

Fridge & Freezer Recycling Program PY7 Evaluation Report

FINAL

Energy Efficiency / Demand Response Plan:
Plan Year 7
(6/1/2014-5/31/2015)

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Prepared by:

Jennifer Fagan
Jeremy Eddy
Itron



www.navigant.com



Submitted to:

ComEd
Three Lincoln Centre
Oakbrook Terrace, IL 60181

Submitted by:

Navigant Consulting, Inc.
30 S. Wacker Drive, Suite 3100
Chicago, IL 60606

Contact:

Randy Gunn, Managing Director
312.583.5714
Randy.Gunn@Navigant.com

Jeff Erickson, Director
608.497.2322
Jeff.Erickson@Navigant.com

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E. Executive Summary

This report presents a summary of the findings and results from the evaluation of the PY7¹ Fridge & Freezer Recycling (FFR) Program. The FFR Program is designed to achieve energy savings through the retirement and recycling of older, inefficient refrigerators, freezers, and room air conditioners (ACs). The primary objectives of the program are to decrease the retention of high energy-use refrigerators and freezers and to deliver long-term energy savings. A secondary objective is to dispose of these older units in an environmentally safe manner.

E.1. Program Savings

Table E-1 summarizes the electricity savings from the FFR Program. Verified gross savings excluding the part-use factor, are approximately 8 percent higher than ex-ante gross savings. Both sets of values were computed using the regression equations specified in the TRM, without applying the part-use factor. However, the evaluation-verified gross savings calculations are based on the proportion of appliances located in conditioned space from the customer telephone surveys, whereas ex-ante reported savings are based on appliance locations in the program tracking database. The survey findings are based on responses to a counterfactual question of the decision maker regarding where the unit would have been located if the program had not picked it up. Tracking data unit locations are based on what the truck driver observes at the time the unit is picked up (which may have been a temporary location in anticipation of the unit's impending removal). The no program unit location based on the survey's counterfactual response by the decision maker is the appropriate value for the gross savings calculation. Final verified gross savings also include the part-use factor since it is an element of the gross savings calculation.

Table E-1. PY7 Total Program Electric Savings

Savings Category	Energy Savings (MWh)	Demand Savings (MW)
Ex-Ante Gross Savings	34,656	4.38
Verified Gross Savings – Excluding Part Use Factor	37,375	4.73
Verified Gross Savings – Including Part Use Factor	34,011	4.31
Verified Net Savings	18,885	2.38

Source: ComEd tracking data and Navigant team analysis.

E.2. Program Savings by Measure Type

Table E-2 summarizes the program savings by measure. The verified net-to-gross ratio (NTGR) is based on deemed values including the Program Induced Replacement (PIR) component. The deemed values for PIR, which are pertinent to refrigerators and freezers only, are based on research conducted in the PY5 evaluation and were calculated using a procedure that is consistent with that specified in the Illinois

¹ The PY7 program year began June 1, 2014 and ended May 31, 2015.

Technical Reference Manual (TRM), version 3.0.² Note that there are separate SAG-approved NTG values for refrigerators and freezers, delineated by whether the unit is assigned a Retailer NTGR or a Non-Retailer NTGR. The NTG ratios in the table below, which have been used to determine Verified Net savings, are a weighted average of the Retailer and Non-Retailer NTG ratio values for each appliance type. These NTG ratios are 0.56 for refrigerators (based on a weighted average of Retailer NTGR of 0.17 and Non-Retailer NTGR of 0.79), 0.52 for freezers (based on a weighted average of Retailer NTGR of 0.21 and Non-Retailer NTGR of 0.59) and 0.50 for room ACs for a total NTG ratio of 0.56.

Table E-2. PY7 Program Results by Measure Type

Savings Category	Refrigerators	Freezers	Room ACs
Ex-Ante Gross Savings (MWh)	29,985	4,568	104
Ex-Ante Gross Peak Demand Reduction (MW)	3.69	0.54	0.15
Deemed Part-Use Factor	0.92	0.83	1
Verified Gross Savings (MWh)	30,030	3,876	105
Verified Gross Peak Demand Reduction (MW)	3.71	0.45	0.15
Verified Gross Realization Rate	100%	85%	101%
Deemed Net to Gross Ratio (NTGR) †	0.63	0.56	0.50
Program Induced Replacement (PIR) ‡	-0.06	-0.03	0.00
Final Net to Gross Ratio (NTGR and PIR) ‡	0.56	0.52	0.50
Verified Net Savings (MWh)	16,817	2,016	52
Verified Net Demand Reduction (MW)	2.08	0.24	0.07

Source: ComEd tracking data and Navigant team analysis.

† A deemed value without the PIR. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-

28_Final_EMV_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://www.ilsag.info/net-to-gross-framework.html>

‡ Deemed values based on evaluation research findings from PY5.

E.3. Impact Estimate Parameters for Future Use

In the course of our PY7 research, the evaluation team did research on parameters used in impact calculations including those in the Illinois TRM. Some of those parameters are eligible for deeming for future program years or for inclusion in future versions of the TRM. The evaluation team’s parameters recommended for future use are shown in the following table.

² Although version 3.0 of the TRM was not in effect at the time the PY5 evaluation was conducted, the calculation method used was the same.

Table E-3. Impact Estimate Parameters for Future Use

Parameter	Refrigerators	Freezers	Room ACs	Data Sources
NTG	0.51	0.58	0.50	
Retailer	0.22	0.25	N/A	PY7 Retailer surveys excluding Retailers #1 and #2
Non-Retailer	0.62	0.63	0.50	PY7 Participant Survey
Weighted Average Retailer + Non-Retailer (excluding PIR)	0.54	0.60	0.50	PY7 Participant and Retailer Surveys
Program-Induced Replacement factor	-2.9%	-1.3%	N/A	PY7 Participant surveys
Part-Use Factor	0.95	0.74	1.00	PY7 Participant Survey
Verification Factor	100%	100%	100%	PY7 Participant Survey

Source: Evaluation Analysis

As in the PY4 through PY6 evaluations, the net-to-gross ratios for refrigerators and freezers incorporate a retailer-based net-to-gross ratio for primary units that were subsequently replaced by participants. Many participant-replacers indicated that in the program’s absence, they would have given their units to the retailer they bought the new one from. In turn, those retailers indicated they would have deconstructed and/or recycled many of those units via their normal collection procedures. The research report section of this document (Section 6, Appendix) provides a fully detailed analysis and reporting of the retailer based NTGR and participant survey-based NTGR results. Note that the Retailer NTG values for Refrigerators and Freezers exclude Retailer #1 and #2, since they are not participating in the program starting in PY8. Directionally, the research-based PY7 NTG ratio for refrigerators is notably lower than the research-based PY6 value, and the research-based NTG ratio in PY6 was slightly lower than in PY5.

The research report part-use factor for refrigerators in PY7 (0.95) is higher than the PY6 value (0.79) and is similar to the research-based value observed in PY5 (0.92). The research report part-use factor for freezers in PY7 (0.74) is somewhat lower than it was in PY6 (0.79) and in PY5 (0.83).

Finally, all participants surveyed stated that ComEd’s implementation contractor did pick up their unit resulting in a verification rate of 100 percent. This value is based on responses to a phone survey question (and related follow-up questions) regarding whether the respondent recalled having the program pick up their unit.

E.4. Program Volumetric Detail

According to program tracking data, there were 38,239 participants in PY7 contributing a total of 40,946 recycled measures to the program. These volumes are similar to PY6, where the program recycled a total of 42,313 units, which were contributed by 40,140 participants. Since the unit pick-up was verified by 100 percent of surveyed participants, resulting in a 100 percent verification rate, no further reduction was necessary to the program-claimed unit count. These values are shown in the following table.

Table E-4. PY7 Volumetric Findings Detail

	Program-Reported Number of Units	Verification Factor	Verified Participation Units	% of Total Units
Number of Participants	38,239	100%	38,239	100%
Units by Measure Type				
Refrigerators	35,205	100%	35,205	86%
Freezers	5,299	100%	5,299	13%
Room ACs	442	100%	442	1%
Total Measures	40,946	100%	40,946	100%

Source: ComEd tracking data and Navigant team analysis.

E.5. Results Summary

The following table summarizes the key metrics from PY7.

Table E-5. PY7 Results Summary

Participation	Units	PY7
Verified Net Savings	MWh	18,885
Verified Net Demand Reduction	MW	2.38
Verified Gross Savings	MWh	34,011
Verified Gross Demand Reduction	MW	4.31
Program Realization Rate (Gross)	%	98
Deemed Net to Gross Ratio (NTGR) †	#	Refrigerators 0.63
		Freezers 0.56
		Room A/C 0.50
Program Induced Replacement (PIR) ‡	#	Refrigerators (0.06)
		Freezers (0.03)
		Room A/C (0.00)
Final Net to Gross Ratio (NTGR and PIR) †	#	Total Program (0.56)
		Refrigerators (0.56)
		Freezers (0.52)
	#	Room A/C (0.50)
Refrigerators picked-up - Non-retail	#	25,025
Refrigerators picked-up - Retail	#	10,180
Freezers picked-up - Non-retail	#	4,862
Freezers picked-up - Retail	#	437
A/C Units picked-up	#	442
Unique customer participants	#	38,239

Source: ComEd tracking data and Navigant team analysis.

† A deemed value. Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-

28_Final_EMV_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

‡ Deemed values based on evaluation research findings from PY5.

E.6. Findings and Recommendations

The FFR Program continues to recycle a high volume of units and provides a reliable source of savings for ComEd. Verified savings have decreased 4 percent from PY6 values due primarily to the fact that the number of units recycled through the program is down 3 percent from PY6. In terms of net savings, the deemed net-to-gross ratio applied for refrigerators in PY7 was appreciably higher than the ratio applied in the PY6 evaluation (0.56 and 0.44, respectively).

The following provides insight into key program findings and recommendations.³

Program Savings

Finding 1. The PY7 program achieved verified gross energy savings of 34,011 MWh, while verified net energy savings were 18,885 MWh. Gross peak demand savings were 4.31 MW and net peak demand savings were 2.38 MW.

Gross Realization Rates

Finding 2. The program realization rate (gross) is based on the gross realization rate and the verification rate. The gross realization rate reflects the difference between ex-ante gross savings (kWh) and verified gross savings. Specifically, data from the participant surveys justified a shift in the proportion of units in conditioned spaces relative to the proportions derived from program tracking data. This had an upward effect on gross realization rate, which was offset by the addition of deemed part-use factors by technology in verified savings calculations, and the combination of these factors drove a verified gross realization rate of 0.98 (total program). The final component incorporated was the verification rate which is based on responses to a phone survey question regarding whether the respondent recalled having the program pick up their units. In total, 100 percent (300 of 300) of participants surveyed said that the program did pick up their units, resulting in a verification rate of 100 percent.

Net-to-Gross Ratio

Finding 3. The evaluation research findings NTG ratios were 0.39 for refrigerators (based on a weighted average of a customer NTGR of 0.62, a retailer NTGR of 0.12, and net PIR factor of 0.029), 0.56 for freezers (based on a weighted average of a Customer NTGR of 0.63, a retailer NTGR of 0.11, and net of a PIR factor of 0.013) and 0.50 for room ACs (based on participating customers only) for a total program NTG ratio of 0.41. It also includes a term for Program Induced Replacements, per the TRM. Because a larger proportion of refrigerator participants said they would have their dealer remove the old unit (approximately 40 percent) than freezer participants (approximately 10 percent), the retailer NTGR plays a correspondingly larger role in the final refrigerator NTGR.

Recommendation 1. Free ridership can be reduced by reorienting the program towards those customers who have true secondary units and eliminating participation by those who are replacing existing primary units. However, this comes at a cost, since the pool of available participants is reduced significantly by doing so. ComEd should weigh the pros and cons of this strategy versus alternatives as it is making changes to the program design during PY8.

Energy and Demand Savings Estimates

Finding 4. Based on the specified regression in the TRM, a small number of refrigerator units appear in the detailed results as if they have negative energy and demand consumption. They comprise a very small fraction of the population. Despite this non-intuitive result for

³ Numbered findings and recommendations in this section are the same as those found in the Findings and Recommendations section of the evaluation report for ease of reference between each section.

some units, the overall regression is based on a best fit equation to empirical data for the entire population of units. Because of this, the evaluation team applied the regression based savings values to the full population of program units as the best approach for estimating total program savings. The regression equations in the Illinois Statewide TRM version 4.0 (to be applied in PY8 forward) have been re-specified to address this issue.

Finding 5. The PY7 verified gross energy savings is 34,011 MWh, while verified net energy savings is 18,885 MWh. These numbers are down from the PY6 verified savings values of 35,478 gross MWh and 25,331 net MWh. For refrigerators, gross energy savings per unit is 853 kWh. For freezers, gross energy savings per unit is 732 kWh, reflecting further reductions from PY6 values based on the mix and characteristics of units collected in PY7.

Finding 6. In the program tracking data, approximately 9,000 records were missing the prior location of the units and whether the unit is a primary or secondary unit. Virtually all of the records missing this information (97 percent) were from participating retailers. This represents an increase in the number of records with missing information relevant to savings calculations, as the PY6 program tracking data was missing these values for approximately 7,000 records. This is important data that is used in the Illinois Statewide TRM version 3.0 regression model and will be applied in the evaluations going forward. For this evaluation, survey findings on unit location were used in place of the missing records in the regression process.

Recommendation 2. We recommend that the participating retailers be required to capture the prior location of the units and if the unit is a primary or secondary unit. This is a first step towards improving the accuracy of tracking data related to the unit's prior location.

Program Participation

Finding 7. Program participation, based on the number of participants, remains strong but is down about 5 percent from PY6, although it is still higher than the program goal of 40,000 units. While participation levels met ComEd's participation goals for PY7, the decline in such levels does not bode well for future years when program goals are increasing.

Recommendation 3. To meet increased goals planned for PY8 and PY9, ComEd will need to increase incentives, and expand marketing efforts. This presumes a year-round program operation.⁴

⁴ Note that the PY8 program was recently suspended after the program implementer ceased operation due to financial difficulties

1 Introduction

1.1 Program Description

The Fridge & Freezer Recycling (FFR) Program was designed to achieve energy savings through the retirement and recycling of older, inefficient refrigerators, freezers, and room air conditioners (ACs). 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. The implementation contractor was JACO Environmental.

1.2 Evaluation Objectives

The evaluation team identified the following key researchable questions for PY7:

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? How can free ridership be reduced?
3. Did the program meet its energy and demand goals? If not, why not?
4. Does spillover exist in the program? If so, how much spillover is occurring?
5. How has the program influenced the market for used refrigerators and freezers?
6. Should the program design be modified to reduce free ridership, and if so, how?

2 Evaluation Approach

This section of the evaluation report presents the approaches used to verify gross and net kWh and kW savings in the FFR Program.

2.1 Overview of Data Collection Activities

The core data collection activities included a review of the tracking data, in depth interviews with the ComEd and JACO program managers, and a series of telephone surveys. The telephone surveys included participating customers, participating retailers of new units, used appliance dealers and a scrap iron company. The full set of data collection activities is summarized in Table 2-1 below.

Table 2-1. Primary Data Collection Activities

What	Who	Target Completes	Completes Achieved	When	Comments
Tracking Data Analysis	All Program Participants	All	All	Sept-Oct 2015	
Ongoing Communications with Program Managers	ComEd and JACO Program Managers	2	2	Ongoing	
CATI Telephone Surveys	Sample of Program Participants	300	300	June-Aug 2015	Focus on verification and net-to-gross assessment
In-Depth Interviews	Participating Retailers	Up to 3	4	Aug-15	Determine used appliance disposal practices in the program's absence
In-depth Interviews	Used Appliance Dealers; Haulers	Up to 2	2	Nov-15	Determine program's effect on used appliance market.

