisements even more potential customers will be exposed to the program.
3. Continue to reinforce the value of recycling older appliances. Just over one-third (36%) of participants surveyed said that they would have continued to use the secondary appliance had it not been for the program. This highlights that there are customers out there that need convincing that they do not need that second refrigerator or stand alone freezer.

4. Only 1/3 of participants noticed a reduction in their electric bills due to recycling their appliance. Participants may have a difficulty associating changes in their electric bill to their own energy saving behaviors. ComEd could help educate their customers on how much money they could save by taking different energy saving actions, including recycling an old appliance. When customers do see the savings and are able to attribute them to their behaviors, they will be more likely to make additional changes in the future.
5. For PY2, ComEd has suggested running a direct mail pilot using a profiling database to target customers with a similar demographic to those that have already participated in the program. The appliances recycled in PY1 were much older, on average, than appliances recycled in states with more mature programs. Not surprisingly, the age of the participants was older as well. Although it is important to remove these much older appliances from the grid as they use a much larger amount of energy, ComEd should be aware that these appliances are the "low hanging fruit" and be careful to not limit their message. ComEd should also make sure that people purchasing newer appliances, who might turn their old appliance into a spare, are aware of the program. An expanded retailer partnership could help reach this market.
6. Of the participants surveyed, 6% went on to participate in another ComEd program. It would be beneficial for ComEd to continue providing information about ComEd's other residential programs when the contractors come to pick up the appliance. It can also be something that is added to the website so that customers who sign up online can find out more information if they choose.

5 APPENDICES

5.1 Data Collection Instruments

The data collection instruments used in this evaluation consisted of in-depth interview guides for the ComEd program manager and JACO program management and implementers.

5.1.1 ComEd Residential Appliance Recycling Participant Survey

QUOTA CHECK:

USE SAMPLE:

- **IF REF_NUM>=1 and REFRIGERATOR QUOTA NOT MET OR**
- **IF FRZ_NUM>=1 and FREEZER QUOTA NOT MET**

INTRODUCTION AND SCREENER

Hello, this is [SURVEYOR NAME] from Opinion Dynamics calling on behalf of Commonwealth Edison company. This is not a sales call. We are contacting customers who had refrigerators, freezers or room air conditioners removed through an appliance pick-up and recycling program offered by Commonwealth Edison. May I please speak with [CUSTOMER_NAME]?

Are you the person who was most involved and familiar with the removal? (If not may I please speak with the person who was most involved with the removal?)

IF NO, NO REFRIGERATOR OR FREEZER PICKED UP: THANK AND TERMINATE

CONTINUE WITH RIGHT PERSON: We are conducting a study to evaluate Commonwealth Edison's appliance pick up and recycling program and would like to include your opinions. This is required by the Illinois Commerce Commission and will be used to verify the effectiveness of the program and to make improvements.

(IF NEEDED: It will take about 15 minutes.)

This call may be monitored or recorded for quality purposes.

SCREENING QUESTIONS

S0. Is ComEd your electric company or do you receive electricity from someone else?

ComEd
Someone Else [TERMINATE]
(Don't know)
(Refused)

S1. Our records show that you had [ONE OR MORE REFRIGERATOR if REF_NUM>0, ONE OR MORE FREEZERS if FRZ_NUM>0, AN AIR CONDITIONER if AC_NUM=1] picked up by ComEd or its subcontractor JACO. Is this correct?

01 Yes, correct
00 No, it was [RECORD VERBATIM and TERMINATE]
98 (Don't know) [TERMINATE]
99 (Refused) [TERMINATE]

[Read if REF_NUM>=1 and if REFRIGERATOR_QUOTA not met]

SECTION A: REFRIGERATOR CHARACTERISTICS

S2b Next, I'm going to ask you some specific questions about the refrigerator that was picked up by ComEd.

A1 Were you using this refrigerator as your main refrigerator, or had it been a secondary or spare? If you recently bought a new main refrigerator and were just waiting for the old one to be picked up, it should be classified as "main." (IF NEEDED: A MAIN REFRIGERATOR IS TYPICALLY IN THE KITCHEN, A SECONDARY OR SPARE IS USUALLY KEPT SOMEPLACE ELSE AND MIGHT OR MIGHT NOT BE RUNNING.)

1 Main
2 Secondary or Spare
3 (N/A - Respondent is not primary user of fridge (landlord, etc.)) [TERMINATE]
8 (Don't know) [TERMINATE]
9 (Refused) [TERMINATE]

QUOTA CHECK … Use responses to 1 for Main quota, 2 for Secondary quota. Once quota met, T&T

[ASK A2 IF A1=2 ELSE SKIP TO A5]

A2 How long had you been using this refrigerator as a secondary or spare?

[IF NEEDED: If respondent is confused, reinforce that "how long had it been a spare <u>when you decided to get rid of it.</u>"]

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don't know)
99 (Refused)

A3 Thinking just about the past year, was the spare refrigerator plugged in and running …

1 All the time
2 For special occasions only
3 During certain months of the year only, or
4 Was it never plugged in and running
8 (Don't know)
9 (Refused)

[ASK A4 and A4a IF A3=02 OR 03, ELSE A5]

A4 If you add up the total time your spare refrigerator was plugged in and running during the last 12 months that you had it, about how many total months would that be? Your best estimate is okay. (GET NEAREST MONTH)

[RECORD IN MONTHS]
00 (Less than 1 month)
98 (Don't know)
99 (Refused)

A4a Was the refrigerator running during the summer or was it mainly running during other times of the year?

1. Running during the summer
2. Mainly running other times of the year
3. (A mix of both summer and other times of the year)
8. (Don't know)
9. (Refused)

A5 Where would the refrigerator have been located if it had not been removed by ComEd?

01 (Kitchen)
02 (Garage)
03 (Porch/Patio)
04 (Basement)
00 (Other (SPECIFY:))
98 (Don't know)
99 (Refused)

[SKIP A5B IFA5=1 OR 98 or 99]

A5B Was the space heated or not?

1 Yes
2 No
3 (Heated part of the year)
8 (Don't know)
9 (Refused)

[SKIP A5C IFA5=98 or 99]

A5C Was the space air-conditioned or not?

