



ComEd Fridge and Freezer Recycling Impact Evaluation Report

Energy Efficiency / Demand Response Plan:
Program Year 2018 (CY2018)
(01/01/2018-12/31/2018)

Presented to
ComEd

DRAFT

March 04, 2019

Prepared by:

Lauren Robinson
Itron

Jennifer Fagan
Itron



www.navigant.com

Submitted to:

ComEd
Three Lincoln Centre
Oakbrook Terrace, IL 60181

Submitted by:

Navigant Consulting, Inc.
150 N. Riverside Plaza, Suite 2100
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

Nishant Mehta, Managing Consultant
608.497.2345
Nishant.Mehta@Navigant.com

Disclaimer: This report was prepared by Navigant Consulting, Inc. ("Navigant") for ComEd based upon information provided by ComEd and from other sources. Use of this report by any other party for whatever purpose should not, and does not, absolve such party from using due diligence in verifying the report's contents. Neither Navigant nor any of its subsidiaries or affiliates assumes any liability or duty of care to such parties, and hereby disclaims any such liability.

TABLE OF CONTENTS

1. Introduction	1
2. Program Description	1
3. Cumulative Persisting Annual Savings	2
4. Program Savings Detail	4
5. Program Savings by Measure	5
6. Impact Analysis Findings and Recommendations	7
6.1 Impact Parameter Estimates	7
6.2 Other Impact Findings and Recommendations	7
6.2.1 Program Savings Target Attainment	7
6.2.2 Gross Realization Rates	7
6.2.3 Program Participation	8
7. Appendix 1. Impact Analysis Methodology	8
7.1 Verified Gross Program Savings Analysis Approach	8
7.1.1 Refrigerators	8
7.1.2 Freezers	9
7.1.3 Room Air Conditioners	10
7.2 Verified Net Program Savings Analysis Approach	11
7.3 Survey Questions Used to Determine Part-Use Factor	11
8. Appendix 2. Impact Analysis Detail	11
9. Appendix 3. Total Resource Cost Detail	12

LIST OF TABLES AND FIGURES

Figure 2-1. Number of Measures Recycled by Type	2
Figure 3-1. Cumulative Persisting Annual Savings	4
Table 2-1. CY2018 Volumetric Findings Detail	1
Table 3-1. Cumulative Persisting Annual Savings (CPAS) – Electric	3
Table 4-1. CY2018 Total Annual Incremental Electric Savings	5
Table 5-1. CY2018 Energy Savings by Measure – Electric	6
Table 5-2. CY2018 Demand Savings by Measure	6
Table 5-3. CY2018 Summer Peak Demand Savings by Measure	6
Table 6-1. Savings Parameters	7
Table 7-1. CY2018 Values for Independent Variables - Refrigerators	9
Table 7-2. CY2018 Values for Independent Variables - Freezers	10
Table 8-1. CY2018 Total Annual Incremental Savings, Detailed Calculation	12
Table 9-1. Total Resource Cost Savings Summary	12

1. INTRODUCTION

This report presents the results of the impact evaluation of ComEd's CY2018 Fridge and Freezer Recycling (FFR) Program. It presents a summary of the energy and demand impacts for the total program and broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology. CY2018 covers January 1, 2018 through December 31, 2018.

2. PROGRAM DESCRIPTION

The FFR Program achieves 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.