Table 2-2. Additional Resources

Reference Source	Author	Gross Impacts	Process
Illinois Technical Reference Manual, version 3.0	VEIC		X

2.2 Verified Savings Parameters

The evaluation team used procedures specified in the Illinois Technical Reference Manual (TRM) version 3.0⁵ to calculate PY7 gross energy savings. These procedures call for energy savings to be computed using the regression equations specified below, which have remained unchanged in the TRM following an update in version 2.0. Note that all of the factors in the regression equations are derived from pooled data from metering studies conducted by several Midwestern utilities, including one done by the ComEd evaluation team in PY4. None of these factors except for the part-use factor are subject to change based on this PY7 evaluation. The part use factor will continue to be updated based on research findings from two years prior.

⁵ Source: <http://www.ilsag.info/technical-reference-manual.html>

2.2.1 Energy and Demand Savings – Refrigerators and Freezers

This section includes regression specifications and part-use factors for refrigerators, freezers and room air conditioners based on the IL TRM v3.0, Section 5.1.8 for refrigerators and freezers and Section 5.1.9 for room air conditioners.

Energy savings for refrigerators are based upon a linear regression model using the coefficients as described in Table 2-3 below.

Table 2-3: Energy savings for Refrigerators⁶

Independent Variable	Coefficient
Intercept	116.84
Age (years)	10.89
Pre-1990	431.79
Size (Cubic Feet)	19.42
Single Door	-795.37
Side-by-side	426.41
Primary Unit	170.41
Unconditioned Space X CDD	17.34
Unconditioned Space X HDD	-11.78
Part Use Factor†	0.92

Source: IL TRM v3.0, Section 5.1.8.

† Source: TRM and PY5 evaluation

The IL TRM v3.0 specifies the equation below to estimate energy savings.

⁶ Energy savings are based on an average 30-year TMY temperature of 51.1 degrees. Coefficients provided in TRM version 3.0.

Equation 1. Energy Savings – Refrigerators

$$\Delta\text{kWh} = [116.84 + (\text{Age} * 10.89) + (\text{Pre-1990} * 431.79) + (\text{Size} * 19.42) + (\text{Single-Door} * -795.37) + (\text{Side-by-side} * 426.41) + (\text{Primary Unit} * 170.41) + (\text{CDDs} * \text{unconditioned} * 17.34) + (\text{HDDs} * \text{unconditioned} * -11.78)] * \text{Part Use Factor}$$

Where:

- Age = Age of retired unit
- Pre-1990 = Pre-1990 dummy (=1 if manufactured pre-1990, else 0)
- Size = Capacity (cubic feet) of retired unit
- Side-by-side = Side-by-side dummy (= 1 if side-by-side, else 0)
- Single-Door = Single-Door dummy (= 1 if Single-Door, else 0)
- Primary Usage = Primary Usage Type (in absence of the program) dummy (= 1 if Primary, else 0)
- Interaction: Located in Unconditioned Space x CDD/365.25
(=1 * CDD/365.25 if in unconditioned space)
- CDD = Cooling Degree Days
- Interaction: Located in Unconditioned Space x HDD/365.25
(=1 * HDD/365.25 if in unconditioned space)
- HDD = Heating Degree Days

Source: IL TRM v.3.0, Section 5.1.8

After savings were computed, a part-use factor was then applied. This factor is also based on the values specified in IL TRM v3.0, Section 5.1.8.

According to the Illinois Technical Reference Manual v 3.0⁷, energy savings for freezers are based upon a linear regression model using coefficients described in Table 2-4 below.

⁷ Illinois Technical Reference Manual v3.0, Section 5.1.8

Table 2-4: Energy savings for freezers⁸:

Independent Variable	Coefficient
Intercept	132.12
Age (years)	12.13
Pre-1990	156.18
Size (cubic feet)	31.84
Chest	-19.71
Unconditioned Space X CDD	9.78
Unconditioned Space X HDD	-12.76
Part-use factor†	0.83

Source: IL TRM v.3.0, Section 5.1.8

† Source: TRM and PY5 evaluation

The IL TRM v3.0 specifies the equation below to estimate energy savings.

Equation 2. Energy Savings – Freezers

$$\Delta kWh = [132.12 + (Age * 12.13) + (Pre-1990 * 156.18) + (Size * 31.84) + (Chest * -19.71) + (CDDs * unconditioned * 9.78) + (HDDs * unconditioned * -12.76)] * Part Use Factor$$

Where:

Age = Age of retired unit

Pre-1990 = Pre-1990 dummy (=1 if manufactured pre-1990, else 0)

Size = Capacity (cubic feet) of retired unit

Side-by-side = Side-by-side dummy (= 1 if side-by-side, else 0)

Single-Door = Single-Door dummy (= 1 if Single-Door, else 0)

Chest = Chest freezer dummy (=1 if chest freezer, else 0)

Primary Usage = Primary Usage Type (in absence of the program) dummy
(= 1 if Primary, else 0)

Interaction: Located in Unconditioned Space x CDDs = Proportion of units in unconditioned spaces interacted with CDDs

Interaction: Located in Unconditioned Space x HDDs = Proportion of units in unconditioned spaces interacted with HDDs

Part Use Factor = To account for those units that are not running throughout the entire year.

Source: IL TRM v.3.0, Section 5.1.8

⁸ Energy savings are based on an average 30-year TMY temperature of 51.1 degrees. Coefficients provided in TRM version 3.0.

After savings were computed, a part-use factor was then applied. This factor is also based on the values specified in IL TRM v3.0, Section 5.1.8.

Summer peak demand savings for refrigerators and freezers were estimated according to the equation below.

Equation 3. Summer Coincident Peak Demand Savings – Refrigerators and Freezers

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

Where:

kWh = Savings provided in algorithm above

CF = Coincident factor defined as summer kW/average kW
 = 1.081 for Refrigerators
 = 1.028 for Freezers

Source: IL TRM v.3.0, Section 5.1.8

Energy and Demand Savings - Room Air Conditioners

Room AC gross savings were estimated using the algorithm specified in TRM version 3.0 and shown below.

Equation 4. Energy Savings – Room Air Conditioners

$$\Delta kWh = ((FLH_{RoomAC} * BtuH * (1/EER_{exist}))/1000)$$

Where:

FLH_{RoomAC} = Full Load Hours of room air conditioning unit

BtuH = unit capacity [BTU/h] is a nameplate value

EER_{exist} = unit efficiency [EER] of the recycled unit

Source: IL TRM v.3.0, Section 5.1.9

Summer peak demand savings for room air conditioners were estimated according to the equation below.

Equation 5. Summer Coincident Peak Demand Savings – Room Air Conditioners

$$\Delta kW = (BtuH * 1/EER_{exist}/1000)* CF$$

Where:

Btu/H = Size of retired unit

EER_{exist} = Efficiency of existing unit

CF = Summer Peak Coincidence Factor for measure
 = 0.3

Source: IL TRM v.3.0, Section 5.1.9

The following table presents the parameters that were used in the verified gross and net savings calculations, and indicates which were examined through evaluation activities and which were deemed.

Table 2-5. Verified Savings Parameter Data Sources

Gross Savings Input Parameters	Data Source	Deemed † or Evaluated?
Unit Energy Consumption	IL TRM v 3.0	Deemed
Unit Energy Demand	IL TRM v 3.0	Deemed
Net-to-gross ratio	Illinois Stakeholder Advisory Group (SAG)† PY5 Participant Surveys	Deemed (SAG consensus) Deemed (Program Induced Replacement Factor)
Part-Use Factor	IL TRM v 3.0	Deemed
Verification Factor	PY7 Participant Surveys	Evaluated

† Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

2.2.2 Verified Gross Program Savings Analysis Approach

To verify savings for the FFR Program, the evaluation- used an in-depth review and analysis of tracking data, application of the regression-based algorithms and part-use factors per the Illinois 2014 TRM version 3.0. The verification was based on a screening question in the telephone survey to confirm the appliances were picked-up as reported in the program tracking database.

2.2.2.1 Approach Used for Refrigerators and Freezers

Gross savings are based on: (1) The regression specifications in the TRM version 3.0 for each appliance type; (2) the part-use factors in the TRM version 3.0 by appliance type; and (3) appliance characteristics from the PY7 tracking data, except for unit location. The unit location variable is important because it is a separate term in the regression specification for TRM version 3.0.

The unit location is based on the participating customer survey findings which are considered more accurate than the unit location data in the tracking data. The tracking data is not fully populated at present, primarily because participating retailers have not been supplying this data. The survey asked the decision maker where the unit would have been located if the program had not picked it up. The unit locations in the tracking data are based on what the truck driver observes at the time the unit is picked up (which may have been a temporary location in anticipation of the unit’s impending removal). Final verified gross savings also include the part-use factor since it is an element of the gross savings calculation

The evaluation team used the following procedure to compute verified gross savings for refrigerators and freezers. For each of the 300 sites represented by a completed survey, gross savings was calculated twice: first using the tracking data unit location, and second, using the survey data unit location. Savings under each calculation method were then summed for each appliance type, and a multiplier was developed based on the ratio of tracking+survey/tracking only savings. The resulting multipliers were 1.09

(refrigerators) and 1.02 (freezers). These multipliers were then applied to savings across all collected measures for the given appliance type which were based on tracking data only. The 100 percent verification factors, also based on participant survey results, were then applied.

The verified gross savings estimates for both energy (kWh) and peak demand (kW) rely on regression equations developed from the results of five metering studies conducted by evaluators for several Midwestern utilities, including one done by the ComEd evaluation team in PY4. This methodology corresponds to Option D (Calibrated Simulation) in PJM's Manual 18b, Energy Efficiency Measurement and Verification. This Option allows the use of a model, in this case the regression equations that have been calibrated using actual data (in this case, the *in situ* metered data).

Gross energy savings are initially expressed in terms of full-year Unit Energy Consumption (UECs). The regression-based approach that underlies UEC estimates models full-year energy savings as a function of several independent variables. These include appliance characteristics (e.g., age, size and unit location), and several dummy variables (e.g., unit type, configuration, whether the unit was manufactured before 1993 or not). A part-use adjustment is then applied.

Negative Unit Energy Consumption and Demand. The application of the regression-based savings algorithm resulted in a small number of refrigerator units with negative unit energy consumption and demand values. A total of 373 refrigerator units (1.1 percent) fell into this category. The negative UECs are exclusively single door refrigerators.

Despite this non-intuitive result, the overall regression is based on a best fit equation to empirical data for the entire population of units. Because of this, the evaluation team applied the regression based savings values to the full population of program units as the best approach for estimating total program savings. The regression equations in version 4.0 of the TRM (to be applied in PY8 forward) have been re-specified to address this issue.

Part-Use Adjustment. The full-year UEC value is adjusted for part-use based on the deemed part-use factors specified in the TRM, version 3.0. The TRM part-use adjustment is based on prior evaluations' results which, in turn, are based on responses to phone survey questions regarding the actual intended use of units in the program's absence. 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 values of these factors were calculated directly from verified evaluation results for ComEd and Ameren and are specified separately for refrigerators and freezers.

2.2.2.2 Approach Used for Room Air Conditioners

Gross savings are based on: (1) The engineering algorithm and associated full-load hours in the TRM version 3.0; and (2) AC unit characteristics from the PY7 tracking data, except for unit location. No part-use adjustment was needed.

2.2.2.3 Verification Factor

A verification factor is applied to the calculated gross saving for each appliance type. This value is based on responses to a series of phone survey questions regarding whether the respondent recalled having the

program pick up their units. All 300 respondents contacted indicated that the program did pick up their unit, resulting in a verification rate of 100 percent for PY7.

2.2.3 Verified Net Program Savings Analysis Approach

Verified net energy and demand (coincident peak and overall) savings were calculated by the evaluation team by multiplying the verified gross savings estimates by a net-to-gross ratio (NTGR). In PY7, the NTGR estimates used to calculate the net verified savings were based on past evaluation research and defined through a negotiation process through SAG as documented in a spreadsheet.⁹ These values are subsequently adjusted by a Program Induced Replacement factor, as specified in the 2014 Illinois TRM, version 3.0.

2.2.3.4 Free-Ridership

The values for PY7 approved by SAG were based on participant and retailer self-reported information from the telephone surveys on alternative disposal methods in the program's absence. Responses that correspond to a method that permanently removes the unit from the grid are considered free riders.

2.2.3.5 Program-Induced Replacement Factor (PIR)

The SAG-approved NTG values for PY7 included a Program-Induced Replacement (PIR) factor, as required by the 2014 TRM, version 3.0. This term accounts for the role played by the FFR Program and incentive in inducing a customer to replace their unit after the old unit was removed by the program and recycled. Per the TRM procedure, only replacements that result from the program incentive as a factor named by the respondent are to be reflected in the PIR adjustment. In calculating this factor, savings from participants who indicate that the program incentive caused them to replace their old unit are reduced by the estimated consumption of the replacement unit. The consumption of the replacement units was estimated using the ENERGY STAR Appliance Savings Calculator available on the ENERGY STAR website. The average characteristics of new units captured in the survey are used for inputs into the Appliance Savings Calculator.

2.2.3.6 Spillover

The FFR Program design and program theory do not support an expectation of significant spillover. However, spillover was investigated by the evaluation team, based on self-reported responses to a set of spillover questions in the participating customer survey. Any spillover reported that is associated with a high degree of program influence is quantified directly using engineering equations, and then incorporated into the NTGR calculation.

2.3 Sampling Plan

Participant survey. The evaluation team compiled a sample of FFR participants by random selection from the FFR Program tracking database provided by ComEd. Basic data cleaning steps were undertaken before the sample was pulled from the database to, among other things, remove records with missing or invalid phone numbers. A total of 710 participants who recycled more than one of the same type of

⁹ Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

appliance were dropped from the survey effort to minimize their confusion about which unit was the subject of the interview, and to keep the survey to a reasonable length. In addition, 43 participants were dropped because of missing phone numbers or the tracking database indicated they were a business. These records could not be included in the surveying efforts, but were included in the final impact results. The final participant population from which the survey sample was drawn was 38,154 participants.

The sample was then stratified by appliance type and quotas were set based on the proportion of each appliance in the general population. Each participant was first assigned to one of three main strata based on the nature of usage and type of unit recycled: Primary refrigerator, secondary refrigerator, and freezer. For refrigerators, these main categories were further stratified based on their association with retailers and non-retailers. Quotas were then set for each stratum. The freezer stratum was oversampled to ensure sufficient data would be available. No separate quota was set for room AC recyclers, since those units account for a very small percentage of the total population. Respondents who had recycled more than one appliance were only asked about one.

The survey staff was instructed to randomly select and dial participants until they had reached the designated quotas. There was no separate quota for room AC recyclers because AC participants would naturally end up in the refrigerator and freezer quotas. Table 2-6 shows the population sizes and number of completed surveys for each of the strata.

Table 2-6. PY7 Participant Survey Population and Sample Sizes by Stratum

Appliance Recycled	Retailer	Population Size* (N)	Sample Quotas	Completed Surveys (n)
Primary Refrigerator	Retailer	1,707	17	17
	Non-Retailer	4,710	20	20
Secondary Refrigerator	Retailer	8,410	83	83
	Non-Retailer	18,804	80	80
Freezer	N/A	4,523	100	100
Total		38,154	300	300

**Source: PY7 FFR Participant Survey Sample Frame from Program Tracking Database*

2.4 Sampling Error

Table 2-7 gives population sizes, completed interviews and the associated statistical confidence intervals for each appliance type. A 90 percent confidence interval was used in the analysis.