1 Yes
2 No
3 (Air conditioned part of the year)
8 (Don't know)
9 (Refused)

A6 How old was the refrigerator when ComEd removed it?

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don't know)
99 (Refused)

A7 Did you replace the refrigerator that ComEd picked up with another one?

1 Yes
2 No
8 (Don't know)
9 (Refused)

[ASK IF A7=1 else skip to A9]
A8aa. Did you get the replacement refrigerator before or after the old refrigerator was picked up?

1 Before [read in before in A8a]
2 After [read in after in A8a]
3 (Got it the same day) skip to 8b
8 (Don't know) Skip to A8b
9 (Refused) Skip to A8b

A8a How long <before/after> the old one was picked-up did you get the replacement refrigerator?

01 Within one to two weeks
02 Within one month
03 Within two to three months
04 Within four to six months
05 Within six to twelve months/ one year
06 More than one year later
00 (Other (record verbatim))
98 (Don't know)
99 (Refused)

A8b Was this replacement refrigerator brand new or used?

1. Brand new
2. Used

8. (Don’t know)
9. (Refused)

A8c Does your replacement refrigerator have … (READ)

01 A single door, with a freezer compartment inside
02 Two doors, side by side
03 A Top freezer
04 Or a Bottom freezer?
00 (Other (SPECIFY:___))
98 (Don't know)
99 (Refused)

A8d Is the replacement refrigerator frost free or manual defrost?

01 Frost free
02 Manual defrost
00 (Other (SPECIFY:___))
98 (Don't know)
99 (Refused)

A8e1 Is your replacement refrigerator larger, smaller or the same size as the one it replaced?

1 Larger
2 Smaller
3 Same Size
8 (Don't know)
9 (Refused)

A8f Was getting the replacement a major reason you decided to discard the old one?

1 Yes
2 No
8 (Don’t know)
9 (Refused)

[SKIP IF A8b=1, ELSE TA9]

A8g How old is this replacement refrigerator?

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don’t know)
99 (Refused)

[ONLY READ TA9 IF A7=1]

TA9. Now let’s get back to your old refrigerator that was removed by ComEd.

A9 When you first heard about ComEd's Appliance Recycling Program, were you already considering getting rid of this refrigerator? This could have been by selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center.

1 Yes
2 No
8 (Don't know)
9 (Refused)

A10a. If you had been unable to get rid of your refrigerator through the ComEd appliance recycling program, would you have still gotten rid of the refrigerator, or would you have kept it?

1 Gotten rid of it
2 Kept it
8 (Don't know)
9 (Refused)

[ASK IF A10a = 1, ELSE SKIP TO B2]

A10b. If the ComEd program hadn't been available, would you have gotten rid of the refrigerator within 6 months of when you did, within a year of when you did, or would it have taken longer than a year for you to get rid of this refrigerator?

1. Within 6 months
2. Within a year
3. Over a year
8. (Don't know)
9. (Refused)

SECTION B: CONSIDERATION OF ALTERNATIVES SECTION

B1 Now suppose that ComEd appliance recycling program hadn't been available. I am going to read a list of alternative ways that you could have disposed of this refrigerator. Please tell me which one you would have been most likely to use to get rid of this refrigerator. Would you have…

1. Sold it
2. Given it away for free
3. Have it removed by the dealer you got your new or replacement refrigerator from
4. Taken it to a dump or recycling center
5. Hired someone to take it to a dump or recycling center
6. (Keep it)
8. (Don't know)
9. (Refused)

B2. What was the condition of the refrigerator? Would you say …

1. It worked and was in good physical condition
2. It worked but needed minor repairs like a door seal or handle, or
3. It worked but had some bigger problems
4. (It didn't work)
8. (Don't know)

9. (Refused)

B3. Thinking about the refrigerator that ComEd picked up, how much money do you think it would have cost each month to run it if it were running full-time?

1 Nothing
2 $1 to $5
3 $6 to $10
4 $11 to $15
5 $16 to $20
6 More than $20
8 (Don't know)
9 (Refused)

[ASK B4A THRU B4E IF A10a=2. OTHERWISE, SKIP TO B5]

B4A. You mentioned you would have kept this refrigerator if the ComEd appliance recycling program wasn't available. If you had kept the refrigerator, would it have been stored unplugged, or used as a spare?

1 Stored it unplugged
2 Used it as a spare
3 (Both-store it and use it)
4 (Would not have kept it)
8 (Don't know)
9 (Refused)

[ASK IF B4A=2 or 3, Else B5]
B4B For how many years would you have used this refrigerator as a spare? IF NEEDED: Your best estimate is fine.

[NUMERIC OPEN END]
00 (Less than 1 year)
96 (Until it broke, indefinitely)
98 (Don't know)
99 (Refused)

B4C. Where would this refrigerator have been located if you hadn't gotten rid of it and had used it as a spare? IF NEEDED, CLARIFY: What room? IF NEEDED: Your best estimate is fine.

01 (Kitchen)
02 (Garage)
03 (Porch)
04 (Basement)
00 (Other (SPECIFY:___))
98 (Don't know)
99 (Refused)

[SKIP IF B4C=1 OR B4C=98 or 99]

B4D. Would this have been a heated space?

1. Yes
2. No
3. (Part of the year)
8. (Don't know)
9. (Refused)

[SKIP IF B4C=98 or 99]

B4E Would this have been an air-conditioned space?

1 Yes
2 No
3 (Part of the year)
8. (Don't know)
9. (Refused)

B5. There may have been a number of reasons why you chose to get rid of the refrigerator that we've been discussing. Using a 0 to 10 scale where 0 is not at all important and 10 is extremely important, please tell me how important each reason was in your decision to get rid of it?

a. The refrigerator was expensive to run
b. The refrigerator was a spare that I did not use very much [ASK IF A1=2]
[ASK B5C AND B5D IF A7=1 ELSE SKIP TO C1]
c. The refrigerator was old and I wanted something with more modern features
d. I wanted a bigger refrigerator [SKIP IF A8E1 =2,3]

FREEZER SECTION

[READ IF FRZ_NUM>=1]

QUOTA CHECK:

IF REF_NUM=0 THEN COUNT THIS AGAINST FREEZER QUOTA.