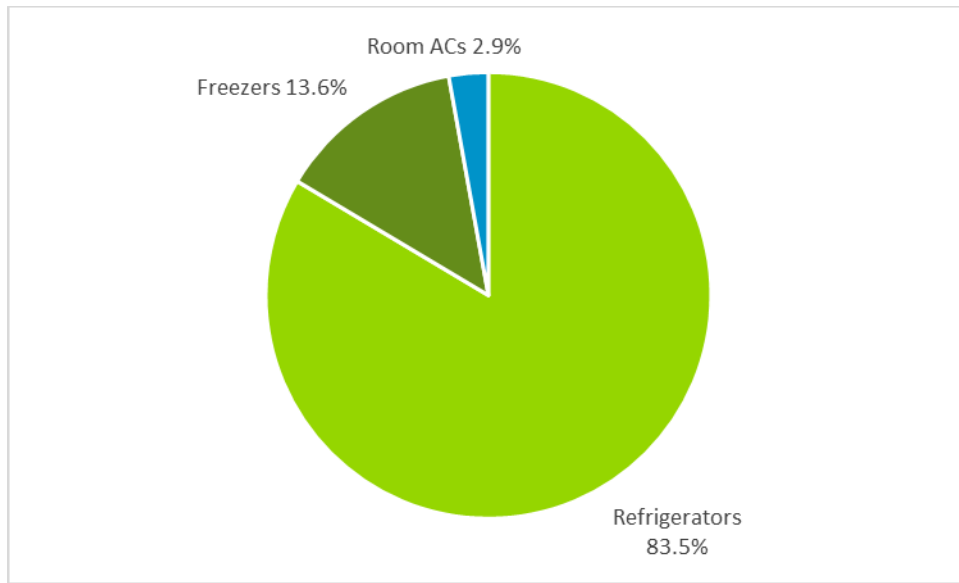
The program had 48,033 participants in CY2018 contributing a total of 53,155 recycled measures to the program. The CY2018 volumes are lower than PY9 due to the 19-month duration of PY9. These values are shown in Table 2-1 and Figure 2-1 below.

Table 2-1. CY2018 Volumetric Findings Detail

Participation	Program Reported # of Units	% of Total Units
Number of Participants	48,033	100%
Units by Measure Type		
Refrigerators	44,411	83.5%
Freezers	7,220	13.6%
Room ACs	1,524	2.9%
Total Measures	53,155	100%

Source: ComEd tracking data and Navigant team analysis.

Figure 2-1. Number of Measures Recycled by Type



3. CUMULATIVE PERSISTING ANNUAL SAVINGS

The measure-specific and total verified gross savings for the FFR Program and the cumulative persisting annual savings (CPAS) for the measures recycled in CY2018 are shown in the following table and figure. The total CPAS across all measures is 21,697,981 kWh. There are no gas savings associated with this program. The majority of CPAS savings are from refrigerator measures (86.9%), followed by freezers (12.7%) and room ACs (0.4%).

Table 3-1. Cumulative Persisting Annual Savings (CPAS) – Electric

End Use Type	Research Category	EUL	CY2018		Lifetime Net Savings†	Verified Net kWh Savings									
			Verified Gross Savings	NTG*		2018	2019	2020	2021	2022	2023	2024	2025	2026	
Appliances	Refrigerators	8.0	36,824,340	0.51	150,243,305	18,780,413	18,780,413	18,780,413	18,780,413	18,780,413	18,780,413	18,780,413	18,780,413	18,780,413	
Appliances	Freezers	8.0	4,722,351	0.58	21,911,709	2,738,964	2,738,964	2,738,964	2,738,964	2,738,964	2,738,964	2,738,964	2,738,964	2,738,964	
Appliances	Room ACs	4.0	357,209	0.50	714,417	178,604	178,604	178,604	178,604						
CY2018 Program Total Electric CPAS			41,903,899		172,869,432	21,697,981	21,697,981	21,697,981	21,697,981	21,519,377	21,519,377	21,519,377	21,519,377	-	
CY2018 Program Expiring Electric Savings‡							-	-	-	178,604	178,604	178,604	178,604	21,697,981	

Note: The green highlighted cell shows program total first year electric savings.