Table 2-7. PY7 Participant Survey Population, Sample Sizes and Sampling Error by Appliance Type

Strata	Population Size* (N)	Completed Surveys (n)	Sampling Error (90% CI)
Recycled Refrigerators	33,915	200	5.13%
Recycled Freezers	5,217	100	10.54%
Totals	39,132	300	4.87%

*Source: program tracking database

2.5 Survey Disposition

Participant Survey. Table 2-8 shows the final disposition for the 2,234 program participants the evaluation team attempted to contact for this evaluation. As the table shows, we completed interviews with 300 participants, or 13 percent of the sample. We were unable to reach 43 percent for a variety of reasons such as no one answering, an answering machine, or a busy signal. Another 11 percent requested to be called back later to complete the survey but did not end up doing so. There were problems with the phone number, such as a disconnected number, for 11 percent. Finally, 11 percent of participants who answered refused to participate in the survey.

The remaining reasons why surveys were not completed were a language barrier (1.7 percent), not enough time to complete (4 percent) or ComEd was not their electric utility (0.5 percent). For the last category, we speculate respondents were confused between their electricity supplier, which can be someone other than ComEd, and their delivery services company, which is always ComEd.

Table 2-8. Participant Survey Sample Disposition

Sample Disposition	Customers	%
Participants Attempted to Contact	2,234	100%
Completes	300	13%
Appliance not picked up	0	0%
Appliance removed, unsure of removal company	12	1%
Electric company not ComEd	12	1%
Incomplete	95	4%
Refusal	238	11%
Unable to Reach	964	43%
Language Barrier	39	2%
Phone Number Issue	247	11%
Non-Specific Callback/Appointment Scheduled	242	11%

Source: Evaluation Team analysis.

3 Gross Impact Evaluation

Program activity remained relatively high in PY7 although the volume of activity was down from PY6. A total of 40,946 units were verified as being recycled, and these achieved 34,011 MWh and 4.31 MW of verified gross savings. The PY7 verified gross MWh savings is 96 percent of PY6 verified gross MWh savings. Verified savings have decreased slightly from PY6 values primarily because the number of units recycled through the program is down 3 percent from PY6.

3.1 Tracking System Review

A detailed review of the tracking system data by the evaluation team surfaced some minor issues that should be addressed going forward. Approximately 9,000 units listed “Cust NA” for prior location, unit usage (primary or secondary) if the unit was replaced or not, and seasonal usage if applicable. According to program tracking data, almost all of the cases of missing data (97 percent) are units that were recycled by the program’s retailer partners. The unit’s prior location is currently required to estimate program savings based on the regression specification in the 2014 Illinois TRM, Version 3.0. Therefore, those fields need to be populated, if at all possible.

Key findings are:

1. The tracking data is high quality and is generally sufficient to estimate program savings accurately under the current TRM regression specifications.
2. Prior location, unit usage, unit season, and unit replaced are missing in approximately 9,000 records mostly due to the retail partners not collecting those data elements. This is an increase relative to PY6 when approximately 7,000 records were missing this information.

3.2 Program Volumetric Findings

According to program tracking data, the program had 38,239 participants, contributing a total of 40,946 units to the program. The evaluation survey resulted in a verification rate of 100 percent for each appliance type, based on responses to the phone survey. The volume of units processed through the program is down from PY6, when 42,313 units were verified as being recycled through the program.

The breakdown of units is 86 percent refrigerators, 13 percent freezers, and 1 percent air conditioners. This breakdown is almost identical to the proportions in PY4, PY5, and PY6.

Key findings include:

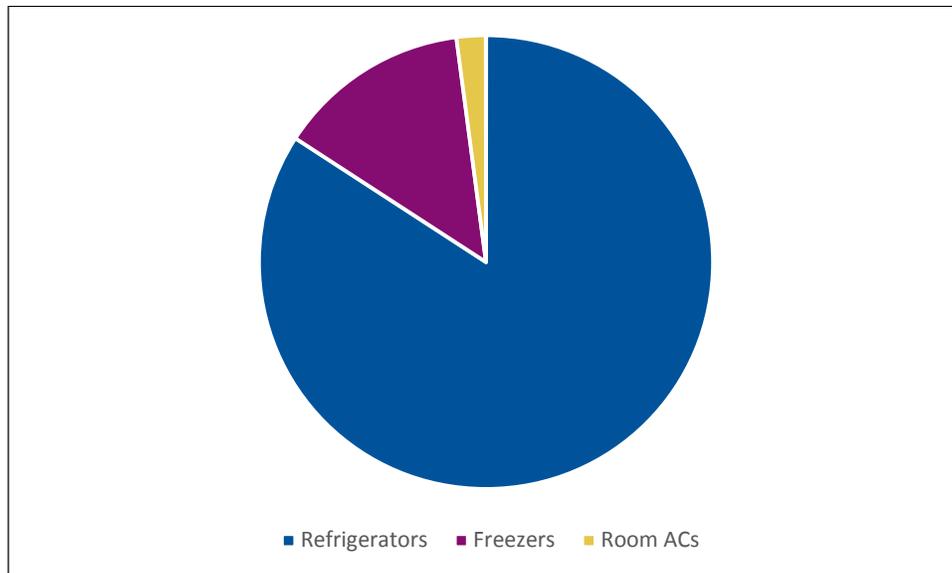
1. Program activity is down 3 percent% from PY6, although it is still higher than the program goal of 40,000 units.
2. The proportions of units by unit type are similar to those in PY4, PY5 and PY6.

Table 3-1. PY7 Volumetric Findings Detail

	Program-Reported Number of Units	Verification Factor	Verified Participation Units	% of Total Units
Number of Participants	38,239	100%	38,239	100%
Units by Measure Type				
Refrigerators	35,205	100.00%	35,205	86%
Freezers	5,299	100.00%	5,299	13%
Room ACs	442	100.00%	442	1%
Total Measures	40,946	100.00%	40,946	100%

Source: ComEd tracking data and Navigant team analysis.

Figure 3-1. Number of Measures Installed by Type



Source: Evaluation Analysis

3.3 Gross Program Impact Parameter Estimates

As described in Section 2, energy and demand savings for refrigerators and freezers are estimated using a detailed set of regression equations specified in the TRM. In addition, the TRM procedure includes a separate formula for developing engineering-based estimates of room A/C savings.

The EM&V team conducted research to validate the parameters that were not specified in the TRM. The results are shown in the following table.

Table 3-2. Verified Gross Savings Parameters

Input Parameters	Data Source	Deemed or Evaluated?
Unit Energy Consumption	Illinois 2012 TRM v 3.0 †	Deemed
Unit Energy Demand	Illinois 2012 TRM v 3.0	Deemed
Net-to-gross ratio	SAG Spreadsheet ‡	Deemed - Base NTGR Evaluated - PIR factor
Part-Use Factor	PY5 Participant Surveys	Deemed
Verification Factor	Illinois 2012 TRM v 3.0	Deemed

† State of Illinois Technical Reference Manual version 3.0 from <http://www.ilsag.info/technical-reference-manual.html>.

‡ Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

3.4 Verified Gross Program Impact Results

The resulting total program verified gross savings is 34,011 MWh and 4.31 MW as shown in Table 3-3. The table presents savings at the measure group level including the room AC measure, where the estimate is not statistically significant at the 90/10 level. Verified gross savings excluding the part-use factor, are approximately 8 percent higher than ex-ante gross savings. Both sets of values were computed using the regression specified in the TRM, without applying the part-use factor. However, verified gross savings uses the proportion of appliances located in conditioned space from the customer telephone surveys, whereas reported savings are based on documentation of space conditioning in the program tracking data. Final verified gross savings include the part-use factor since it is an element of the gross savings calculation. Gross Realization Rates based on savings adjusted for the Part-Use factor are shown in Table 3-3 below.

Table 3-3. PY7 Verified Gross Impact Savings Estimates by Measure Type

	Gross Energy Savings (MWh)	Gross Peak Demand Savings (MW)
Refrigerators		
Verification Factor	100%	100%
Gross Realization Rate based on savings excluding Part-Use Factor	1.09	1.09
Gross Realization Rate based on savings including Part-Use Factor	1.00	1.00
Part Use Factor	0.92	0.92
Verified Gross Savings	30,030	3.71
Freezers		
Verification Factor	100%	100%
Gross Realization Rate based on savings excluding Part-Use Factor	1.02	1.02
Gross Realization Rate based on savings including Part-Use Factor	0.85	0.85
Part Use Factor	0.83	0.83
Verified Gross Savings	3,876	0.45
Room ACs		
Verification Factor	100%	100%
Gross Realization Rate	1.00	1.00
Part Use Factor	1.00	1.00
Verified Gross Savings	105	0.15
Total		
Ex-Ante PY7 Gross Savings	34,656	4.38
Verified Gross Realization Rate	0.98	0.98
Gross Realization Rate based on savings excluding Part-Use Factor	1.08	1.08
Gross Realization Rate based on savings including Part-Use Factor	0.98	0.98
Verified Gross Savings	34,011	4.31

Source: Evaluation analysis

4 Net Impact Evaluation

The SAG consensus process determined¹⁰ that the NTG values for each of the measures recycled through this program should be deemed prospectively and used to calculate verified net savings. The TRM, Version 3.0 procedure for Refrigerator and Freezer Recycling that was adopted subsequent to this determination requires that the NTG value also include a term for Program Induced Replacements (PIR). These are replacements of refrigerators or freezers that are directly attributable to the incentive provided by the program.

Thus, the NTG ratio is calculated from three elements: the free ridership and spillover values and the PIR. The PIR was calculated from findings from the PY5 participating customer surveys; the procedure for determining it is described in Section 2.

The table below shows the deemed NTG values adjusted by the Program Induced Replacement factor, and the resulting PY7 verified net savings. Note that there are separate SAG-approved NTG values for refrigerators and freezers, delineated by whether the unit is assigned a Retailer NTGR or a Non-Retailer NTGR. The NTG ratios in the table below, which have been used to determine Verified Net savings, are a weighted average of the Retailer and Non-Retailer NTG ratio values for each appliance type. These NTG ratios are 0.56 for refrigerators (based on a weighted average of Retailer NTGR of 0.17 and Non-Retailer NTGR of 0.79), 0.52 for freezers (based on a weighted average of Retailer NTGR of 0.21 and Non-Retailer NTGR of 0.59) and 0.50 for room ACs for a total NTG ratio of 0.56.

¹⁰ Source: ComEd_NTG_History_and_PY7_Recommendation_2014-02-28_Final_EMV_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Table 4-1. PY7 Verified Net Impact Savings Estimates by Measure Type

	Sample Size	Energy Savings (MWh)	Significant at 90/10?	Coincident Peak Demand Savings (MW)	Significant at 90/10?
Refrigerators					
Verification Factor	200	100%	Yes	100%	Yes
Gross Realization Rate including part use factor		1.002		1.004	
Verified Gross Savings		30,030	Yes	3.71	Yes
Part Use Factor		0.92	N/A	0.92	N/A
Free Ridership + PIR factor		0.44		0.44	
Spillover		0.00		0.00	
NTG	84	0.56	Yes	0.56	Yes
Verified Net Savings		16,817	Yes	2.08	Yes
Freezers					
Verification Factor	100	100%	Yes	100%	Yes
Gross Realization Rate including part use factor		0.85		0.85	
Verified Gross Savings		3,876	Yes	0.45	Yes
Part Use Factor		0.83	N/A	0.83	N/A
Free Ridership + PIR factor		0.47		0.47	
Spillover		0.00		0.00	
NTG ¹¹	73	0.52	Yes	0.52	Yes
Verified Net Savings		2,016	Yes	0.24	Yes
Room ACs					
Verification Factor	2	100%	No	100%	No
Gross Realization Rate		1.01		1.00	
Verified Gross Savings		105	No	0.15	No
Part Use Factor		1.00	N/A	1.00	N/A
Free Ridership		0.50		0.50	
Spillover		0.00		0.00	
NTG		0.50		0.50	
Verified Net Savings		52	No	0.07	No
Total					
Ex-Ante Gross Savings		34,656		4.38	
Verification Factor		100%	Yes	100%	Yes
Gross Realization Rate including part use factor		0.98		0.98	
Verified Gross Savings		34,011	Yes	4.31	Yes
Part Use Factor		0.91		0.91	
Free Ridership + PIR factor		0.44		0.44	
Spillover		0.00		0.00	
NTG		0.56	Yes	0.56	Yes
Verified Net Savings		18,885	Yes	2.38	Yes

Source: Evaluation Team analysis.

¹¹ Sample size is from PY5 participant surveys that formed the basis of deemed NTGR values for PY7.

5 Findings and Recommendations

Overall, the FFR Program performed strongly. The program continues to recycle a high volume of units and provides a reliable source of savings for ComEd. Verified gross and net savings are driven by a regression specification based on the pooled results of five metering studies completed for Midwestern utilities, including the study the evaluation team completed in PY4 for ComEd.

This section summarizes the key impact and process findings and recommendations.

Program Savings Goals Attainment

Finding 1. The PY7 program achieved verified gross energy savings is 34,011 MWh, while evaluation-verified net savings were 18,885 MWh. Gross peak demand savings were 4.31 MW and net savings were 2.38 MW.

Gross Realization Rates

Finding 2. The program gross realization rate is the difference between ex-ante gross savings (kWh) and verified gross savings. Data from the participant surveys justified a shift in the proportion of units in conditioned spaces relative to the proportions derived from program tracking data. This had an upward effect on gross realization rate, which was offset by the addition of deemed part-use factors by technology in verified savings calculations. The combination of these factors produced a verified gross realization rate of 0.98 (total program). The final component of the realization rate was the verification rate, which is based on responses to a phone survey question regarding whether the respondent recalled having the program pick up their units. All participants surveyed said that the program did pick up their units, resulting in a verification rate of 100 percent.

Net-to-Gross Ratio

Finding 3. The evaluation research findings NTG ratios were 0.39 for refrigerators (based on a weighted average of a customer NTGR of 0.62 and a retailer NTGR of 0.12, and net of a PIR factor of 0.029), 0.56 for freezers (based on a weighted average of a customer NTGR of 0.63 and a retailer NTGR of 0.11, and net of a PIR factor of 0.013) and 0.50 for room ACs (based on participating customers only) for a total program NTG ratio of 0.41. It also includes a term for Program Induced Replacements, per the TRM. Because a larger proportion of refrigerator participants said they would have their dealer remove the old unit (approximately 40 percent) than freezer participants (approximately 10 percent), the Retailer NTGR plays a correspondingly larger role driving the final refrigerator NTGR.

Recommendation 1. Free ridership can be reduced by reorienting the program towards those customers who have true secondary units and eliminating participation by those who are replacing existing primary units. However, this comes at a cost, since the pool of available participants is reduced significantly by doing so. ComEd should weigh the pros and cons of this strategy versus alternatives as it is making changes to the program design during PY8.

Energy and Demand Savings Estimates

Finding 4. Based on the specified regression in the TRM, a small number of refrigerator units appear in the detailed results as if they have negative energy and demand consumption.

They comprise a very small fraction of the population. Despite this non-intuitive result for some units, the overall regression is based on a best fit equation to empirical data for the entire population of units. Because of this, the evaluation team applied the regression based savings values to the full population of program units as the best approach for estimating total program savings. Note that the regression equations in version 4.0 of the TRM (to be applied in PY8 forward) have been re-specified to address this issue.

Finding 5. The PY7 verified gross energy savings is 34,011 MWh, while evaluation-verified net savings is 18,885 MWh. These numbers are down from the PY6 verified savings values of 35,478 gross MWh and 25,331 net MWh. For refrigerators, gross energy savings per unit is 853 kWh. For freezers, gross energy savings per unit is 732 kWh, reflecting further reductions from PY6 values based on the mix and characteristics of units collected in PY7.