IF REF_NUM>=1 THEN DO *NOT* COUNT THIS AGAINST FREEZER QUOTA, WE NEED AS MANY MULTIPLE APPLIANCE RECYCLERS AS WE CAN GET.

SECTION C: FREEZER CHARACTERISTICS

Next, I'm going to ask you some specific questions about the freezer that was picked up by ComEd.

C1 How long had you been using this freezer?

[IF NEEDED: If respondent is confused, reinforce that "how long had it been used <u>when you decided to get rid of it.</u>"]

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
96 (N/A – Respondent not primary user (landlord, etc.)) [TERMINATE]
98 (Don't know)

99 (Refused)

C2 Thinking just about the past year, was the freezer plugged in and running …

1 All the time
2 For special occasions only
3 During certain months of the year only, or
4 Was it never plugged in and running
8 (Don't know)
9 (Refused)

[ASK C3 and C4 IF C2=02 OR 03, ELSE C5]

C3 If you add up the total time your freezer was plugged in and running during the last 12 months that you had it, about how many total months would that be? Your best estimate is okay. (GET NEAREST MONTH)

[RECORD IN MONTHS]
00 (Less than 1 month)
98 (Don't know)
99 (Refused)

C4 Was the freezer running during the summer or was it mainly running during other times of the year?

1. Running during the summer
2. Mainly running other times of the year
3. (A mix of both summer and other times of the year)
8. (Don't know)
9. (Refused)

C5 Where would the freezer have been located if it had not been removed by ComEd?

01 (Kitchen)
02 (Garage)
03 (Porch/Patio)
04 (Basement)
00 (Other (SPECIFY:))
98 (Don't know)
99 (Refused)

[SKIP IF C5=1 OR 98 or 99]

C5B Was the space heated or not?

1 Yes
2 No
3 (Heated part of the year)
8 (Don't know)
9 (Refused)

[SKIP IF C5=98 or 99]

C5C Was the space air-conditioned or not?

1 Yes
2 No
3 (Air conditioned part of the year)
8 (Don't know)
9 (Refused)

C6 How old was the freezer when ComEd removed it?

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don't know)
99 (Refused)

C7. Did you replace the freezer that ComEd picked up with another one?

1 Yes
2 No
8 (Don't know)
9 (Refused)

[ASK IF C7=1 else skip to C9]

C8aa. Did you get the replacement freezer before or after the old freezer was picked up?

1 Before [read in before in C8a]
2 After [read in after in C8a]
3 (Got it the same day) Skip to C8b
8 (Don't know) Skip to C8b
9 (Refused) Skip to C8b

C8a. How long <before/after> the old one was picked-up did you get the replacement

freezer? RECORD TIME INTERVAL

01 Within one to two weeks
02 Within one month
03 Within two to three months
04 Within four to six months
05 Within six to twelve months/ one year
06 More than one year later
00 (Other (record verbatim))
98 (Don't know)
99 (Refused)

C8b. Was this replacement freezer brand new or used?

1. Brand new
2. Used
8. (Don't know)
9. (Refused)

[SKIP IF C8b=1, ELSE C8c]

C8g How old is this replacement freezer?

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don't know)
99 (Refused)

C8c. Is your replacement freezer … (READ)

01 A chest freezer or
02 An upright freezer
00 (Other (SPECIFY:___))
98 (Don't know)
99 (Refused)

C8d. Is the replacement freezer frost free or manual defrost?

01 Frost free
02 Manual defrost
00 (Other (SPECIFY:___))
98 (Don't know)
99 (Refused)

C8e1 Is your replacement freezer larger, smaller or the same size as the one it replaced?

1 Larger
2 Smaller
3 Same Size
8 (Don't know)
9 (Refused)

C8f Was getting the replacement a major reason you decided to discard the old one?

1 Yes
2 No
8 (Don't know)
9 (Refused)
[ONLY READ TC9 IF C7=1]

TC9. Now let's get back to your old freezer that was removed by ComEd.

C9 When you first heard about ComEd's Appliance Recycling Program, were you already considering getting rid of this freezer? This could have been by selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center.

1 Yes
2 No
8 (Don't know)
9 (Refused)

C10. If you had been unable to get rid of your freezer through the ComEd appliance recycling program, would you have still gotten rid of the freezer, or would you have kept it?

1 Gotten rid of it
2 Kept it
8 (Don't know)
9 (Refused)

[ASK IF C10=1 ELSE SKIP TO D2]

C11b. If the ComEd program hadn't been available, would you have gotten rid of the freezer within 6 months of when you did, within a year of when you did, or would it have taken longer than a year for you to get rid of this freezer?

1. Within 6 months
2. Within a year
3. Over a year
8. (Don't know)
9. (Refused)

SECTION D: CONSIDERATION OF ALTERNATIVES SECTION

D1 Now suppose that the ComEd appliance recycling program hadn't been available. I am going to read a list of alternative ways that you could have disposed of this freezer. Please tell me which one you would have been most likely to use to get rid of this freezer. Would you have…

1. Sold it
2. Given it away for free
3. Have it removed by the dealer you got your new or replacement freezer from
4. Taken it to a dump or recycling center, or
5. Hired someone to take it to a dump or recycling center?
6. (Keep it)
8. (Don't know)
9. (Refused)

D2 What was the condition of the freezer? Would you say …

1 It worked and was in good physical condition
2 It worked but needed minor repairs like a door seal or handle
3 It worked but had some bigger problems
4 (It wasn't working)
8 (Don't know)

9 (Refused)

D3 Thinking about the freezer that ComEd picked up, how much money do you think it would have cost each month to run it if it were running full-time?

1 Nothing
2 $1 to $5
3 $6 to $10
4 $11 to $15
5 $16 to $20
6 More than $20
8 (Don't know)
9 (Refused)

[ASK D4A THRU D4E IF C10=2. OTHERWISE, SKIP TO D5]

D4A. You mentioned you would have kept this freezer if the ComEd appliance recycling program wasn't available. If you had kept the freezer, would it have been stored unplugged, or would you have continued using it?