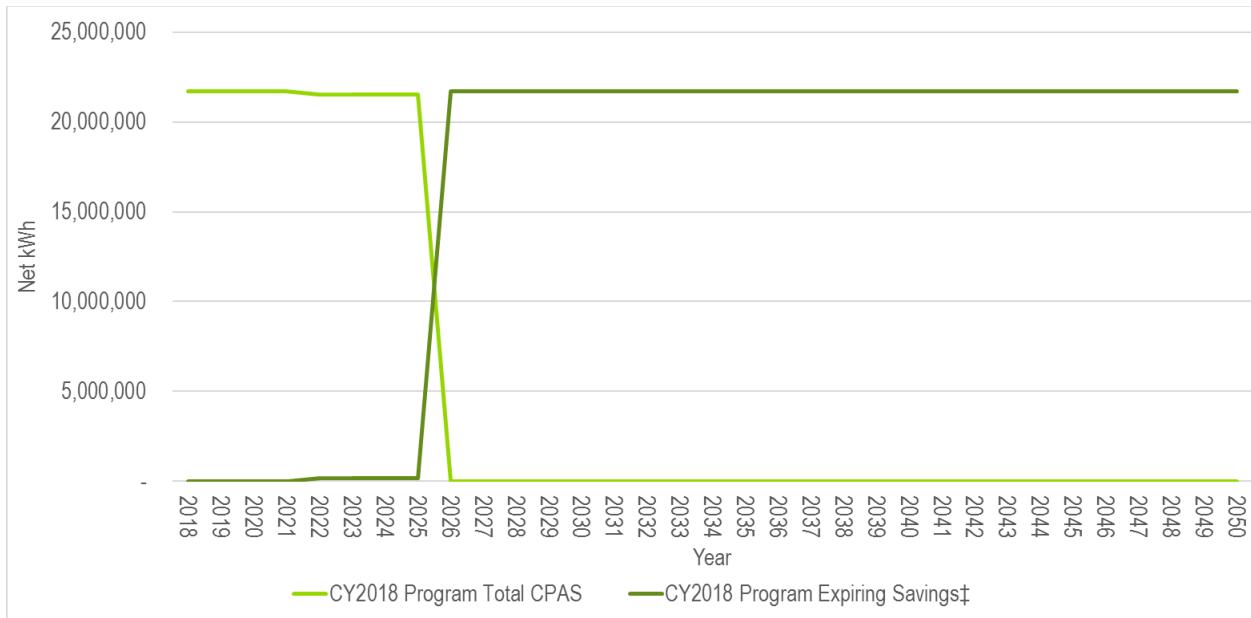
* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Expiring savings are equal to CPAS Yn-1 - CPAS Yn + Expiring Savings Yn-1.

Source: Navigant analysis

Figure 3-1. Cumulative Persisting Annual Savings



‡ Expiring savings are equal to CPAS Yn-1 - CPAS Yn + Expiring Savings Yn-1.
 Source: Navigant analysis

4. PROGRAM SAVINGS DETAIL

Table 4-1 summarizes the incremental energy and demand savings the FFR Program achieved in CY2018. The FFR Program did not claim any gas savings in CY2018. The program’s verified gross savings are approximately 2% higher than ex ante gross savings. Both ex ante and verified gross energy savings were computed using the equations specified in the Illinois Technical Reference Manual (IL TRM) v6.0. However, a difference in the ex ante and verified refrigerator and freezer TRM savings calculation methods emerges due to an equation variable that indicates whether the appliance was located in a conditioned space. The verified gross savings calculations use the proportion of appliances located in conditioned space that are derived from the customer telephone surveys, whereas ex ante gross savings calculations are based on appliance locations in the program tracking database. The TRM also stipulates the use of a part-use factor for refrigerator and freezer savings calculations. Both the ex ante and verified estimates used the PY7 Research Findings part-use factors.

Table 4-1. CY2018 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Demand Savings (kW)	Summer Peak Demand Savings (kW)
Electricity			
Ex Ante Gross Savings	40,898,693	NR	NR
Program Gross Realization Rate	1.02	NA	NA
Verified Gross Savings	41,903,899	6,422	5,600
Program Net-to-Gross Ratio (NTG)	Varies	Varies	Varies
Verified Net Savings	21,697,981	3,296	2,890
Converted from Gas*			
Ex Ante Gross Savings	NA	NA	NA
Program Gross Realization Rate	NA	NA	NA
Verified Gross Savings	NA	NA	NA
Program Net-to-Gross Ratio (NTG)	NA	NA	NA
Verified Net Savings	NA	NA	NA
Total Electric Plus Gas			
Ex Ante Gross Savings	40,898,693	NR	NR
Program Gross Realization Rate	1.02	NA	NA
Verified Gross Savings	41,903,899	6,422	5,600
Program Net-to-Gross Ratio (NTG)	Varies	Varies	Varies
Verified Net Savings	21,697,981	3,296	2,890

NR = Not Reported

* Gas savings converted to kWh by multiplying therms * 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh).