Finding 6. In the program tracking data, approximately 9,000 records were missing the prior location of the units and if the unit is a primary or secondary unit and most of the missing records (97 percent) were from participating retailers. This is important data that is used in the Illinois Statewide TRM version 3.0 regression model and will be applied in the evaluations going forward. For this evaluation, survey findings on unit location were used in place of the missing records in the regression process.

Recommendation 2. We recommend that the participating retailers be required to capture the prior location of the units and if the unit is a primary or secondary unit. This is a first step towards improving the accuracy of tracking data related to the unit's prior location.

Program Participation

Finding 7. Program participation, based on the number of participants, remains strong but is down about 5 percent from PY6, although it is still higher than the program goal of 40,000 units. While participation levels met ComEd's participation goals for PY7, the decline in such levels does not bode well for future years when program goals are increasing.

Recommendation 3. To meet increased goals planned for PY8 and PY9, ComEd will need to offer a combination of increased incentives and expanded marketing efforts. This presumes a year-round program operation.¹²

¹² Note that the PY8 program was suspended mid-year after the program implementer ceased operation due to financial difficulties.

6 Appendix

6.1 Evaluation Research Impact Approaches and Findings

This section presents PY7 program savings using the part-use factors and net-to-gross ratios derived from the PY7 surveys of program participants and retailers. The savings estimates are based on the same regression-based coefficients used to develop the evaluation-verified estimate of savings. We also present trends in unit characteristics over time and summarize any significant changes in program trends.

6.1.1 Evaluation Research Gross Impact Findings

Unit Energy Consumption (UECs) and Demand. The research report gross impact savings estimates are based on the same Illinois 2014 TRM v 3.0 regression based coefficients that were used to develop the evaluation-verified gross impact savings estimates. Refer to Section 3.1 for more details.

Negative Unit Energy Consumption and Demand. The application of the regression based savings algorithm results in a small number of refrigerator units with negative unit energy consumption and demand values. A total of 373 (1.1 percent) refrigerator units fall into this category. The negative UECs are exclusively single door refrigerators. The regression equations in version 4.0 of the TRM (to be applied in PY8 forward) have been re-specified to address this issue.

Despite the non-intuitive result, the overall regression is based on a best fit equation to empirical data for the entire population of units. Because of this, the evaluation team applied the regression based savings values to the full population of program units as the best approach for estimating total program savings.

Part-use factors. The research findings part-use factors are based on the PY7 participant survey findings. These 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.

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 factor 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, the participant reported the unit would have been plugged in and running had the program not picked it up. For PY7, this average was determined to be 95 percent or 0.95. As Table 6-1 indicates, the UEC adjusted for the part-use factor yields an average refrigerator consumption of 870 kWh per year.

Freezers. For freezers, the average part-use factor is based on a similar question for all participants who disposed of a freezer. For PY7, this average was determined to be 74 percent or 0.74. The supplemental data collected in the survey provide no further insight into the part-year usage, nor do the tracking data. Adjusted for part-use, the average freezer consumes 679 kWh per year.

PY7 versus PY6 Part-Use Factors. The PY7 part-use factor for refrigerators is up significantly from the PY6 level which was 0.79 for refrigerators. Conversely, the PY7 part-use factor for freezers was 0.74, which is down from the PY6 level of 0.79. The net effect of these changes is a significant increase in overall savings per unit driven by refrigerators compared to PY6 values.

Table 6-1. Research Findings Gross Savings (UECs) Adjusted for Part-Use

Appliance Type	Gross Savings (UECs)	Part-Use Factor	UEC Adjusted for Part-Use
Refrigerators	853	95%	814
Freezers	732	74%	544

Source: Evaluation analysis

Verification rate. The verification rate is based on responses to a phone survey question regarding whether the respondent recalled having the program pick up their units. If the respondent indicated that the program did not pick up any units, then they were thanked for their time and the survey was ended without gathering additional information. In PY7, all survey respondents were able to verify their units were picked up by the program, resulting in a verification rate of 100 percent for all three measure types.

6.1.2 Gross Impact Results

The research findings verified gross energy savings for PY7 are 34,717 MWh, while the coincident peak demand savings are 4.40 MW. The tables below present the details behind these estimates.

Table 6-2. PY7 Research Findings Gross Impact Parameter and Energy Savings Estimates (MWh)

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	35,205	5,299	442	40,946
Research Findings Annual kWh Savings Impacts				
Research Findings annual Gross kWh savings per unit (full-load operating hours)	853	732	236	831
Part-Use Factor	0.95	0.74	1.00	0.93
Verification Factor	100%	100%	100%	100%
Research Findings annual Gross kWh savings per unit adjusted for part-use	814	544	36	773
Research Findings Program Gross MWh	31,139	3,473	105	34,717

Source: Evaluation analysis

Table 6-3. PY7 Research Findings Gross Impact Parameter and Demand Savings Estimates (MW)

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	35,205	5,299	442	40,946
Verification Factor	100%	100%	100%	100%
Verified Participation Units	35,205	5,299	442	40,946
Annual Gross kW savings per unit (full-load operating hours)	0.11	0.08	0.33	0.11
Research Findings Program Gross MW	3.84	0.41	0.15	4.40

Source: Evaluation analysis

6.1.3 Evaluation Research Net Impact Findings

The primary objective of the research findings net savings analysis for the FFR Program was 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.

The PY7 NTG assessment of retailer-sourced units continues with the expanded scope initially implemented in PY5, which had a goal of assessing program influence in all cases where an existing unit has been replaced. Such an inquiry included both the three participating retailers in the program, and two of the largest nonparticipating retailers associated with unit replacements. Responses from the existing participant survey were used to guide the analytical approach for the retailer associated units, as well as the non-replaced units picked up by JACO at customers' homes. The "no program" question battery included probing surrounding the participating customer's disposal options associated with the retailer they purchased the new unit from, and their rationale for recycling the unit via ComEd's program rather than choosing to have the retailer remove it. This helps to ensure consistency and a fuller understanding of the responses given to the critical survey question used to determine free ridership for the program.

Data sources included the following:

- *Telephone surveys with participating customers.* As in previous years, we relied heavily on findings from telephone surveys of participating customers to determine how their units would have been disposed of if the program hadn't picked them up.
- *In-depth interviews with participating retailers.* These findings were used to determine the disposition of used appliances absent the program for those who purchase a new unit via these channels and who indicated they would have had the retailer remove the unit if the ComEd program had not been available.
- *Telephone surveys with nonparticipating retailers associated with unit replacements.* The evaluation team also obtained contact information, and conducted interviews with the two largest nonparticipating retailers associated with unit replacements. These interviews shed light on the disposition of used appliances absent the program **for those participants that indicate absent ComEd's program, they would have given the unit away to the retailer** they bought their new

unit from. In such cases, the NTG ratio is based on that retailer's own disposal practices absent the program, which is revealed during these phone surveys.

The retailer interviews and participating customer phone surveys provide all inputs needed for the calculation of the program's net-to-gross ratio. The *participating customer survey* provided the self-reported percentage of units that: (1) would have been kept and used; (2) would have been kept by a household but not used; and (3) would have been discarded by a household through a method in which the refrigerator would have been destroyed. The retailer interviews provide the percentage of units that are discarded and destroyed by each retailer absent the program. Units that would have been kept but not used, and those that would have been discarded and destroyed absent ComEd's program, are considered free riders. The program's NTG ratio is then calculated from these results.

The program NTGR is a weighted average resulting from calculations for two categories of participants:

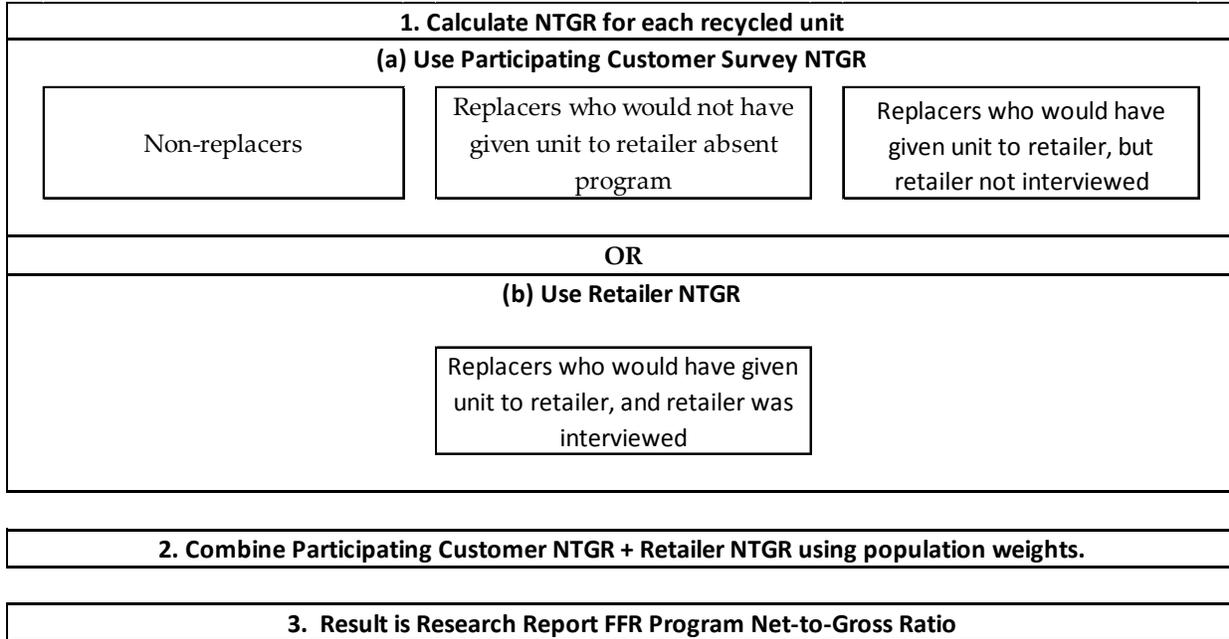
1. Participating customer survey responses are used directly in the calculation of the NTGR for three categories of participants:
 - Those who did not replace their unit.
 - Those who replaced it but indicated they would have used a disposal method not involving the retailer they bought the new unit from.
 - Those who replaced it, would have used a disposal method involving the retailer, but where an interview with the retailer was not completed.

This includes participants who indicated they would have otherwise sent the unit to a recycling facility, taken the unit to a landfill, or used another method that would have permanently removed the unit from the grid.

2. For the remaining customers, the NTGR was determined based on the disposal practices of each retailer interviewed. Those remaining are ones who would have used a method involving the retailer they bought the replacement unit from, would have used a disposal method involving the retailer, and where an interview with the retailer was completed. Interviews were completed with five major retailers that sold replacement units to participating customers. NTGRs were then calculated for each retailer firm.

Figure 6-1 below provides a graphical representation of this framework.

Figure 6-1. Research Report NTG Framework



Spillover. Information regarding participant spillover was also collected, but ultimately did not support a finding of any spillover. For this program, because the program approach does not support a theory for how meaningful spillover might occur, a finding of no spillover was not surprising. From the survey, there were six respondents who cited the program as being ‘very influential’ for their taking additional energy efficiency actions. However, five of these six respondents did so by participating in another ComEd residential program (for which the savings was presumably claimed). Programs cited included Home Energy Assessment, Home Energy Rebates, and Smart Lighting Discounts. There were additional respondents who also undertook further actions to reduce their energy use, however, they indicated the FFR Program was either only moderately or not at all influential in their decision making.

Participating Customer findings. Of those survey respondents that replaced their units 34 percent, 94 of 274, indicated they would have had their unit removed by the dealer (i.e., retailer). The remaining 66 percent, 180 of 274, would have used various other methods such as donating it to a charity, hauling it to the dump and recycling center, hiring someone to haul it away, and keeping it stored unplugged.

Of those participating customers who said they would not have had the dealer remove the unit, 45 out of 107 refrigerator respondents (42 percent) and 32 of 75 freezer respondents (43 percent) revealed they would have used a method to dispose of their unit that would have permanently destroyed it or would have kept the unit but not used it, indicating they are free riders. Resulting NTGRs are 0.58 for refrigerators, and 0.57 for freezers. These values were applied to both non-replaced units, and those who would have used a method not involving the retailer they bought the replacement unit from in calculating the research findings program NTGR.

Additional questions in the participating customer surveys probed deeper into any disposal options other than ComEd’s program that they may have considered. These were intended to assess the realism of the “no program” responses given and provide further insight into the responses given to the critical survey question used to determine free ridership for the program. Key findings from this battery are:

- Among the options available to *refrigerator* respondents (n = 200),
 - Fully 48 percent (n = 95) thought of giving the unit away to a charity or a private party
 - Also 39 percent (n = 78) considered having the garbage collector remove the unit
 - Approximately one third of respondents (30 percent, n = 59) considered having the unit hauled to a dump, landfill, or recycling center
 - Only 12 percent (n = 23) considered selling to a private party or appliance dealer
 - Just under 7 percent (n = 13) considered using Craigslist to dispose of their unit
 - Those considering disposing of the unit themselves (n = 58) were asked about their ability to physically move and transport the unit. Less than one third (29 percent, n = 17) said they could do this themselves, while over two thirds (71 percent, n = 41) said they would need assistance.
 - Just 2 percent of participants (n = 4) attempted to trade in or sell the unit to a dealer. Half (n = 2) could not get the price they wanted, while another one-fourth (n = 1) said the unit’s condition was not good enough for the dealer. Among those who wanted to sell the unit, prices sought were \$50 and \$250.
- Among the options available to *freezer* respondents (n = 100),
 - A majority of respondents (61 percent, n = 61) considered giving the unit away
 - A quarter of respondents (25 percent, n = 25) considered selling to a private party or appliance dealer
 - Almost half (41 percent, n = 41) considered having the unit hauled to a dump, landfill, or recycling center
 - Also 13 percent (n = 13) considered using Craigslist to dispose of their unit
 - Those considering disposing of the unit themselves (n = 45) were asked about their ability to physically move and transport the unit. Less than half (40 percent, n = 18) said they could do this themselves, while over half (60 percent, n = 27) said they would need assistance.
 - There were 7 percent of respondents (n=7) who attempted to trade in or sell the unit to a dealer. Of those, 43 percent (n=3) could not get the price they wanted. Prices sought were \$25, \$75, and \$100. The remaining 57 percent (n=4) did not have their sales inquiry calls returned or had their sales inquiry denied due to the condition of the unit.

Retailer findings. A total of four retailers that provided replacement units to participating customers were interviewed to learn of their appliance disposal practices in the absence of ComEd’s program. Retailers were asked a series of questions regarding the following:

- Pickup and disposal services for replaced units
 - Charges, if any for such services
 - Percentage of customers that receive such services
- Recycling and/or deconstruction of units picked up by the retailer
 - Approach for units outside of ComEd’s program – percentage of units affected
 - Approach prior to the start-up of ComEd’s program – percentage of units affected
- Other disposition of units

- o Percentage that are picked up by a hauler/third party and resold (i.e., remain grid connected)

Each retailer provided specific answers to each of these topic areas. In general, a high percentage of units turned over to retailers are being disposed of via a method that permanently removes them from the grid. Only a small percentage, the newest units in the best condition, are resold.

From this information, we were able to construct a retailer-specific NTG ratio, representing one minus the percentage of units that would otherwise have been recycled or deconstructed in the absence of ComEd’s program. As indicated in the table below, the rate of recycling varies significantly by retailer. The three program retailers and three non-program retailers interviewed represent 31 percent of the new units purchased by program participants.