1 Stored it unplugged
2 Continued using it
3 (Both-store it and use it)
4 (Would not have kept it)
8 (Don't know)
9 (Refused)

[ASK IF D4A=2 or 3, ELSE D5]
D4B For how many years would you have used this additional freezer? IF NEEDED: Your best estimate is fine.

[NUMERIC OPEN END]
00 (Less than 1 year)
96 (Until it broke, indefinitely)
98 (Don't know)
99 (Refused)

D4C. Where would this freezer have been located if you hadn't gotten rid of it and had continued using it? IF NEEDED, CLARIFY: What room? IF NEEDED: Your best estimate is fine.

01 (Kitchen)
02 (Garage)
03 (Porch)
04 (Basement)
00 (Other (SPECIFY:___))
98 (Don't know)
99 (Refused)

[SKIP TO D4E IF D4C=1, 98,99]

D4D. Would this have been a heated space?

1. Yes
2. No
3. (Part of the year)
8. (Don't know)
9. (Refused)

[SKIP to D5 IF D4C=98,99]

D4E Would this have been an air-conditioned space?

1 Yes
2 No
3 (Part of the year)
8. (Don't know)
9. (Refused)

D5. There may have been a number of reasons why you chose to get rid of the freezer that we've been discussing. Using a 0 to 10 scale where 0 is not at all important and 10 is extremely important, please tell me how important each reason was in your decision to get rid of it?

a. The freezer was expensive to run
b. I did not use the freezer very much
[ASK D5C AND D5D IF C7=1 ELSE SKIP TO E00]
c. The freezer was old and I wanted something with more modern features
d. I wanted a bigger freezer [SKIP IF C8E1 =2,3]

AC Section

[READ IF AC_NUM=1]

SECTION E: ROOM AIR CONDITIONER CHARACTERISTICS

Next, I'm going to ask you some specific questions about the air conditioner you had picked up.

E00 Was this your own AC or were you discarding someone else's unit?

01. (My own unit)
02. (Someone else's unit)
03. (Landlord updating appliances for apartment building)
00. (Something else) (RECORD VERBATIM)
98. (Don't know)
99. (Refused)

SKIP TO G1 IF E00 IS NOT = TO 1 OR 3

ASK IF E00=1, ELSE E5

E1 At the time the room air conditioner was picked up, was it your only AC, or did you have additional AC units?

1 Only AC
2 Had additional ACs
8 (Don't know)
9 (Refused)

E2 Thinking just about the most recent summer that you still had this AC, was it plugged in and running?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK E3 IF E2=1 ELSE SKIP TO E5]

E3. Still thinking about this last summer that you had the room AC unit, did you run it most days regardless of the temperature or only on days when the temperature reached a certain level?

1. Most days
2. Only when temperature reached a certain level
3. It was never plugged in and running.
8. (Don't know)
9. (Refused)

[ASK E3A IF E3=2, ELSE E4]

E3a. How hot did it have to get inside your home or condominium before you ran the room AC unit?

01 Less than 70 degrees
02 70 to 75 degrees
03 76 to 80 degrees
04 81 to 85 degrees
05 Above 85 degrees
00 Other (record verbatim)
98. (Don't know)
99. (Refused)

E4. When you were cooling your home or condominium, did you tend to run the room AC unit all day long, or only when you were home or using that room?

1. All the time
2. Only when home/using the room
8. (Don't know)
9. (Refused)

E5 In what room was the room AC unit located? (IF NEEDED: Please tell me the room where it was most often located.)

1. (Bedroom)
2. (Living room)
3. (Dining room)
4. (Kitchen)
5. (Hallway)
6. (Other)
8. (Don't know)
9. (Refused)

E6. At the time of the pick-up, how old was the room air conditioner?

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don't know)
99 (Refused)

E7 Did you replace the AC unit ComEd picked up with a different one? [IF NEEDED: This could have been a different type of AC unit, such as a central AC unit.]

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK IF E7=1 ELSE SKIP TO 10]

E8aa. Did you get the replacement AC before or after the old AC was picked up?

1 Before [read in before in E8]
2 After [read in after in E8]
3 (Got it the same day) Skip to E8a
8 (Don't know) Skip to E8a
9 (Refused) Skip to E8a

E8 How long <before/after> the old one was picked-up did you get the replacement

AC?

RECORD TIME INTERVAL
01 Within one to two weeks
02 Within one month
03 Within two to three months
04 Within four to six months
05 Within six to twelve months/ one year
06 More than one year later
00 (Other (record verbatim))
98 (Don't know)

99 (Refused)

E8A. Was the replacement another room air conditioner or a central AC system?

1. Room air conditioner
2. Central AC
8. (Don't know)
9. (Refused)

E8B. Was the replacement AC brand new or used?

1. Brand new
2. Used
8. (Don't know)
9. (Refused)

[ASK IF E8B=2, ELSE E8D]

E8C. How old is the replacement air conditioner?

[NUMERIC OPEN END RECORD IN YEARS]
00 (Less than one year)
98 (Don't know)
99 (Refused)

[ASK IF E8A=1, ELSE E8E]

E8D Is your replacement AC larger, smaller or the same size as the one it replaced?

1 Larger
2 Smaller
3 Same Size
8 (Don't know)
9 (Refused)

E8E Is the replacement AC energy-efficient?

1. Yes
2. No
8. (Don't know)
9. (Refused)

E9 Can you provide me any more information about the replacement AC unit, such as the brand name and model number, size in tons, or any other characteristics?

[OPEN END: RECORD INFORMATION ON BRAND NAME, MODEL #, ETC.]

96. No
98. (Don't know)
99. (Refused)

Now let's get back to the room air conditioner that you had disposed of.

E10. When you first heard that ComEd would pick up an AC along with your other appliance, were you already considering getting rid of this room air conditioner? This could have been by selling it, giving it away, having someone pick it up, or taking it to the dump or a recycling center.

1 Yes
2 No
8 (Don't know)
9 (Refused)

E11A If you had been unable to get rid of your AC through the ComEd appliance recycling program, would you have still gotten rid of the AC, or would you have kept it?