Note: The demand savings are equivalent to the reduction in kW.

The coincident Summer Peak period is defined as 1:00-5:00 PM Central Prevailing Time on non-holiday weekdays, June through August.

Source: ComEd tracking data and Navigant team analysis.

5. PROGRAM SAVINGS BY MEASURE

The program includes three measure types as shown in the following tables. The refrigerator measure contributed the greatest portion of net energy savings (86.6%). Freezers accounted for another 12.6%, while the room AC measure comprised 0.8%. This breakdown of savings is almost identical to the proportions in PY4, PY5, PY6, PY7, PY8, and PY9.

Table 5-1. CY2018 Energy Savings by Measure – Electric

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG *	Verified Net Savings (kWh)	Effective Useful Life
Appliances	Refrigerators	35,950,363	1.02	36,824,340	0.51	18,780,413	8.0
Appliances	Freezers	4,591,121	1.03	4,722,351	0.58	2,738,964	8.0
Appliances	Room ACs	357,208	1.00	357,209	0.50	178,604	4.0
Total		40,898,693	1.02	41,903,899	0.52	21,697,981	8.0

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

Source: ComEd tracking data and Navigant team analysis.

Table 5-2. CY2018 Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Demand Reduction (kW)	NTG *	Verified Net Demand Reduction (kW)
Appliances	Refrigerators	NR	NA	4,201	0.51	2,142
Appliances	Freezers	NR	NA	539	0.58	312
Appliances	Room ACs	NR	NA	1,682	0.50	841
Total		NR	NA	6,422	0.51	3,296

NR = Not Reported

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

Source: ComEd tracking data and Navigant team analysis.

Table 5-3. CY2018 Summer Peak Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate*	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
Appliances	Refrigerators	NR	NA	4,541	0.51	2,316
Appliances	Freezers	NR	NA	554	0.58	321
Appliances	Room ACs	NR	NA	505	0.50	252
Total		NR	NA	5,600	0.52	2,890

NR = Not Reported

* A deemed value. Source: ComEd_NTG_History_and_PY10_Recommendations_2017-03-01.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>.

Source: ComEd tracking data and Navigant team analysis.

6. IMPACT ANALYSIS FINDINGS AND RECOMMENDATIONS

6.1 Impact Parameter Estimates

The evaluation team used the procedures specified in the IL TRM v6.0 to calculate the verified gross energy savings. These procedures use equations to calculate energy savings, which are shown in Section 7 (Appendix 1). Section 8 (Appendix 2) shows the input parameters used by the EM&V team to calculate verified energy and peak demand savings. Note that all the factors in the regression equations below are derived from pooled data from metering studies conducted by several Midwestern utilities, including one done by ComEd in PY4.

The following table details all the custom and deemed inputs used for calculating the energy and demand savings for each measure, as well as their source.

Table 6-1. Savings Parameters

Measure	Custom* Input Parameters	Deemed† Input Parameters	Deemed† Input Data Source
Refrigerators	Part-Use-Factor	Regression coefficients and intercepts for Unit Energy Consumption calculations, CDD/HDD zonal values, Summer Peak Coincidence Factor	IL TRM v6.0 Section 5.1.8
Freezers	Part-Use-Factor	Regression coefficients and intercepts for Unit Energy Consumption calculations, CDD/HDD zonal values, Summer Peak Coincidence Factor	IL TRM v6.0 Section 5.1.8
Room ACs	NA	Full Load Hours (FLH), Btu/H, EERexist, Summer Peak Coincidence Factor	IL TRM v6.0 Section 5.1.9

* Based on the PY7 participating customer survey data.

† State of Illinois Technical Reference Manual version 6.0 from <http://www.ilsag.info/technical-reference-manual.html>.

6.2 Other Impact Findings and Recommendations

The evaluation team has developed findings and recommendations from the CY2018 evaluation, as follows:

6.2.1 Program Savings Target Attainment

Finding 1. The evaluation-verified gross energy savings is 41,903,899 kWh, exceeding the program’s CY2018 gross energy savings target of 34,979,000 kWh¹.

Finding 2. The evaluation-verified net energy savings is 21,697,981 kWh, achieving 99.98% of the program’s CY2018 net energy savings target of 21,703,000 kWh².