Table 6-4. PY7 Net-to-Gross Ratios for Participating and Nonparticipating Retailers

Retailer	NTGR ratio	Percentage of Program Units Given to Retailer Absent the Program (Survey based)
Retailer # 1 – local firm	0.02	16%
Retailer #2 – national chain	0.15	0.4%
Retailer #3 – national chain	0.25	12%
Retailer #4 – national chain	-	1%
Retailer #5 – national chain	0.25	1%
Retailer #6 – regional chain	0.10	1%
Total Retailer Units	0.12	31%

Source: Retailer interviews

Weighted Average NTGR. A weighted average of the two net-to-gross ratios are then calculated separately for refrigerators and freezers using the proportions of participants who fall into each of the two categories of participating customer survey NTGR and retailer survey NTGR. The proportion of participants in the retailer category is combined for both refrigerators and freezers since the retailer interviews did not distinguish between unit types.

The formula for this calculation is: $(NTGR_{nr} * \%nr) + (NTGR_r * \%r)$

Where:

NTGR_{nr} = non retailer-based net-to-gross ratio

%_t = percentage of participants who receive non retailer-based net-to-gross ratio¹³

NTGR_r = retailer-based net-to-gross ratio

%_r = percentage of participants who receive retailer-based net-to-gross ratio

¹³ Participating customer survey responses are used directly in the calculation of the NTGR for three categories of participants: (1) those who did not replace their unit; (2) those who replaced it but indicated they would have used a disposal method not involving the retailer they bought the new unit from; and (3) those who replaced it, would have used a disposal method involving the retailer, but where an interview with the retailer was not completed. This third

The resulting NTGR is then applied to the average unit energy consumption per unit recycled by the respective retailers or by JACO and also weighted by the number of units recycled by each retailer or JACO. The result produces a weighted NTGR for refrigerators and freezers that takes into account both non-retailer and retailer based NTGRs. Table 6-5 presents the non-retail and retailer based recycling channels and the resulting weighted NTGR by appliance type.

Table 6-5. PY7 Research Findings Net-to-Gross for Retailer and Non-Retailer Participants

Unit Type	NTGR Non-Retailer	NTGR Retailer ¹⁴	NTGR Weighted Average (before PIR)
Refrigerator	0.62	0.12	0.42
Freezer	0.63	0.11	0.57
Room ACs	0.50	N/A	0.50

Source: Evaluation Team analysis.

6.1.4 Used Appliance Dealer Interview Results

As in PY6, interviews were also conducted with several used appliance dealers as a cross-check on the program’s effect on the market for used appliances. The information obtained did not provide any evidence to counter the NTGR findings above. These interviews were with the same firms as in PY6¹⁵, since there have been no new entrants into the used appliance market during the past two years. Consequently, the interviews served to review answers provided previously, and to obtain any updated information. In general, the information provided was essentially the same as in PY6. General themes were that:

- **Only the nicest and newest units are resold.** These comprised a very small percentage, less than 5 percent, of the used appliance population. The remainder are deconstructed and/or used for parts.
- The majority of respondents were again reluctant to provide definitive estimates of the age range at which units still had resale market value, preferring to make statements like, “We only sell the newer ones ... the nice looking ones”, and referring to operating condition rather than a given age range.
- One used dealer, who actively works with two of the program’s three participating retailers, corroborated statements made in PY6, stating his company only removes units in “really good condition and fairly new (1-3 years old), people want really nice units. They are tight with their money now, and rather than buying a cheap older unit, they would rather try to patch their existing unit and make it work for a while longer before buying a newer one.” He estimated that

category includes participants who indicated they would have otherwise sent the unit to a recycling facility, taken the unit to a landfill, or used another method that would have permanently removed the unit from the grid.

¹⁴ The Retailer NTGR values for Refrigerators and Freezers are based on survey responses from the 3 retailers who currently participate in ComEd’s program, plus three additional retailers that sold replacement units to survey respondents. Because of low program influence, ComEd has adjusted the participating retailer component of its program in PY8 to exclude the largest local retailer.

¹⁵ The sample size was relatively small (n=5) and the businesses dealt with a mix of both working and nonworking units. The small sample size reflected only those larger firms with websites that were the real target of the interview - used dealers.

his firm removed only 5 percent of the newly replaced units for eventual resale, and the remaining 95 percent were deconstructed for the metals. Of the 5 percent, only 2 percent are resold and the balance are deconstructed and used for spare parts.

Program-induced replacements. The final NTG ratio also includes a term for Program-Induced Replacements (PIR). This term accounts for the role played by the FFR Program and specifically, the incentive in inducing a customer to replace their unit after the old unit was removed by the program and recycled. Pursuant to the TRM procedure, such inducement is to be based on the influence of the program incentive only. Savings from participants who indicate that the incentive provided by the program caused them to replace their old unit are reduced by the estimated consumption of the replacement unit. In calculating the PIR, a savings of 100 kWh per year per appliance was assumed for the consumption of the new replacement units. This is in line with the values estimated using the ENERGY STAR Appliance Savings Calculator available on the ENERGY STAR website. Incorporating the PIR factors into the NTG ratio causes the value to decline by the magnitude of the adjustment, similar to the effect of free ridership.

Table 6-6 and Table 6-7 below illustrate the PIR calculation used for refrigerators and freezers, respectively. For those who replaced a refrigerator, 15 percent cited the FFR Program as having induced the replacement, and of those, just over half (or 7.5 percent of respondents) said the incentive was the primary factor in their replacement decision. Similarly, for freezer replacers, 17 percent said the program caused them to replace their unit and of those, one-third (or 6 percent of respondents) cited the incentive as the causal factor. The resulting PIR factors associated with incentives only are -3 percent for refrigerators and -1 percent for freezers.

Table 6-6. PY7 Program-Induced Replacement Calculation – Refrigerators

Replaced Recycled Unit?	Percent of Respondents	Program Induced Replacement?	Percent of Respondents	Motivated by Incentive	Percent of Respondents	Percent of Total Population	Induced kWh/Unit	Number of Units	Total Induced kWh
Yes	85%	Yes	13%	Yes	45%	5%	501	1,760	881,877
		No	87%	No	55%	6%	0	2,112	0
No	15%					15%	0	5,281	0
Totals								35,205	881,877
Weighted Average Program Induced Replacement Factor (all units)							25.0		-2.9%

Source: Evaluation analysis

Table 6-7. PY7 Program-Induced Replacement Calculation – Freezers

Replaced Recycled Unit?	Percent of Respondents	Program Induced Replacement?	Percent of Respondents	Motivated by Incentive	Percent of Respondents	Percent of Total Population	Induced kWh/Unit	Number of Units	Total Induced kWh
Yes	43%	Yes	21%	Yes	22%	2%	468	106	49,603
				No	78%	7%	0	371	0
		No	79%			34%	0	1,802	0
No	57%				57%	0	3,020	0	
Totals								5,299	49,603
Weighted Average Program Induced Replacement Factor (all units)							9.4		-1.3%

Source: Evaluation analysis

After accounting for PIR, the final NTGRs are shown below in Table 6-8.

Table 6-8. PY7 Research Findings Final Program Net-to-Gross Ratios

Unit Type	NTGR Non-Retailer	NTGR Retailer	NTGR Weighted Average (before PIR)	PIR Factor	NTGR Weighted Average (after PIR)
Refrigerator	0.62	0.12	0.42	(0.029)	0.39
Freezer	0.63	0.11	0.57	(0.013)	0.56
Room ACs	0.50	N/A	0.50	N/A	0.50

Source: Evaluation analysis

6.1.5 Net Program Impact Results

The research findings indicate that the PY7 net program savings is 14,103 MWh, which is 41 percent of the gross MWh research findings. The continuation of the retailer-based NTGR in PY7 reduces the net savings attributable to the program since many of the major appliance retailers also recycle used units according to the retailer surveys. The research findings net MWh savings are 75 percent of the evaluation-verified net MWh savings.

Table 6-9. PY7 Research Findings Net Impact Parameter and Savings Estimates (MWh and MW)

Research Findings Annual Net MWh Savings Impacts	Refrigerators	Freezers	Room AC	Total Program
Research Findings Program Gross MWh	31,139	3,473	105	34,717
Free Ridership %	58%	43%	50%	
Program Induced Replacement %	2.94%	1.28%	N/A	
Net-to-Gross Ratio (1-Free Rider % + Program Induced %)	0.39	0.56	0.50	0.41
Total Seventh-Year Research Findings Net MWh Savings	12,119	1,932	52	14,103
Research Findings Program Gross MW	3.84	0.41	0.15	0.40
Net-to-Gross Ratio (1-Free Rider %)	0.39	0.56	0.50	0.41
Total Seventh-Year Research Findings Net MW Savings	1.50	0.23	0.07	1.80

Source: Evaluation analysis

6.1.6 Unit Characteristics

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

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

Table 6-10 and Table 6-11 below provide the age and size characteristics of the units collected in PY7 through ComEd's program.

The ages of refrigerators, freezers and room AC units in PY7 are significantly younger than in PY6 and previous years. The average age of both refrigerators and freezers in PY7 is 1.8 years younger than in PY6. This reflects the effectiveness of the program in removing older units from the market over time. Despite this, the stock of appliances going through the program is still quite old. For example, well over half of refrigerators (58 percent) are between 16 and 30 years old. Freezers tend to be older than refrigerators with over half (58 percent) of the units between 21 and 35 years old. The room air conditioner units that were recycled in the program in PY7 are also younger than room air conditioner units recycled in PY6. There were significantly more units between 0 and 15 years old in PY7, which caused the average age of an AC unit in PY7 to be 21.4 years old compared to 24.4 in PY6.

Table 6-10. Age Characteristics of Recycled Appliances

Appliance Type	Age in Years									Average
	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	2%	10%	24%	19%	28%	11%	3%	1%	2%	19.1
Freezers	1%	6%	13%	11%	32%	17%	9%	4%	6%	23.6
Room Air Conditioners	5%	3%	17%	23%	24%	13%	12%	3%	2%	21.4

Source: Evaluation analysis

The average size of refrigerators in the program is 19.7 cubic feet and 15.7 cubic feet for freezers. The size of units has not changed significantly since PY5.

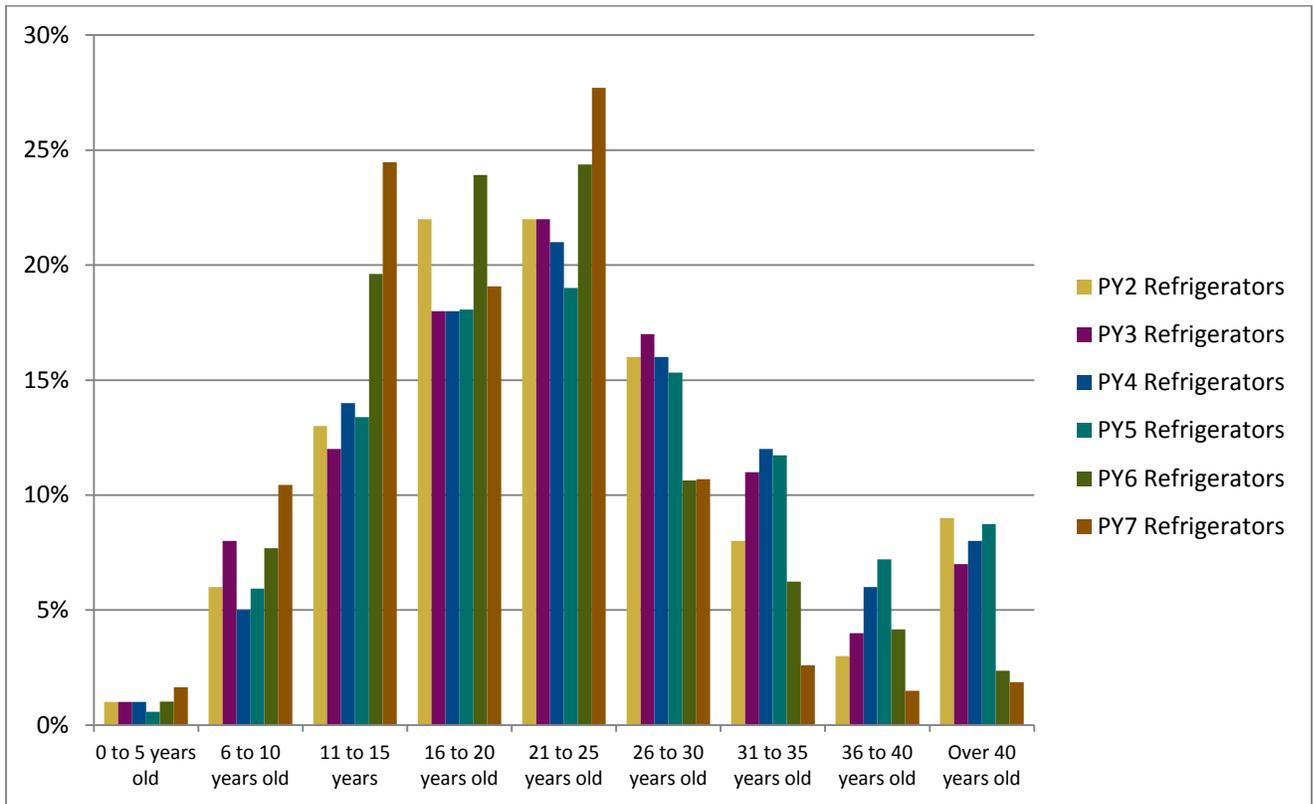
Table 6-11. Size Characteristics of Recycled Appliances

Appliance Type	10 cubic feet and smaller	11 to 15 cubic feet	16 to 20 cubic feet	21 cubic feet and larger	Average
Refrigerators	2%	11%	45%	43%	19.7
Freezers	12%	37%	43%	8%	15.7

Source: Evaluation analysis

Looking at trends in unit age over time, the PY7 unit data continues and extends the general trend toward newer refrigerators in the program. This year’s data and the general trend across program years appropriately reflect the decline in the stock of older appliances over time due to the program.

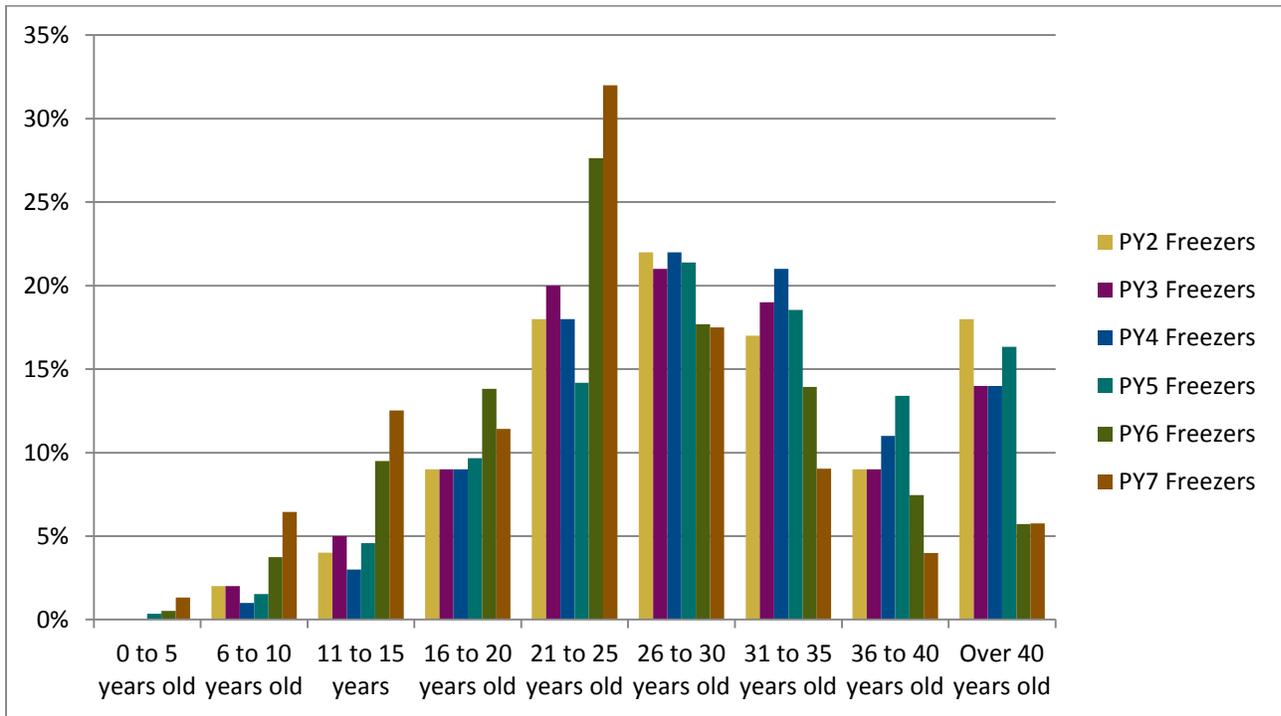
Figure 6-2: Age of Refrigerators



Source: Evaluation analysis

Similarly, the freezer data reflects a jump in the pickup of newer aged appliances, particularly in the 6 to 15 and 21 to 25 age categories.