1 Gotten rid of it
2 Kept it
8 (Don't know)
9 (Refused)

[ASK IF E11a=1 ELSE SKIP TO F3a]

E11b. If the ComEd program hadn't been available, would you have gotten rid of the AC within 6 months of when you did, within a year of when you did, or would it have taken longer than a year for you to get rid of this AC?

1. Within 6 months
2. Within a year
3. Over a year
8. (Don't know)
9. (Refused)

SECTION F: CONSIDERATION OF ALTERNATIVES SECTION

F1 Now suppose that the ComEd appliance recycling program hadn't been available. I am going to read a list of alternative ways that you could have disposed of this AC. Please tell me which one you would have been most likely to use to get rid of this AC. Would you have…

1. Sold it
2. Given it away for free
3. Taken it to a dump or recycling center
4. Hired someone to take it to a dump or recycling center
5. (Keep it)
8. (Don't know)
9. (Refused)

F2 What was the condition of the AC? Would you say …

1 It worked and was in good physical condition
2 It worked but needed minor repairs
3 It worked but had some bigger problems
4 (It wasn't working)

8 (Don't know)
9 (Refused)

[ASK F3A THRU F3E IF E11a=2. OTHERWISE, SKIP TO F4]

F3A. You mentioned you would have kept this air conditioner if the ComEd appliance recycling program weren't available. If you had kept the AC, would you have used this AC or would you have stored it and not used it?

1 Used it
2 Stored it and not used it
3 (Both-store it and use it)
4 (Would not have kept it)
8 (Don't know)
9 (Refused)

[ASK IF F3A=1 or 3, ELSE F4]
F3B For how many years would you have used this AC? IF NEEDED: Your best estimate is fine.

[NUMERIC OPEN END]
00 (Less than 1 year)
96 (Until it broke, indefinitely)
98 (Don't know)
99 (Refused)

F4. There may have been a number of reasons why you chose to get rid of the air conditioner that we've been discussing. Using a 0 to 10 scale where 0 is not at all important and 10 is extremely important, please tell me how important each reason was in your decision to get rid of it?

a. The AC was expensive to run (0 to 10 Scale)
b. I did not use the AC very much(0 to 10 Scale)
c. The AC was old and wasn't cooling the best anymore(0 to 10 Scale)
(Skip if E8D=2,3) d. I wanted a bigger AC unit or system(0 to 10 Scale)

PROCESS QUESTIONS

Next I have some questions about your experiences with the ComEd Appliance Recycling Program.

G1. How did you <u>first</u> learn about the Appliance Recycling Program?

01. (Retailer)
02. (Internet)
03. (Bill Insert)
04. (ComEd Energy at Home Newsletter)
05. (Friend/relative/neighbor)
06. (ComEd website)
07. (Municipal Website or Municipal newsletter)
08. (Radio)
09. (Newspaper)
00. (Other____)
98. (Don't know)

99. (Refused)

G2. Since you first learned about the program, have you heard about the program from any other sources? If yes, where else? (Categories eliminated based on QG1)

01. (Retailer)
02. (Internet)
03. (Bill Insert)
04. (ComEd Energy at Home Newsletter)
05. (Friend/relative/neighbor)
06. (ComEd website)
07. (Municipal Website or Municipal newsletter)
08. (Radio)
09. (Newspaper)
00. (Other____)
96. (No/No other sources)
98. (Don't know)
99. (Refused)

[SKIP IF G1=03 OR G2=03]

G2a. Have you seen the program mentioned in a ComEd bill insert?

1 Yes
2 No
8 (Don't know)
9 (Refused)

G3. The appliance recycling program includes not only the pick-up service, but also consumer education. At the time you found out about the pick-up service, did you receive information or learn that older refrigerators and freezers are less efficient and use more energy than newer ones?

1. Yes, received information
2. No
8. (Don't know)
9. (Refused)

G3aa. And did you learn that the refrigerator or freezer that is picked up by the program would be recycled, which means that the coolant in the unit would be safely removed and the materials that the unit is made of would be reused?

1. Yes, received information
2. No
8. (Don't know)
9. (Refused)

G3a. There are a number of ways you could have gotten rid of your appliance(s). What is the MAIN reason you chose the ComEd Appliance Recycling Program instead of some other way?

01. ($25/cash incentive)
02. (The convenience of the home pick-up/Don't have to take it someplace myself)
03. (Pick up was free)
04. (Appliance was recycled/Was disposed of in a way that was good for environment)
05. (Was recommended by friend/family)
06. (Was recommended by retailer)
07. (Did not know of any other way/No other option)
00. (Other_specify)
98. (Don't know)
99. (Refused)

G3b. Were there any other reasons? (Categories eliminated based on QG3a)

01. ($25/cash incentive)
02. (The convenience of the home pick-up/Don't have to take it someplace myself)
03. (Pick up was free)
04. (Appliance was recycled/Was disposed of in a way that was good for environment)
05. (Was recommended by friend/family)
06. (Was recommended by retailer)
07. (Did not know of any other way/No other option)
00. (Other_specify)
96. (No other reason)
98. (Don't know)
99. (Refused)

G4aa. Once you decided to participate, the first step was signing up for the program. Are you the one that took care of this, or did someone else in your household sign up?

1. I signed up
2. Someone else signed up
8. (Don't know)
9. (Refused)

[ASK if G4aa=1, ELSE G8b]

G4b. Did you sign up online, on the phone or in person at Abt (Pronounced: "Apt") Electronics?

01. Telephone
02. Online
03. In person at Abt Electronics
00. (Other [OPEN END])
98. (Don't know)
99. (Refused)

[ASK IF G4b=02, ELSE G4f]

G4c. Was it easy to find the sign up screen on the website?

1. Yes
2. No
8. (Don't know)
9. (Refused)

G4d. Did the website answer all your questions about the appliance recycling program?

1. Yes
2. No
3. (Not applicable)
8. (Don't know)
9. (Refused)

G4e. Did you receive confirmation that your sign up had been successful?