6.2.2 Gross Realization Rates

Finding 3. Verified gross savings are approximately 2% higher than ex ante gross savings, which is the equivalent of a gross realization rate of 1.02. Gross realization rates by measure type showed a small amount of variation, with a refrigerator value of 1.02, a freezer value of 1.03 and a room air conditioner value of 1.00.

¹ Commonwealth Edison Company’s 2018 – 2021 Energy Efficiency and Demand Response Plan (June 30, 2017)

² Commonwealth Edison Company’s 2018 – 2021 Energy Efficiency and Demand Response Plan (June 30, 2017)

Finding 4. The evaluation-verified gross realization rate exceeded 1.00 is due to differences in the percentages of refrigerators and freezer units in unconditioned spaces between the telephone survey and tracking data. For the 241 telephone survey respondents with refrigerators, the percentage in unconditioned spaces was 57%, compared to 67% according to the corresponding tracking data. Similarly, for the 120 telephone survey respondents with freezers, the percentage in unconditioned spaces was 54%, compared to 62% according to the corresponding tracking data. A lower percentage of units in unconditioned spaces caused the estimated energy savings to increase.

6.2.3 Program Participation

Finding 5. The CY2018 FFR Program recycled a total of 53,155 units and exceeded its CY2018 unit participation target of 45,000 units. Therefore, program marketing and promotion efforts appear to be on track, and the \$50 incentive level is effective at achieving the desired level of participation.

7. APPENDIX 1. IMPACT ANALYSIS METHODOLOGY

The EM&V team calculated verified gross and net savings using the following regression specifications as defined by the IL TRM v6.0 in PY2018.

7.1 Verified Gross Program Savings Analysis Approach

Savings estimates were developed for the full population of units collected in CY2018 to estimate CY2018 Unit Energy Consumption (UECs). The ex post savings estimates of energy (kWh) savings rely on regression equations as specified in the TRM v6.0. Gross energy savings are expressed in terms of full-year UECs. UEC estimates were made using a regression-based approach that models full-year energy savings as a function of unit characteristics (i.e., age, size, configuration, defrost mode, and unit location prior to being recycled).

Gross peak demand (kW) savings were also calculated according to the algorithm specified in the IL TRM v6.0. The coincidence factors in the IL TRM v6.0 were calculated using the regression equations to predict consumption on summer peak days.

Both energy (kWh) and peak demand (kW) savings estimates were made based on the characteristics of the population of units collected by the program during CY2018. In addition, gross energy savings estimates were adjusted for part-use, by applying part-use factors from the PY7 evaluation.

7.1.1 Refrigerators

First year energy savings from a recycled refrigerator is calculated based on Equation 1 below, as found in the Illinois TRM v6.0 section 5.1.8. After energy savings based on full load hours have been computed a part-use factor is then applied. This factor is based on the value from the most recent part-use factor participant survey results available at the start of the CY2018 program year, in this case 0.95 from the PY7 evaluation.

Equation 1. Refrigerator Recycling Energy Savings Calculation

$$\Delta kWh = [83.32 + (\text{Age} * 3.68) + (\text{Pre-1990} * 485.04) + (\text{Size} * 27.15) + (\text{Side-by-side} * 406.78) + (\text{Primary Usage} * 161.86) + (\text{CDD}/365.25 * \text{unconditioned} * 15.37) + (\text{HDD}/365.25 * \text{unconditioned} * -11.07)] * \text{Part Use Factor}$$

Where:

Age	= Age of retired unit
Pre-1990	= 1 if manufactured pre-1990, else 0
Size	= Capacity (cubic feet) of retired unit
Side-by-side	= 1 if side-by-side, else 0
Primary Usage	= 1 if primary unit (in absence of the program), else 0
Unconditioned	= 1 if located in unconditioned space, else 0
CDD	= Cooling Degree Days ³
HDD	= Heating Degree Days ⁴
Part Use Factor	= Accounts for units not running throughout the entire year (0.95)

Table 7-1 below reports the average CY2018 values for each independent variable of the regression equation for refrigerators.