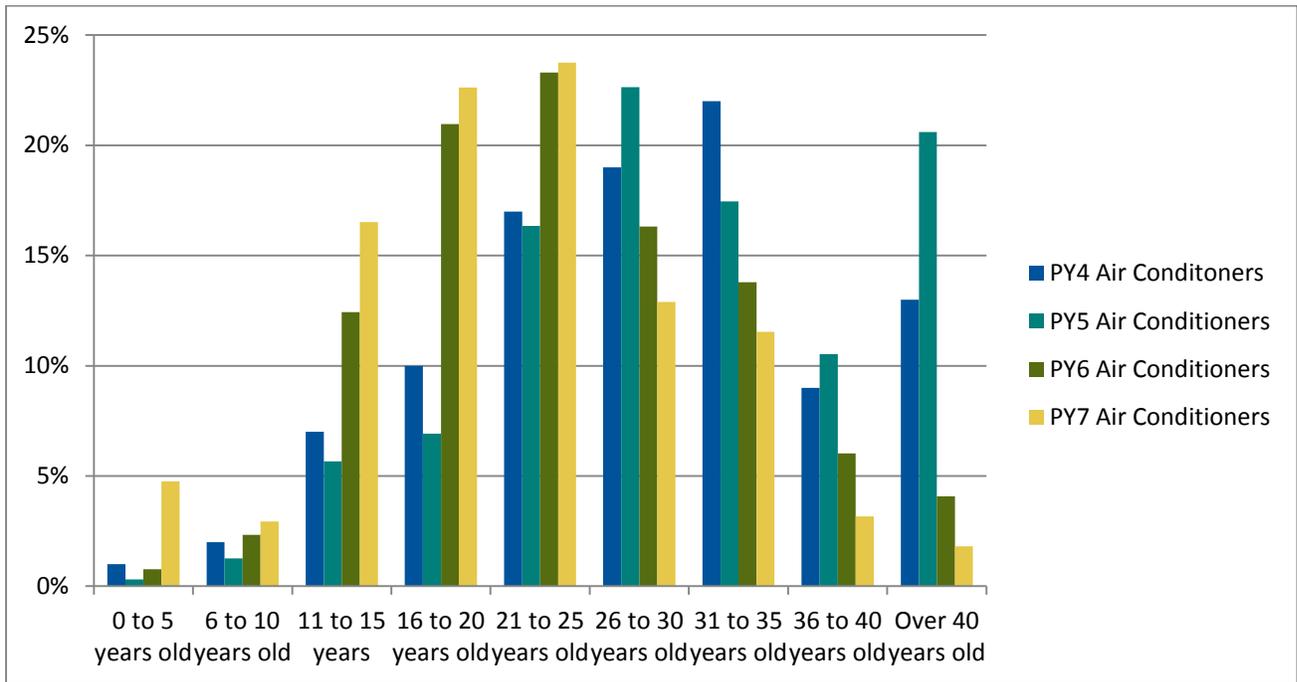
Figure 6-3: Age of Freezers



Source: Evaluation analysis

Room AC units show a similar trend toward newer units in PY7, based on the increase in units for all ages 0 to 25 years and the drop in units for all ages 26 years and older. This trend is shown in Figure 6-4.

Figure 6-4: Age of Room Air Conditioners



Source: Evaluation analysis

6.1.7 Number of Appliances Recycled by Channel

As in past program years, all room AC units and the significant majority of freezer and refrigerator units were picked up by ComEd’s subcontractor, JACO. Table 6-12 shows number of units by type picked up by JACO and by participating program retailers.

Table 6-12. Number of Appliances Recycled by Channel

Channel	Room AC	Freezer	Refrigerator	Total	Percent
JACO pick up	442	4,862	25,025	30,329	74%
Retailer Channel:	-	437	10,180	10,617	26%
Local retailer	-	278	6,346	6,624	16%
National chain stores	-	159	3,834	3,993	10%
Total	442	5,299	35,205	40,946	100%

Source: Program tracking database

The process of collecting appliances from participants signing up through the retail channel has not changed significantly in recent years. At the time the new unit is delivered, the retailer’s delivery teams pick up the old appliance and bring it back to their warehouse where such units are sorted and held in an area separate from non-participating units until they are picked up by JACO.

6.1.8 Reasons for Disposing of the Appliance

Reasons for disposing of the old unit vary depending on whether it is a refrigerator or freezer. Over half of participants recycling their primary refrigerator (54 percent) wanted to upgrade to a newer appliance with more modern features, while 32 percent were concerned about the expense of running their previous unit. Participants recycling a secondary refrigerator cite the same reasons (41 percent and 26 percent, respectively) and also note infrequent use of the appliance as a motivator (18 percent).¹⁶ Participants are more likely to recycle a freezer because they use it infrequently (41 percent) and are also concerned with the expense of running the freezer (29 percent).

Table 6-13. Reasons for Disposing of Appliance

Reasons for Disposing Unit	Percent Rating Reason As Important (score of 7 and higher)		
	Primary Refrigerators (n=37)	Secondary Refrigerators (n=163)	Freezers (n=100)
Expense of running unit	32%	26%	29%
Wanted newer appliance or more modern features	54%	41%	18%
Infrequent use of appliance	8%	18%	41%
Wanted a larger unit	5%	4%	2%

Source: Participant Survey

6.1.9 Participation in Additional ComEd Programs

For a small share of participants, involvement in the FFR Program has led to participation in other ComEd energy efficiency programs. Just 5 percent of respondents indicated that they have participated in other ComEd energy efficiency or pricing programs following their participation in the FFR Program, somewhat lower than the 7 percent who reported having done so in PY6. The most frequently mentioned programs were the Smart Lighting Discounts program and the Central AC Cycling program.

¹⁶ Although many customers have one stand-alone freezer, it is considered a secondary unit because they also have access to the freezer in their primary refrigerator.

6.2 PJM Data and Findings

The table below provides the MW savings associated with the FFR Program, which was estimated in accordance with the requirements by PJM for savings bid in.

PY7 Research Findings Gross Impact Parameter and Demand Savings Estimates (MW)

Gross and Net Impact Parameter and Savings Estimates	Refrigerators	Freezers	Room AC	Total Program
Total units recycled through the Program	35,205	5,299	442	40,946
Verification Factor	100%	100%	100%	100%
Verified Participation Units	35,205	5,299	442	40,946
Annual Gross kW savings per unit (full-load operating hours)	0.11	0.08	0.33	0.11
Research Findings Program Gross MW	3.84	0.41	0.15	4.40

Source: Evaluation analysis



6.3 Participant Survey

PY7 COMED RESIDENTIAL APPLIANCE RECYCLING PARTICIPANT SURVEY Final 8/3/2015

INTRODUCTION AND SCREENER

Hello, this is [SURVEYOR NAME] from Opinion Dynamics Corporation calling on behalf of Commonwealth Edison company. This is not a sales call. May I please speak with [CUSTOMER_NAME]? 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.

Are you the person who was most involved and familiar with the removal?

IF NO, NOT RIGHT PERSON: May I please speak to the person who would know the most about the removal? REPEAT INTRODUCTION AND CONTINUE

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

IF YES, 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.

CP1. Are you currently talking to me on a regular landline phone or a cell phone?

1. (Regular landline phone)
2. (Cell phone)
8. (Don't Know)
9. (Refused)

<SKIP IF CP1=1>

CP2. Are you currently in a place where you can talk safely and answer my questions?

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

SCREENING QUESTIONS

U1. Is ComEd your electric delivery company or do you receive electricity from someone else?

1. ComEd [SKIP TO S1]
2. Someone Else
8. (Don't know)
9. (Refused)

U2 Is your electricity supplier a municipal electric utility or a retail electricity supplier such as Bluestar, Direct Energy or another such supplier?

- 1 Municipal electric utility [TERMINATE]
- 2 Retail energy supplier
- 98 (Don't know)
- 99 (Refused)

S1. Our records show that you had [ONE REFRIGERATOR if REF_FL=1, ONE FREEZER if FRZ_FL=1, AND AN AIR CONDITIONER if AC_FL=1] picked up by ComEd's subcontractor JACO. Is this correct?

- 1 Yes, correct
- 2 No
- 98 (Don't know) [TERMINATE]
- 99 (Refused) [TERMINATE]

[ASK IF S1 = 2, 98 or 99 else skip to S2a.]

S1a. Was your <READ_QS1> picked up recently?

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

[ASK IF S1a = 1]

S1b. Who picked up your unit?

- 1. (Retailer I bought the new unit from)
- 2. (Someone else, specify)
- 8. (Don't Know)
- 9. (Refused)

[ASK IF S1a = 2]

S1c. Why wasn't it picked up?

- [OPEN END]
- 8. (Don't Know)
 - 9. (Refused)

[ASK IF S1a = 2]

S1d. Do you still have your old refrigerator or freezer?

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

[ASK IF S1d = 1]

S1d1. Is it plugged in and working in your home?

- 1. Yes

- 2. No
- 8. (Don't Know)
- 9. (Refused)

[ASK IF S1D1 = 2]

S1d2 Where is it now?

[OPEN END]

- 8. (Don't Know)
- 9. (Refused)

[READ IF ALL_RECYCLED_NUM=1]

S2a I'm going to ask you some specific questions about the [REFRIGERATOR if REF_FL=1, FREEZER if FRZ_FL=1, AIR CONDITIONER if AC_FL=1] that was picked up.

[READ IF ALL_RECYCLED_NUM>1]

S2b , I'm going to ask you some specific questions about each of the appliances that were picked up by ComEd.

[Read Section A if REF_FL=1 and if REFRIGERATOR_QUOTA not met]

SECTION A: REFRIGERATOR CHARACTERISTICS

A0. According to our records, you had a refrigerator removed that was made by [REF_MAKE]. Is this correct?

- 1. Yes
- 2. No, it was [RECORD MANUFACTURER VERBATIM]
- 8. (Don't know) [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE SKIP TO C0]
- 9. (Refused) [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE SKIP TO C0]

A1 At the time this refrigerator was picked up, were you using it as your main refrigerator, or had it been a secondary or spare? (Interviewer: a main refrigerator is typically in the kitchen, a secondary or spare is usually kept someplace else and might or might not be running. If the person recently bought a new main refrigerator and was just waiting for the old one to be picked up, it should be classified as "main.")

- 1 Main
- 2 Secondary or Spare
- 98 (Don't know)
- 99 (Refused)

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

[ASK IF A1=2 ELSE SKIP TO A5]

A2 How long had you been using this refrigerator as a secondary or spare? [If respondent is confused, reinforce that "how long had it been a spare when you decided to get rid of it."]

[NUMERIC OPEN END RECORD IN YEARS]

- 0 (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

98 (Don't know)

99 (Refused)

[ASK A4 and A4A IF A3=02 OR 03]

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 OR HALF MONTH)

[RECORD IN MONTHS]

0 (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

98. (Don't know)

99. (Refused)

A5 Where *would* the refrigerator have been located if it had not been removed by ComEd? (IF NEEDED: If the fridge was your primary unit, we're interested in whether you would have left it in the kitchen or moved it to another room)

1 (Kitchen)

2 (Garage)

3 (Porch/Patio)

4 (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 (Yes - Heated part of the year)

98 (Don't know)

99 (Refused)

[SKIP IF QA5=98,99]

A5C Was the space air-conditioned or not?

- 1 Yes
- 2 No
- 3 (Yes - Air conditioned part of the year)
- 98 (Don't know)
- 99 (Refused)

A6 How old was the refrigerator when ComEd removed it?

[NUMERIC OPEN END RECORD IN YEARS]

- 0 (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)

PROGRAM INDUCED REPLACEMENTS

[IF A7=2,8,9, SKIP TO A9]

PI1 Were you planning to replace your refrigerator before you decided to recycle your existing unit through ComEd's program?

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

[IF PI1 = 8,9 SKIP TO A7a]

PI1a. [IF PI1=1] Just to confirm: you are saying that you WOULD have replaced your old refrigerator with or without ComEd's program, is that correct?

- 1. Correct, I would have replaced it either way.
- 2. Incorrect, I would not have replaced it without ComEd's program.
- 8. (Don't Know)
- 9. (Refused)

[IF PI1a = 1,8,9 SKIP TO A7a]

PI1b. [IF PI1=2] Just to confirm: you are saying that you would NOT have bought a new refrigerator independent of ComEd's program, is that correct?

1. Correct, I would not have replaced it without ComEd's program.
2. Incorrect, I would have replaced it either way.
8. (Don't Know)
9. (Refused)

[IF PI1b = 2,8,9 SKIP TO A7a]

PI1c. What was it about ComEd's program that encouraged you to buy the replacement unit? Was it [READ; ACCEPT MULTIPLES]:

- 1 The program incentive
- 2 The convenience of the home pick-up of the old unit, or
- 3 Something else [RECORD VERBATIM]
4. (Nothing in ComEd's program encouraged me to buy a replacement unit)
8. (Don't Know)
9. (Refused)

REPLACEMENT UNIT CHARACTERISTICS

[ASK IF A7=1 ELSE SKIP TO A9]

A7a What is the name and location of the retailer that you purchased the replacement unit from?

- 00 RECORD VERBATIM
- 8 (Don't know)
- 9 (Refused)

A8aa. Did you install 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 A8B]
- 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 install the replacement refrigerator? RECORD TIME INTERVAL

- 1 (Same day)
- 2 (Within one to two weeks)
- 3 (Within one month)
- 4 (Within two to three months)
- 6 (Within four to six months)
- 7 (Within six to twelve months/ one year)
- 8 (More than one year later)
- 00 (Other (record verbatim))
- 98 (Don't know)
- 99 (Refused)

A8b Was the replacement refrigerator brand new or used?

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

A8c Does your replacement refrigerator have ... (READ)

- 1 A single door, with a freezer compartment inside
- 2 Two doors, side by side (IF NEEDED: with a freezer on one side and a fridge on the other)
- 3 A Top freezer (IF NEEDED: two doors, with a freezer on top and fridge on the bottom)
- 4 Or a Bottom freezer? (IF NEEDED: two doors, with a freezer on bottom and fridge on the top)
- 00 Other (SPECIFY:___)
- 98 (Don't know)
- 99 (Refused)

A8d Is the replacement refrigerator frost free or manual defrost?

- 1 Frost free
- 2 Manual defrost
- 00 Other (SPECIFY:___)
- 98 (Don't know)
- 99 (Refused)

A8e What size is this replacement refrigerator in cubic feet? (IF NEEDED: Your best estimate is fine. CLARIFY FRACTIONS TO GET TO NEAREST NUMBER.)