1. Yes
2. No
3. (Not applicable)
8. (Don't know)
9. (Refused)

[ASK IF G4b=1, ELSE G4i]

G4f. Was the representative you spoke to on the telephone polite and courteous?

1. Yes
2. No
3. (Not applicable)
8. (Don't know)
9. (Refused)

G4g. Did the representative answer all your questions about the program?

1. Yes
2. No
3. (Not applicable)
8. (Don't know)
9. (Refused)

G4h. Did you have to call more than once?

1. Yes
2. No
3. (Not applicable)
8. (Don't know)
9. (Refused)

[ASK IF G4b=3, ELSE G5]

G4i. Was the employee you spoke to at Abt (Pronounced: “Apt”) polite and courteous?

1. Yes
2. No
3. (Not applicable)
8. (Don’t know)
9. (Refused)

G4j. Did the employee answer all your questions about the program?

1. Yes
2. No
3. (Not applicable)
8. (Don’t know)
9. (Refused)

G5. Were you able to schedule a pick-up date and time that was convenient for you?

1. Yes
2. No
8. (Don’t know)
9. (Refused)

G4. On a scale of 0 to 10 where 0 is very dissatisfied and 10 is very satisfied, how satisfied are you with the sign up experience?

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
98. (Don’t know)
99. (Refused)

(ASK IF G4=0,1,2,3, ELSE G6)

G4a. Why did you rate it that way?

00 (OPEN END)
98 (Don’t know)
99 (Refused)

G6. How much time passed between when you scheduled the appointment and when your appliance(s) was/were picked up? (NOTE TO INTERVIEWER: IF RESPONDENT SAYS “ABOUT A WEEK”, RECORD AS 1 WEEK)

00[ENTER DAYS AND WEEKS]

98. (Don’t know)
99. (Refused)

G7. On a scale of 0 to 10 where 0 is very dissatisfied and 10 is very satisfied, how satisfied are you with the time it took between when you scheduled the appliance pickup and when it actually got picked up?

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
98. (Don’t know)
99. (Refused)

G8b. Just before the pick-up took place, did you receive a call in advance to confirm the appointment or to let you know the collection team was coming?

1. Yes
2. No
3. (Not applicable)
8. (Don’t know)
9. (Refused)

G8c. Did the collection team arrive on time?

1. Yes
2. No
3. (Not applicable)
8. (Don’t know)
9. (Refused)

G8. On a scale of 0 to 10 where 0 is very dissatisfied and 10 is very satisfied how satisfied were you with the collection team who picked up your appliance(s)? [REPEAT SCALE IF NECESSARY]

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. (Wasn't at home)
98. (Don't know)
99. (Refused)

(ASK IF G8=0, 1,2,3, ELSE G9)

G8a. Why did you rate it that way?

00 (OPEN END)
98 (Don't know)
99 (Refused)

G9. On that same scale from 0 to 10, how satisfied are you with the size of the payment you received as a result of your participation in the ComEd Appliance Recycling Program? [REPEAT SCALE IF NECESSARY]

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
98. (Don't know)
99. (Refused)

(ASK IF G9=0, 1,2,3, ELSE G10)

G9a. Why did you rate it that way?

(OPEN END)
(Don't know)
(Refused)

G10b. How long did it take to get the check after your appliance was picked up?

01. 1 week or less
02. 2 weeks
03. 3 weeks
04. 4 weeks
05. 5 weeks
06. 6 weeks
07. 7 weeks
08. 8 weeks or more
00. (Other, specify)
98. (Don't know)
99. (Refused)

G10. How satisfied are you with the amount of time it took to receive your payment from ComEd, using the same scale from 0 to 10? [REPEAT SCALE IF NECESSARY]

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
98. (Don't know)
99. (Refused)

(ASK IF G10=0, 1,2,3, ELSE G11)

G10a. Why did you rate it that way?

00 (OPEN END)
98 (Don't know)
99 (Refused)

G11. Thinking about your entire experience with the ComEd Appliance Recycling Program, overall, how satisfied are you with the service, using the same scale from 0 to 10?

[REPEAT SCALE IF NECESSARY]

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
98. (Don't know) – Skip to G13
99. (Refused) – Skip to G13

[ASK G11A IF G11 >= 5, ELSE G11B]

G11A. What aspects of the program did you particularly like? [Multiple Response accept 3]

01. (Positive comment about pick-up team)
02. (The service was easy/Didn't have to dispose of appliance myself)
03. (Short wait between signing up and pick-up)
04. (It was free)
05. (The $25 payment)
06. (Like that appliance was recycled/helps the environment.)
00. (Other-specify)
96. (None of it/Didn't like any of it)
98. (Don't know/Not sure)
99. (Refused)

[ASK G11B IF G11 <= 5, ELSE G13]

G11B. What aspects of the program did you particularly dislike? [Multiple Response accept 3]

01. (Pick up team did not arrive on time)
02. (Other negative comment about pick-up team)
03. (Had to wait a long time to get appointment)
04. (Other negative comment about scheduling appointment)
05. (Someone had to be home for pick-up)
06. (Refund wasn't as much as I was told/false advertising)
07. (Took too long to receive payment; haven't received payment yet)
00. (Other-specify)
96. (None of it/Was satisfied with all)
98. (Don't know)
99. (Refused)

G13. Overall how satisfied are you with ComEd, using the same scale from 0 to 10? [REPEAT SCALE IF NECESSARY]

0. 0
1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
98. (Don't know)
99. (Refused)

(ASK IF G13=0,1,2,3, ELSE G14)

G13a. Why did you rate it that way?

00 (OPEN END)
98 (Don't know)
99 (Refused)

G14. Would you say participating in this program has made you feel more favorable, less favorable, or no different about ComEd?

More favorable about ComEd
Less favorable about ComEd
No different about ComEd
8. (Don't know)
9. (Refused)

G15. How long have you been a ComEd customer at any location?

(NUMERIC OPEN END 1-99)

00. Less than one year
98. (Don't know)
99. (Refused)

G16. Based on your participation in the ComEd Appliance Recycling Program, have you taken any additional actions to save energy in your home?