Table 7-1. CY2018 Values for Independent Variables - Refrigerators

Independent Variable	Average Value	Source
Age (years)	21.8	CY2018 Tracking Data
Pre-1990	0.15	CY2018 Tracking Data
Size (Cubic Feet)	19.1	CY2018 Tracking Data
Side-by-side	0.30	CY2018 Tracking Data
Primary Unit	0.49	CY2018 Tracking Data
Unconditioned Space	0.67	CY2018 Tracking Data
Primary Unit - Surveyed*	0.49	CY2018 Participant Survey
Unconditioned Space - Surveyed*	0.57	CY2018 Participant Survey
CDD	835.7	CY2018 Tracking Data, TRM v. 6.0
HDD	6,350.4	CY2018 Tracking Data, TRM v. 6.0

* Based on the 241 surveyed refrigerator respondents

Summer coincident peak demand savings from a recycled refrigerator is calculated based on Equation 2 below, as found in the ILTRM v6.0 section 5.1.8.

Equation 2. Refrigerator Recycling Summer Coincident Peak Demand Savings Calculation

$$\Delta kW = \Delta kWh / 8766 * CF$$

Where:

ΔkWh	= Energy savings as calculated in Equation 1
CF	= 1.081 (Coincident factor defined as summer kW/average kW)

7.1.2 Freezers

First year energy savings from a recycled freezer is calculated based on Equation 3 below, as found in the IL TRM v6.0 section 5.1.8. After energy savings based on full load hours have been computed a part-use factor is then applied. This factor is based on the value from the most recent part-use factor

³ Dependent on geographic location.

⁴ Dependent on geographic location.

participant survey results available at the start of the CY2018 program year, in this case 0.74 from the PY7 evaluation.

Equation 3. Freezer Recycling Energy Savings Calculation

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

Where:

- Age** = Age of retired unit
- Pre-1990** = 1 if manufactured pre-1990, else 0
- Size** = Capacity (cubic feet) of retired unit
- Chest** = 1 if chest freezer, else 0
- Unconditioned** = 1 if located in unconditioned space, else 0
- CDD** = Cooling Degree Days⁵
- HDD** = Heating Degree Days⁶
- Part Use Factor** = Accounts for units not running throughout the entire year (0.74)

Table 7-2 below reports the average CY2018 values for each independent variable of the regression equation for freezers.

Table 7-2. CY2018 Values for Independent Variables - Freezers

Independent Variable	Average Value	Source
Age (years)	26.6	CY2018 Tracking Data
Pre-1990	0.35	CY2018 Tracking Data
Size (Cubic Feet)	15.0	CY2018 Tracking Data
Chest	0.28	CY2018 Tracking Data
Unconditioned Space	0.62	CY2018 Participant Survey
Unconditioned Space - Surveyed*	0.54	CY2018 Participant Survey
CDD	834.3	CY2018 Tracking Data, TRM v. 6.0
HDD	6,353.8	CY2018 Tracking Data, TRM v. 6.0

*Based on the 120 surveyed freezer respondents

Summer coincident peak demand savings from a recycled freezer is calculated based on Equation 4 below, as found in the IL TRM v6.0 section 5.1.8.

Equation 4. Freezer Recycling Summer Coincident Peak Demand Savings Calculation

$$\Delta kW = \Delta kWh / 8766 * CF$$

Where:

- ΔkWh** = Energy savings as calculated in Equation 3
- CF** = 1.028 (Coincident factor defined as summer kW/average kW)

7.1.3 Room Air Conditioners

Room AC gross energy savings are estimated using the algorithm specified in IL TRM v6.0 and shown in Equation 5 below.

⁵ Dependent on geographic location.

⁶ Dependent on geographic location.

Equation 5. Room AC Recycling Energy Savings Calculation

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

Where:

- FLH_{RoomAC}** = Full Load Hours of room air conditioning unit (dependent on location)
- BtuH** = Unit capacity of retired unit (if unknown assume 8500)
- EE_{Rexist}** = Efficiency of the existing unit (7.7)

Summer coincident peak demand savings from a recycled room AC is calculated based on Equation 6 below, as found in the IL TRM v6.0 section 5.1.9.