- 1 Less than 16 cu. ft.
- 2 16-19 cu. ft.
- 3 20-22 cu. ft.
- 4 23-25 cu. ft.
- 5 Greater than 25 cu. ft.
- 0 Other (Specify)
- 98 (Don't know)
- 99 (Refused)

[ASK A8e1 ONLY IF A8e IS 98 (DK) OR 99 (REF)]

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

- 1 Larger
- 2 Smaller
- 3 Same Size
- 98 (Don't know)
- 99 (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)

[ASK A8g IF A8b=2]

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
- 98 (Don't know)
- 99 (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
- 98 (Don't know)
- 99 (Refused)

[ASK IF A10a = 1]

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
- 98. (Don't know)
- 99. (Refused)

SECTION B: CONSIDERATION OF ALTERNATIVES SECTION

[ASK SECTION B IF A0=1,00]

B1 I am now going to read a list of alternative ways that you could have disposed of this refrigerator. For each, tell me if this is a method you had considered using or doing. Did you consider... [ROTATE 1-5; Multiple response]

1. Selling it
 2. Giving it away for free
 3. Having it removed by the dealer you got your new or replacement refrigerator from
 4. Taking it to a dump or landfill, or a recycling center
 5. Hiring your garbage collector or someone else to haul it away
 6. Keeping it
- 98 (DON'T KNOW)
99 (REFUSED)

[ASK IF B1=1]

B1a. You said you considered selling your refrigerator. Did you consider selling the refrigerator to an appliance dealer, or to a private party (like a friend, relative or by running an ad)?

1. Dealer
 2. Private party (friend, relative, or by running ad)
 3. Both
98. (Don't know)
99. (Refused)

[ASK IF B1=2]

B1b. You said you considered giving away your refrigerator. Did you consider giving it to a private party (like a friend, relative or by running an ad), or to a charitable organization? (IF NEEDED: examples of a charitable organization could be Goodwill Industries or a Church)

1. Private party (friend, relative or by running an ad)
 2. Charitable organization
 3. Both
98. (Don't know)
99. (Refused)

B1ab Have you ever heard of Craigslist.com? [IF NEEDED: Craigslist.com is a website that is used for buying, selling and giving away new and used items. It performs functions similar to classified ads in newspapers.]

- 1 Yes
 - 2 No
- 98 (Don't know)
99 (Refused)

[ASK IF B1ab=1]

B1ac Have you ever used Craigslist to buy, sell or give away used furniture or appliances?

- 1 Yes
 - 2 No
- 98 (Don't know)
99 (Refused)

[ASK IF B1ac=1]

- B1ac1 What did you use it for?
- 00 Other (RECORD VERBATIM)
 - 98 Don't know
 - 99 Refused

[ASK IF B1=1,2 AND B1ab=1]

B1ad If the ComEd program hadn't been available, would you have used Craigslist.com to sell or give away your refrigerator?

- 1 Yes – would have sold on Craigslist
- 2 Yes – would have given away on Craigslist
- 3 No
- 00 Other (RECORD VERBATIM)
- 98 (Don't know)
- 99 (Refused)

[ASK IF B1ad=1]

- B1ad1 How much would you have sold it for?
- 0 Numeric Open End (Record Dollars)
 - 9998 Don't know
 - 9999 Refused

[ASK IF B1=4]

B1c. You said you considered taking away the refrigerator. Did you consider taking it to a dump or landfill, or to a recycling center?

- 1. Dump/landfill
- 2. Recycling Center
- 3. Both
- 98. (Don't know)
- 99. (Refused)

[ASK IF A10a=2 or B1=6]

B1d. You said you considered keeping the refrigerator. Did you consider storing it unplugged, or using it as a spare?

- 1 Storing it unplugged
- 2 Using it as a spare
- 3 Both
- 98 (Don't know)
- 99 (Refused)

[DO NOT ASK IF B1ad=1 OR 2]

B7 Now suppose that ComEd appliance recycling program hadn't been available. Which one of these alternatives that we've just discussed would you have been most likely to do, if the ComEd appliance recycling program had not been available? [INDICATE ONE RESPONSE ONLY]

1. [ASK IF B1a=2,3] Selling it to a private party
2. [ASK IF B1a=1,3] Sell it to an appliance dealer
3. [ASK IF B1b=1,3] Give it away to a private party
4. [ASK IF B1b=2,3] Give it away to a charity organization, such as Goodwill Industries or a church
5. [ASK IF B1=3] Have it removed by the dealer you got your new or replacement refrigerator from
6. [ASK IF B1c=1,3] Haul it to the dump or landfill
7. [ASK IF B1c=2,3] Haul it to the recycling center
8. [ASK IF B1=5] Hired your garbage collector or someone else to haul it away
9. [ASK IF B1d=1,3] Keep it and store it unplugged
10. [ASK IF B1d=2,3] Keep it and use it as a spare
00. (Some other way (SPECIFY: _____))
98. (Don't know)
99. (Refused)

Plans for keeping and using refrigerator as a spare
[ASK B4B THRU B4E IF B1d=2,3, else skip to B8]

B4B You mentioned [if B7=10, read “you would have kept this refrigerator and used it as a spare”] [if B1d=2,3 & B7<10, read “you considered keeping this refrigerator and using it as a spare”] if the ComEd appliance recycling program weren’t available. For how many years would you have used this refrigerator as a spare? IF NEEDED: Your best estimate is fine.

[NUMERIC OPEN END]

- 77 (Until it broke, indefinitely)
- 0 (Less than 1 year)
- 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.

- 1 (Kitchen)
- 2 (Garage)
- 3 (Porch)
- 4 (Basement)
- 00 Other (SPECIFY:___)
- 98 Don't know
- 99 Refused

[SKIP IF A5=B4C=2 OR A5=B4C=3 OR A5=B4C=4]

B4D. Would this have been a heated space?

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

[SKIP IF A5=B4C=2 OR A5=B4C=3 OR A5=B4C=4]

B4E Would this have been an air-conditioned space?

- 1 Yes
- 2 No
- 3 (Yes - Part of the year)
- 98. (Don't know)
- 99. (Refused)

[ASK IF B1a=1-3]

B8. You mentioned that you considered selling your refrigerator to [IF B1a=1, read in "an appliance dealer"] [IF B1a=2, read in, "a private party"] [If B1a=3, read in "an appliance dealer or private party"]. Did you actually attempt to sell your refrigerator in this way before participating in the program?

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

[ASK IF B8=1 & B1a=3]

B8a. Did you attempt to trade in or sell the refrigerator to an appliance dealer, or to a private party? (IF NEEDED: Private party could be a friend, family member, neighbor or someone you find through running an ad)

- 1. To a dealer
- 2. To a private party
- 3. Both
- 98. (Don't know)
- 99. (Refused)

[ASK IF B8=1]

B8b. Why did you not follow through with this transaction?

- 1. (Couldn't find an interested dealer/non-dealer at the price I wanted)
- 2. (Couldn't find an interested dealer/non-dealer because of the unit's condition)
- 3. (Decided recycling unit was more important than selling it)
- 4. (Other (SPECIFY :___))
- 98. (Don't know)
- 99. (Refused)

[ASK IF [(B8=1 & B1a=2) OR B8a=2,3] (AND skip if B1ad1>=0 & AND B1ad1<9998)]

B8c. If you had sold this refrigerator to a private party (e.g. not a dealer), how much money do you think you would have received for it?

- 1. Dollars _____(\$1 to 2,000)
- 98. (Don't know)
- 99. (Refused)

[ASK IF (B8=1 & B1a=1) OR B8a=1,3]

B8d. If an appliance dealer were to take it away, how much, if anything, do you think you would have to pay for this service?

1. Nothing /free service
2. Dollars _____(\$1 to 2,000)
98. (Don't know)
99. (Refused)

[ASK IF B1=4]

B2g. One factor in disposing of a refrigerator is being able to physically move and transport it. Do you have the ability to do this yourself, or would you need assistance such as renting or borrowing a truck or having someone other than your immediate family help you?

1. Yes, could do it myself
2. No
98. (Don't know)
99. (Refused)

[ASK B2, B3, B5, B6 of all refrigerator participants]

B2 What was the condition of the refrigerator when you signed up for the ComEd program? 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 problems
- 4 (It didn't work)
- 98 (Don't know)
- 99 (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
- 98 Don't know
- 99 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. [ASK IF A1=2] The refrigerator was a spare that I did not use very much
- c. [ASK IF A7=1] The refrigerator was old and I wanted something with more modern features
- d. [ASK IF A7=1 & A8E1=1,98,99] I wanted a bigger refrigerator

B6 Were there any other reasons you chose to get rid of the refrigerator?

[OPEN END; accept up to two]

96 (No)

98. (Don't know)

99. (Refused)

FREEZER SECTION

[READ IF FRZ_FL=1]

QUOTA CHECK:

IF REF_FL=0 THEN COUNT THIS AGAINST FREEZER QUOTA.

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

SECTION C: FREEZER CHARACTERISTICS

C0. According to our records, you had a freezer removed that was made by [FRZ_MAKE]. Is this correct?

1. Yes

2. No [RECORD MANUFACTURER VERBATIM]

8. (Don't know) [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE E0]

9. (Refused) [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE E0]

C1 How long had you been using this freezer? [If respondent is confused, reinforce that "how long had it been used when you decided to get rid of it."]

[NUMERIC OPEN END RECORD IN YEARS]

0 (Less than one year)

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

98 Don't know

99 Refused

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

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 OR HALF MONTH)

[RECORD IN MONTHS]

0 (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
- 8. (Don't know)
- 9. (Refused)

C5 Where would the freezer have been located if it had not been removed by ComEd? **Explain:** we want to understand where the unit was located when you were using it before it was picked up.

- 1 (Kitchen)
- 2 (Garage)
- 3 (Porch/Patio)
- 4 (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 (Yes - Heated part of the year)
- 98 Don't know
- 99 Refused

[SKIP IF C5=98 or 99]

C5C Was the space air-conditioned or not?

- 1 Yes
- 2 No
- 3 (Yes - Air conditioned part of the year)
- 98 Don't know
- 99 Refused

C6 How old was the freezer when ComEd removed it?

[NUMERIC OPEN END RECORD IN YEARS]

- 1 (Less than one year)
- 98 Don't know
- 99 Refused

C7 Did you replace the freezer that ComEd picked up with another one? (NOTE: We are only interested in stand-alone freezers, not freezers that are part of your refrigerator)

- 1 Yes
- 2 No
- 8 (Don't know)

9 (Refused)

PROGRAM INDUCED REPLACEMENTS

[IF C7=2,8,9, SKIP TO C9]

PI2 [ASK IF C7=1] Were you planning to replace your freezer before you decided to recycle your existing unit through ComEd's program?

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

[IF PI2 = 8,9 SKIP TO C7a]

PI2a. [IF PI2=1] Just to confirm: you are saying that you WOULD have replaced your old freezer with or without ComEd's program, is that correct?

- 1. Correct, I would have replaced it either way.
- 2. Incorrect, I would not have replaced it without ComEd's program.
- 8. Don't Know
- 9. Refused

[IF PI2a = 1,8,9 SKIP TO C7a]

PI2b. [IF PI2=2] Just to confirm: you are saying that you would NOT have bought a new freezer independent of ComEd's program, is that correct?

- 1. Correct, I would not have replaced it without ComEd's program.
- 2. Incorrect, I would have replaced it either way.
- 8. Don't Know
- 9. Refused

[IF PI2b = 2,8,9 SKIP TO C7a]

PI2c. What was it about ComEd's program that encouraged you to to buy the replacement unit? Was it [READ; ACCEPT MULTIPLES]:

- 1. The program incentive
- 2. The convenience of the home pick-up of the old unit, or
- 3. Something else [RECORD VERBATIM]
- 4. (Nothing in ComEd's program encouraged me to buy a replacement unit)
- 8. Don't Know
- 9. Refused

REPLACEMENT UNIT CHARACTERISTICS

[ASK IF C7=1 ELSE SKIP TO C9]

C7a What is the name and location of the retailer that you purchased the replacement unit from?

- 00 RECORD VERBATIM
- 98 Don't know
- 99 Refused

C8aa. Did you install 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 install the replacement freezer? RECORD TIME INTERVAL

- 1 (Same day)
- 2 (Within one to two weeks)
- 3 (Within one month)
- 4 (Within two to three months)
- 6 (Within four to six months)
- 7 (Within six to twelve months/ one year)
- 8 (More than one year later)
- 00 (Other: record verbatim))
- 98 (Don't know)
- 99 (Refused)

C8b Was the replacement freezer brand new or used?

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

C8c Was your replacement freezer ... (READ)

- 1 A chest freezer or
- 2 An upright freezer
- 00 (Other - Specify)
- 98 (Don't know)
- 99 (Refused)

C8d Is the replacement freezer frost free or manual defrost?

- 1 Frost free
- 2 Manual defrost
- 00 Other (SPECIFY:___)
- 98 Don't know
- 99 Refused

C8e What size is this replacement freezer in cubic feet? IF NEEDED: Your best estimate is fine. CLARIFY FRACTIONS TO GET TO NEAREST NUMBER.

- 1. Less than 10 cubic feet
- 2. 10 to 15 cubic feet
- 3. 16 to 20 cubic feet
- 4. More than 20 cubic feet
- 00. Other (SPECIFY:)
- 98 Don't know
- 99 Refused

[ASK C8e1 ONLY IF C8e IS 98 (DK) OR 99 (REF), ELSE C8f]

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

- 1 Larger
- 2 Smaller
- 3 Same Size
- 98 Don't know
- 99 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)

[ASK C8g ONLY IF C8b=2]

C8g How old is this replacement freezer?

[NUMERIC OPEN END RECORD IN YEARS]

- 0 (Less than one year)
- 98 Don't know
- 99 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
- 98 Don't know
- 99 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
- 98 Don't know
- 99 Refused

[ASK IF C10=1]

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

[ASK SECTION IF C0=1,00]

D1 I am now going to read a list of alternative ways that you could have disposed of this freezer. For each, tell me if this is a method you had considered using or doing. Did you consider... [ROTATE 1-5; Multiple response]

- 1. Selling it
- 2. Giving it away for free
- 3. Having it removed by the dealer you got your new or replacement freezer from
- 4. Taking it to a dump or landfill, or a recycling center
- 5. Hiring your garbage collector or someone else to haul it away
- 6. Keeping it
- 98 (DON'T KNOW)
- 99 (REFUSED)

[ASK IF D1=1]

D1a. You said you considered selling your freezer. Did you consider selling the freezer to an appliance dealer, or to a private party (like a friend, relative or by running an ad)?

- 1. Dealer
- 2. Private party (friend, relative, or by running ad)
- 3. Both
- 98. (Don't know)
- 99. (Refused)

[ASK IF D1=2]

D1b. You said you considered giving away your freezer. Did you consider giving it to a private party (like a friend, relative or by running an ad), or to a charitable organization? (IF NEEDED: examples of a charitable organization could be Goodwill Industries or a Church)

- 1. Private party (friend, relative or by running an ad)
- 2. Charitable organization

- 3. Both
- 98. (Don't know)
- 99. (Refused)

[ASK IF B1ab=SYSMIS]

D1ab.... Have you ever heard of Craigslist.com? [IF NEEDED: Craigslist.com is a website that is used for buying, selling and giving away new and used items. It performs functions similar to classified ads in newspapers.]

- 1 Yes
- 2 No
- 98 (Don't know)
- 99 (Refused)

[ASK IF D1ab=1]

D1ac Have you ever used Craigslist to buy, sell or give away used furniture or appliances?

- 1 Yes
- 2 No
- 98 (Don't know)
- 99 (Refused)

[ASK IF D1ac=1]

D1ac1 What did you use it for?