Yes
No
8. (Don't know)
9. (Refused)

[ASK G16a IF G16=1, ELSE G16B]

G16a. What energy saving actions have you taken?

00. (OPEN END)
98. (Don't know)
99. (Refused)

G16b. Since participating in the program, have you participated in any <u>other</u> ComEd energy efficiency programs?

1 Yes
2 No
8 (Don't know)
9 (Refused)

[ASK G16c and G16d IF G16b=1, ELSE G17]

G16c. Which other program did you participate in?

00 (OPEN END)
98 (Don't know)
99 (Refused)

G16d. How did you hear about this program?

01. (Retailer)
02. (Internet)
03. (Bill Insert)
04. (ComEd Energy at Home Newsletter)
05. (Friend/relative/neighbor)
06. (ComEd website)
07. (Municipal Website or Municipal newsletter)
08. (Radio)
09. (Newspaper)
00. (Other____)
98. (Don't know)
99. (Refused)

G17. Have you noticed a reduction in the amount of your electric bill since your appliance(s) [was/were] removed?

1. Yes
2. No
8. (Don't know)
9. (Refused)

I have just a few questions left for background purposes only.

H1. Do you own or rent your home?

Own
Rent
8. (Don't Know)
9. (Refused)

[ASK IF H1 = 2, ELSE H3]

H2. Do you pay your own electric bill or is it included in your rent?

Pay bill
Included in Rent
8. (Don't Know)
9. (Refused)

H3. How many people live in your household year-round?

[NUMERIC OPEN END]
98. (Don't Know)
99. (Refused)

H4. What is the age of the Head-of-the Household? (IF THE ROLE IS SHARED, PLEASE ASK THEM TO PROVIDE AN AVERAGE)

[NUMERIC OPEN END]
98. (Don't Know)
99. (Refused)

H5. What is the approximate square footage of home that you live in?

[NUMERIC OPEN END]
99998. (Don't Know)
99999. (Refused)

[ASK H5a IF H5 = DK,ELSE H6]

H5a. Is it…

01. Less than 500 square feet
02. 500 to less than 1000 square feet
03. 1000 to less than 1500 square feet
04. 1500 to less than 2000 square feet
05. 2000 to less than 2500 square feet
06. 2500 to less than 3000 square feet
07. 3000 to less than 4000 square feet
08. 4000 to less than 5000 square feet
09. 5000 square feet or more
98. (Don't Know)
99. (Refused)

H6. How long have you lived at your current residence?

[RECORD YEARS]
00. Less than 1 year
98. (Don't Know)
99. (Refused)

H6a. Was your total family income in 2008 before taxes UNDER OR OVER $50,000?

1. Under $50,000
2. Over $50,000
3. (Exactly $50,000)
8. (Don't know)
9. (Refused)

[ASK IF H6a=1, ELSE H6c]

H6b. Was it under $15,000, between $15,000 and $30,000 or between $30,000 and $50,000?

[INTERVIEWER NOTE: IF EXACTLY $30,000 ENTER AS '3. $30,000-$50,000']

1. Under $15,000
2. $15,000-$30,000
3. $30,000-$50,000
8. (Don't know)
9. (Refused)

[ASK IF H6a=2, ELSE H7]

H6c. Was it between $50,000 and $75,000 or between $75,000 and $100,000 or was it over $100,000?

[INTERVIEWER NOTE: IF EXACTLY $75,000 ENTER AS '2. $75,000-$100,000'. IF EXACTLY $100,000 ENTER AS '3. OVER $100,000']

1. $50,000-$75,000
2. $75,000-$100,000
3. Over $100,000
8. (Don't know)
9. (Refused)

H7. What is the highest level of education you have completed?

01. Less than high school
02. High school graduate or equivalent (e.g., GED)
03. Attended some college (includes junior/community college)
04. Bachelors degree
05. Advanced degree
00. (Other, Specify)
98. (Don't know)
99. (Refused)

5.1.2 ComEd Interview Guide – Sharon Madigan – 03/31/09

1. In your opinion, how effective has the overall Residential Appliance Recycling Program been thus far?

    a. What elements of the program are working best?

    b. What elements need improvement?

2. Next I want to learn more about the program implementation approach. We have read JACO's program manual but are wondering if the program implementation has changed from what is described in the manual?

    a. (If yes) Why were changes made?

    b. Specifically, what changes were made?

    c. Have the changes produced favorable results? (describe)

3. Effectiveness of program implementation

    a. What challenges have you have experienced to-date with the implementation of the program, and how have they been addressed?

    b. Is the program on track for meeting this year's goals?

    c. How effective has JACO been implementing the program? How responsive has JACO been at resolving problems? What improvements could be made?

    d. What do you think about the size of the incentive provided to participating ComEd customers? Have incentives been adequate to stimulate participation? What, if any, feedback have you received from customers regarding the incentive level?

    e. Has the participation in this program been greater than or less than expected?. How could it be improved?

    f. It appears that the program tracking data is supposed to be updated quarterly. Can you confirm that this is the case? Updated more frequently? Less? (Answer: Quarterly)

4. Effectiveness of the collection process

    a. How smoothly has the collection process been running thus far? Have there been any problems with the appliance pick up and recycling process?

    b. How much time do you estimate it takes to guide customers through the application process? Have both the phone and email application processes been working well? Does the process present any barriers to program participation?

    c. What is the length of the appliance pick up wait times? Has it been about what you expected? Longer? How do customers perceive the pick up wait times? Have you received any complaints about it?

    d. Have you experienced any problems distributing incentives to customers?

- (If yes) What problems have you experienced?
- Have they been resolved?

e. Do pick up crews leave ComEd packets with customers?

- (If Yes) What marketing or informational materials are included in these packets?

f. Do crew members conduct a brief customer survey during pick ups?

g. What additional customer feedback has the program received to date? How has this been used to refine the program (if at all)?