Equation 6. Room AC Recycling Summer Coincident Peak Demand Savings Calculation

$$\Delta kW = ((BtuH * 1/EE_{Rexist})/1000) * CF$$

Where:

- BtuH** = Unit capacity of retired unit (if unknown assume 8500)
- EE_{Rexist}** = Efficiency of the existing unit (7.7)
- CF** = Summer peak coincidence factor (0.3)

7.2 Verified Net Program Savings Analysis Approach

Verified net energy and demand (coincident peak and overall) savings are calculated by multiplying the verified gross savings estimates by a NTG ratio. In CY2018, the NTG ratio estimates used to calculate the net verified savings are based on past evaluation research and approved through the Illinois Stakeholder Advisory Group (SAG) consensus process.

7.3 Survey Questions Used to Determine Part-Use Factor

The survey question structure used by the evaluation team to determine the part-use factor for a refrigerator or a freezer is designed to determine what the participant would have done with the unit if the program had not picked it up. The structure of the questions asked is as follows:

- At the time this MEASURE was picked up, were you using it as your main MEASURE, or had it been a secondary or spare?
- How long had you been using this MEASURE as a secondary or spare?
- Thinking just about the past year, was the spare MEASURE plugged in and running all the time, for special occasions only, during certain months of the year only, or was it never plugged in and running?
- If you add up the total time your spare MEASURE was plugged in and running during the last 12 months that you had it, about how many total months would that be?
- Was the MEASURE running during the summer or was it mainly running during other times of the year?
- Where would the MEASURE have been located if it had not been removed by ComEd? If the MEASURE was your primary unit, we're interested in whether you would have left it in the kitchen or moved it to another room.

8. APPENDIX 2. IMPACT ANALYSIS DETAIL

Table 8-1 summarizes the program savings by measure. The verified NTG ratio 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 PY7 evaluation

and were calculated using a procedure that is consistent with that specified in the IL TRM v6.0. Note that there are separate SAG-approved NTG values for refrigerators and freezers, delineated by whether the unit is assigned a Retailer NTG ratio or a Non-Retailer NTG ratio. 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, before the PIR is applied, are 0.54 for refrigerators (based on a weighted average of Retailer NTG ratio of 0.22 and Non-Retailer NTG ratio of 0.62), 0.60 for freezers (based on a weighted average of Retailer NTG ratio of 0.25 and Non-Retailer NTG ratio of 0.63) and 0.50 for room ACs. After adjusting for the PIR values, the weighted average program NTG ratio, based on deemed values, is 0.52.

Table 8-1. CY2018 Total Annual Incremental Savings, Detailed Calculation

Savings Category	Refrigerators	Freezers	Room ACs
Ex-Ante Gross Savings (kWh)	35,950,363	4,591,121	357,208
Ex-Ante Gross Peak Demand Reduction (kW)	NA	NA	NA
Deemed Part-Use Factor	0.95	0.74	NA
Verified Gross Savings (kWh)	36,824,340	4,722,351	357,209
Verified Gross Peak Demand Reduction (kW)	4,541	554	505
Verified Gross Realization Rate	1.02	1.03	1.00
Deemed Net to Gross Ratio (NTG Ratio)*	0.54	0.60	0.50
Program Induced Replacement (PIR)*	-0.029	-0.013	NA
Final Net to Gross Ratio (NTG Ratio and PIR)*	0.51	0.58	0.50
Verified Net Savings (kWh)	18,780,413	2,738,964	178,604
Verified Net Peak Demand Reduction (kW)	2,316	321	252

* A deemed value.

Source: ComEd tracking data and EM&V team analysis

9. APPENDIX 3. TOTAL RESOURCE COST DETAIL

Table 9-1, below, shows the Total Resource Cost (TRC) table. It includes only the cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to evaluation later.

Table 9-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (kWh)	Ex Ante Gross Peak Demand Reduction (kW)*	Verified Gross Savings (kWh)	Verified Gross Peak Demand Reduction (kW)
Appliances	Refrigerators	Each	44,411	8.0	35,950,363	NR	36,824,340	4,541
Appliances	Freezers	Each	7,220	8.0	4,591,121	NR	4,722,351	554
Appliances	Room ACs	Each	1,524	4.0	357,208	NR	357,209	505

Source: ComEd tracking data and Navigant team analysis.