- 00 Other (RECORD VERBATIM)
- 98 Don't know
- 99 Refused

[ASK IF D1=1,2 and (B1ab=1 OR D1ab=1)]

D1ad If the ComEd program hadn't been available, would you have used Craigslist.com to sell or give away your freezer?

- 1 Yes – would have sold on Craigslist
- 2 Yes – would have given away on Craigslist
- 3 No
- 00 Other (RECORD VERBATIM)
- 98 (Don't know)
- 99 (Refused)

[ASK IF D1ad=1]

D1ad1 How much would you have sold it for?

- 0 Numeric Open End (RECORD DOLLARS)
- 9998 Don't know
- 9999 Refused

[ASK IF D1=4]

D1c. You said you considered taking away the freezer. Did you consider taking it to a dump or landfill, or to a recycling center?

1. Dump or landfill
2. Recycling Center
3. Both
98. (Don't know)
99. (Refused)

[ASK IF C10=2 or D1=6]

D1d. You said you considered keeping the freezer. Did you consider storing it unplugged, or using it as a spare?

- 1 Storing it unplugged
- 2 Using it as a spare
- 3 Both
- 98 (Don't know)
- 99 (Refused)

[DO NOT ASK IF D1ad=1 OR 2]

D7 Now suppose that ComEd appliance recycling program hadn't been available. Which one of these alternatives that we've just discussed would you have been most likely to do, if the ComEd appliance recycling program had not been available? [INDICATE ONE RESPONSE ONLY]

1. [ASK IF D1a=2,3] Sell it to a private party
2. [ASK IF D1a=1,3] Sell it to an appliance dealer
3. [ASK IF D1b=1,3] Give it away to a private party
4. [ASK IF D1b=2,3] Give it away to a charity organization, such as Goodwill Industries or a church
5. [ASK IF D1=3] Have it removed by the dealer you got your new or replacement freezer from
6. [ASK IF D1c=1,3] Haul it to the dump or landfill
7. [ASK IF D1c=2,3] Haul it to the recycling center
8. [ASK IF D1=5] Hire your garbage collector or someone else to haul it away
9. [ASK IF D1d=1,3] Keep it and store it unplugged
10. [ASK IF D1d=2,3] Keep it and use it as a spare
00. (Some other way (SPECIFY:_____))
98. (Don't know)
99. (Refused)

Plans for keeping and using freezer as a spare

[ASK D4B THRU D4E IF D1d=2,3, else skip to D8]

D4B You mentioned [if D7=10, read "you would have kept this freezer and used it as a spare"] [if D1d=2,3 & D7<10, read "you considered keeping this freezer and using it as a spare"] if the ComEd appliance recycling program weren't available. For how many years would you have used this freezer as a spare? IF NEEDED: Your best estimate is fine.

- [NUMERIC OPEN END]
- 77 (Until it broke, indefinitely)
 - 0 (Less than 1 year)

- 98 Don't know
- 99 Refused

D4C. Where would this freezer 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.

- 1 (Kitchen)
- 2 (Garage)
- 3 (Porch)
- 4 (Basement)
- 00 Other (SPECIFY:___)
- 98 Don't know
- 99 Refused

[SKIP IF C5=D4C=2 OR C5=D4C=3 OR C5=D4C=4]

D4D. Would this have been a heated space?

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

[SKIP IF C5=D4C=2 OR C5=D4C=3 OR C5=D4C=4]

D4E Would this have been an air-conditioned space?

- 1 Yes
- 2 No
- 3 (Part of the year)
- 98. (Don't know)
- 99. (Refused)

[ASK IF D1a=1-3]

D8. You mentioned that you considered selling your freezer to [IF D1a=1, read in "an appliance dealer"] [IF D1a=2, read in, "a private party"] [If D1a=3, read in "an appliance dealer or private party"]. Did you actually attempt to sell your freezer in this way before participating in the program?

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

[ASK IF D8=1 & D1a=3]

D8a. Did you attempt to trade in or sell the freezer to an appliance dealer, or to a private party? (IF NEEDED: Private party could be a friend, family member, neighbor or someone you find through running an ad)

- 1. To a dealer
- 2. To a private party
- 3. Both
- 98. (Don't know)

99. (Refused)

[ASK IF D8=1]

D8b. Why did you not follow through with this transaction?

1. (Couldn't find an interested dealer/non-dealer at the price I wanted)
2. (Couldn't find an interested dealer/non-dealer because of the unit's condition)
3. (Decided recycling unit was more important than selling it)
4. (Other (SPECIFY :___))

98. (Don't know)

99. (Refused)

[ASK IF [(D8=1 & D1a=2) OR D8a=2,3] AND SKIP IF (D1ad1>=0 & D1ad1<9998)]

D8c. If you had sold this freezer to a private party (e.g. not a dealer), how much money do you think you would have received for it?

1. Dollars _____(\$1 to 2,000)

98. (Don't know)

99. (Refused)

[ASK IF (D8=1 & D1a=1) OR D8a=1,3]

D8d. If an appliance dealer were to take it away, how much, if anything, do you think you would have to pay for this service?

1. Nothing /free service
2. Dollars _____(\$1 to 2,000)

98. (Don't know)

99. (Refused)

[ASK IF D1=4]

D2g. One factor in disposing of a freezer is being able to physically move and transport it. Do you have the ability to do this yourself, or would you need assistance such as renting or borrowing a truck or having someone other than your immediate family help you?

1. Yes, could do it myself
2. No

98. (Don't know)

99. (Refused)

[ASK D2, D3, D5, D6 of all freezer participants]

D2 What was the condition of the freezer when you signed up for the ComEd program? 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 problems
- 4 (It didn't work)
- 98 (Don't know)
- 99 (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
- 98 Don't know
- 99 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
- c. [ASK IF C7=1] The freezer was old and I wanted something with more modern features
- d. [ASK IF C7=1 AND C8E1=1,98,99] I wanted a bigger freezer

D6 Were there any other reasons you chose to get rid of the freezer?

[OPEN END; accept up to two]

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

AC Section

[READ IF AC_FL=1]

SECTION E: ROOM AIR CONDITIONER CHARACTERISTICS

E0. According to our records, you also had a room air conditioner removed by ComEd. Is this correct?

- 1. Yes
- 2. No [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE G1]
- 8. (Don't know) [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE G1]
- 9. (Refused) [TERMINATE IF ALL_RECYCLED_NUM=1, ELSE G1]

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

- 1. My own unit
- 2. Someone else's unit
- 3. Something else (RECORD VERBATIM)
- 98. (Don't know)
- 99. (Refused)

IF E00=1, THEN CONTINUE, ELSE E6

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
- 98 Don't know
- 99 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
- 98. (Don't know)
- 99. (Refused)

[ASK E3 IF E2=1 ELSE SKIP TO E6]

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
- 98. (Don't know)
- 99. (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?

- 1 Less than 70 degrees
- 2 70 to 75 degrees
- 3 76 to 80 degrees
- 4 81 to 85 degrees
- 5 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
- 98. (Don't know)
- 99. (Refused)

E5 In what room was the room AC unit 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]

- 0 (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 E10]

E8aa. Did you install 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 E8b]
- 8 (Don't know) [Skip to E8b]
- 9 (Refused) [Skip to E8b]

E8 How long <before/after> the old one was picked-up did you install the replacement AC? (RECORD TIME INTERVAL)

- 1 Same day
- 2 Within one to two weeks
- 3 Within one month
- 4 Within two to three months
- 6 Within four to six months
- 7 Within six to twelve months/ one year
- 8 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]

- 0 (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
- 98 Don't know
- 99 Refused

E8E Is it 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.]

2. No
8. (Don't know)
9. (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
- 98 Don't know
- 99 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
- 98 Don't know
- 99 Refused

[ASK E11b IF E11a = 1, ELSE F1]

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

[ASK IF E11a=1 ELSE SKIP TO F3A]

F1 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 AC. Please tell me which one you would have been most likely to use to get rid of this AC. Would you have... [ROTATE 1-4]

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

[ASK IF F1=1, ELSE F1b]

F1a. Would you have sold the AC to a used appliance dealer or to a private party, either someone you know or by running an ad?

- 1. Sold it to a used appliance dealer
- 2. Sold it to a private party
- 8. (Don't know)
- 9. (Refused)

[ASK IF F1=2]

F1b. Would you have given the AC to someone you know or to a charity organization?

- 1. Given AC to someone you know
- 2. Given to a charity organization
- 8. (Don't know)
- 9. (Refused)

[ASK IF F1=3, 4]

F1c. (IF QF1=3)Would you have taken the AC to a dump or to a recycling center?

(IF QF1=4) Would you have had the AC taken to a dump or to a recycling center?

- 1. Dump
- 2. Recycling Center
- 8. (Don't know)
- 9. (Refused)

[ASK IF B1ab=SYSMIS & D1ab=SYSMIS]

F1ab..... Have you ever heard of Craigslist.com? [IF NEEDED: Craigslist.com is a website that is used for buying, selling and giving away new and used items. It performs functions similar to classified ads in newspapers.]

- 1 Yes
- 2 No
- 98 (Don't know)
- 99 (Refused)

[ASK IF F1ab=1]

F1ac Have you ever used Craigslist to buy, sell or give away used furniture or appliances?

- 1 Yes
- 2 No
- 98 (Don't know)
- 99 (Refused)

[ASK IF F1ac=1]

F1ac1 What did you use it for?

- 00 Other (RECORD VERBATIM)
- 98 Don't know
- 99 Refused

[ASK IF F1=1,2 AND (B1ab=1 OR D1ab=1 OR F1ab=1)]

F1ad If the ComEd program hadn't been available, would you have used Craigslist.com to sell or give away your room air conditioner?

- 1 Yes – would have sold on Craigslist
- 2 Yes – would have given away on Craigslist
- 3 No
- 00 Other (RECORD VERBATIM)
- 98 (Don't know)
- 99 (Refused)

[ASK IF F1ad=1]

F1ad1 How much would you have sold it for?

- 00 Other (RECORD VERBATIM)
- 98 Don't know
- 99 Refused

[ASK F3A THRU F3C IF E11a=2OR F1=5, OTHERWISE, SKIP TO F2]

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)
- 98 Don't know
- 99 Refused

[ASK IF F3A=1 or 3, ELSE F2]

F3B For how many years would you have used this AC? IF NEEDED: Your best estimate is fine.

[NUMERIC OPEN END]

- 77 (Until it broke, indefinitely)
- 0 (Less than 1 year)
- 98 Don't know
- 99 Refused

[ASK IF F3A=1 or 3]

F3C. Where would this AC have been located if you hadn't gotten rid of it and had used it? IF NEEDED, CLARIFY: What room?.

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

[ASK F2, F4, F5 of all AC participants]

F2 What was the condition of the AC when you signed up for the ComEd program? 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 problems
- 4 (It wasn't working)
- 8 (Don't know)
- 9 (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? [ROTATE]

- a. The AC was expensive to run (0 to 10 Scale)
- b. The AC was a spare that I did not use very much (0 to 10 Scale)
- c. The AC was old and wasn't cooling the best any more (0 to 10 Scale)

d. [SKIP IF E8D=2.3] I wanted a bigger AC unit or system (0 to 10 Scale)

F5. Were there any other reasons you chose to get rid of the AC?

[OPEN END]

96. (No)

98. (Don't know)

99. (Refused)

Spillover and Market Impact

SP1. Have you participated in any other energy-efficiency programs offered by ComEd?

1. Yes

2. No **[SKIP TO TQH1]**

8. (Don't know) **[SKIP TO TQH1]**

9. (Refused) **[SKIP TO TQH1]**

SP2 Which programs did you participate in? [Possible list: Smart Lighting Discounts – CFLs, LEDs, Home Energy Assessment, Home Energy Rebates - New Central AC, Home Energy Rebates - Insulation and air sealing, Energy Efficiency Loan, Central AC Cycling, NEST thermostat rebate – limited time.]

[Multiple response, up to 8]

1. (Smart Lighting Discounts – CFLs, LEDs)

2. (Home Energy Assessment)

3. (Home Energy Rebates - New Central AC)

4. (Home Energy Rebates - Insulation and air sealing)

5. (Energy Efficiency Loan)

6. (Central AC Cycling)

7. (NEST thermostat rebate – limited time)

00. (Other : Specify)

98. (Don't know)

99. (Refused)

SP3. [ASK FOR EACH PROGRAM IN SP2] Did you participate in [INSERT PROGRAM FROM SP2] program after or before the Fridge Freezer Recycling Rewards Program?

1. After

2. Before **[SKIP SP5]**

8. (Don't know) **[SKIP SP4]**

9. (Refused) **[SKIP SP4]**

[SKIP IF ALL SP3=2, OTHERWISE ASK H4]

[ASK IF ANY SP3 = 1]

SP4. How influential was your experience participating in the recycling program on your decision to participate in another ComEd energy-efficiency program?

Very influential

1. Somewhat influential

2. Not very influential

3. Not at all influential

- 98. (Don't know)
- 99. (Refused)

SP5. **[ASK IF H1=1]** Based on your experience in recycling your appliance, how likely are you to participate in another utility energy efficiency program? Would you say you are... [READ LIST]

- 1. Much more likely
- 2. Somewhat more likely
- 3. (Neutral)
- 4. Not very likely
- 5. Not at all likely
- 8. (DON'T KNOW)
- 9. (REFUSED)

SP6. In addition to recycling your old <SURVERAPP>, have you made other energy-efficiency improvements or purchases on your own without any assistance from a utility or other energy organization since participating in the appliance recycling program?

- 1. Yes
- 2. No **[SKIP TO H1]**
- 8. (Don't know) **[SKIP TO H1]**
- 9. (Refused) **[SKIP TO H1]**

SP7. What actions did you take? [Do not prompt, allow multiple responses]

- 1. (Installed a high-efficiency dishwasher)
- 2. (Installed a high-efficiency washer)
- 3. (Installed a high-efficiency dryer)
- 4. (Installed a high-efficiency refrigerator)
- 5. (Installed a high-efficiency water heater)
- 6. (Installed CFLs or LEDs) **[Compact Fluorescent Light bulbs or Light Emitting Diode bulbs]**
- 7. (Other, Specify)
- 8. (DON'T KNOW)
- 9. (REFUSED)

SP8. How influential was your participation in the Fridge Freezer Recycling Rewards program on your decision to take this energy-efficiency action?

- 1. Very influential
- 2. Somewhat influential
- 3. Not very influential
- 4. Not at all influential
- 8. (DON'T KNOW)
- 9. (REFUSED)

TQH1. I have just a few questions left for background purposes only.

H1. Do you own or rent your home?

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

H1a Do you own rental property that is leased to others?

- 1 (Yes, lease to others)
- 2 (No, don't lease to others)
- 3 (Other, RECORD VERBATIM)
- 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?

1. Pay bill
2. 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...

1. Less than 500 square feet
2. 500 to less than 1000 square feet
3. 1000 to less than 1500 square feet
4. 1500 to less than 2000 square feet
5. 2000 to less than 2500 square feet
6. 2500 to less than 3000 square feet
7. 3000 to less than 4000 square feet
8. 4000 to less than 5000 square feet
9. 5000 square feet or more
98. (Don't Know)
99. (Refused)

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

[RECORD YEARS/MONTHS GIVEN]

98. (Don't Know)

99. (Refused)

H6a. Was your total family income in 2010 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?

1. Less than high school

2. High school graduate or equivalent (e.g., GED)

3. Attended some college (includes junior/community college)

4. Bachelor's degree

5. Advanced degree

00. (Other, Specify)

98. (Don't know)

99. (Refused)

END. That completes today's survey. On behalf of ComEd, thank you very much for your time today.