5. How is the program currently marketed to customers? (PROBE: Bill inserts, radio ads, posters, newspaper ads?)
   a. Who is leading these efforts? Is it your in-house marketing department?
   b. Which of these channels is the most effective (if you know)?
   c. Is this approach working well? If not, what aspects could use improvement?
   d. What plans are in place for future marketing efforts? Other marketing channels? Timeline? (PROBE: Cable TV, PR activities, store flyers?)
   e. What changes could be made to increase the effectiveness of current marketing efforts?
6. The implementation plan indicates that you have a partnership with Abt Electronics to allow purchasers of new refrigerators to recycle their old appliance. Is this partnership active currently?
   a. (If Yes) Please describe how the partnership works.
   b. How effective has the partnership been in increasing program participation?
   c. What are the advantages of this retailer partnership approach versus traditional curbside pick-up?
   d. Are there plans to expand the program to include other retailers? Which ones?

Quality Assurance and Quality Control

7. The Program Manual specifically describes two Quality Assurance activities for this program including recycling center visit and ride-alongs. How many center visits and ride-alongs have been performed to date? Can you provide a brief description of each activity?
8. Are there any additional quality assurance and control procedures in place?
9. What processes are in place in terms of documenting and reporting these procedures?

5.1.3 JACO Interview Guide – Michael Dunham– 05/06/09

Introduction

My name is ___ and I'm calling from Opinion Dynamics, we are part of the team hired to conduct an evaluation of ComEd's Residential Energy Efficiency programs. We're currently in the process of conducting interviews with program managers and key staff in order to improve our understanding of ComEd's programs. At this time we are interested in asking you some questions about the Residential Appliance Recycling program.

Roles and Protocols

1. What is your role in the program? What are your main responsibilities? Have these changed over time? How long have you carried these out?

2. My understanding is that when the program started there was not a facility in the Chicago area already, is that correct? Can you tell me about the process of set up a recycling center in Chicago?

3. I spoke with Sam Sirkin about the collection process, but it would be great if you could describe in detail the recycling process starting with the point where the units are picked up and what happens to them at the time of pick-up versus in the recycling center.

    a. How smoothly has the recycling process been running thus far? Have there been any problems with the appliance pick up and recycling process?

    b. What does the collection staff do if they find an appliance that is not in working condition or does not meet other requirements such as the correct size?

    c. In what percentage of the homes would you say that the equipment does not qualify for the program?

Quality Assurance and Quality Control

4. The Program Manual specifically describes two Quality Assurance activities for this program including recycling center visit and ride-alongs. Are there any additional quality assurance and control procedures in place at the recycling center?

5. What processes are in place in terms of documenting and reporting these procedures?

6. Is there anything else relevant to the program or program's progress that we have not discussed that we should know about?

5.1.4 JACO Interview Guide – Sam Sirkin – 04/14/09

1. What is your role in the program? What are your main responsibilities? Have these changed over time? How long have you carried these out?

2. In your opinion, how effective has the overall Residential Appliance Recycling Program been thus far?

    a. What elements of the program are working best?

    b. What elements need improvement?

3. Next, I want to learn more about the program implementation approach. We have read the program manual but are wondering if the program implementation has changed from what is described in the manual?

    a. (If yes) Why were changes made?

    b. Specifically, what changes were made?

    c. Have the changes produced favorable results? (describe)

4. Effectiveness of program implementation

    a. What have been the biggest challenges you have experienced to-date with the implementation of the program, and how have they been addressed?

    b. Is the program on track for meeting this year's goals?

    c. What do you think about the size of the incentive provided to participating ComEd customers? Have incentives been adequate to stimulate participation? What, if any, feedback have you received from customers regarding the incentive level?

    d. Has the participation in this program been greater than or less than expected?. How could it be improved?

    e. How frequently is the program tracking data updated? Is it correct that you send weekly updates as well as quarterly KPI updates? What information is provided in the weekly updates? Could you possibly copy me on the updates? (Answer: Quarterly)

5. Now, I'd like to talk about the collection process. It would be great if you could first describe the collection process in detail.

    a. How smoothly has the collection process been running thus far? Have there been any problems with the appliance pick up and recycling process?

    b. How much time do you estimate it takes to guide customers through the application process? Have both the phone and email application processes been working well? Does the process present any barriers to program participation?

c. What is the length of the appliance pick up wait times? Has it been about what you expected? Longer? How do customers perceive the pick up wait times? Have you received any complaints about it?

d. What is the process for distributing incentives to customers?

- Have you experienced any problems distributing incentives?
- (If yes) What problems have you experienced?
- Have they been resolved?

e. Do pick up crews leave ComEd packets with customers?

- (If Yes) What marketing or informational materials are included in these packets?

f. Do crew members conduct a brief customer survey during pick ups?

g. What customer feedback has the program received to date? How has this been used to refine the program (if at all)?

6. How is the program currently marketed to customers? (PROBE: Bill inserts, radio ads, posters, newspaper ads?)

   a. Which of these channels is the most effective (if you know)?

   b. Is this approach working well? If not, what aspects could use improvement?

   c. What plans are in place for future marketing efforts? Other marketing channels? Timeline? (PROBE: Cable TV, PR activities, store flyers?)

   d. What changes could be made to increase the effectiveness of current marketing efforts?

7. The implementation plan indicates that there was a partnership with Abt Electronics to allow purchasers of new refrigerators to recycle their old appliance. Is this partnership active currently?

   a. (If Yes) Please describe how the partnership works.

   b. How effective has the partnership been in increasing program participation?

   c. What are the advantages of this retailer partnership approach versus traditional curbside pick-up?

   d. Do you know of plans to expand the program to include other retailers? Which ones?

8. The implementation plan indicates that you will be calculating energy savings for each recycled appliance. Have these calculations begun?

   a. (If Yes) How are the energy savings calculated? (annual kWhs?) Do you have a database to track the savings? I've seen on the Sharepoint site some mentions of metering. Is that still a possibility?

   b. Have you experienced any problems in calculating energy savings?

      - (If yes) What problems have you experienced?
      - Have they been resolved?

Quality Assurance and Quality Control

9. The Program Manual specifically describes two Quality Assurance activities for this program including recycling center visit and ride-alongs. Do you know how many center visits and ride-alongs have been performed to date?

10. Do you have any data checks or consistency checks in place??

11. Are there any additional quality assurance and control procedures in place?

12. What processes are in place in terms of documenting and reporting these procedures?