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Re: Net-to-Gross Research Results for the ComEd Fridge & Freezer Recycling Program CY2018

INTRODUCTION

This memorandum presents the evaluation research CY2018 results of net-to-gross (NTG) ratio estimates for refrigerators, freezers, and room air conditioners recycled through ComEd's Fridge & Freezer Recycling (FFR) Program. The approach used to calculate the program net-to-gross (NTG) is based on the NTG algorithms specified in the Illinois Technical Reference Manual version 7.0 (TRM).

EVALUATION RESEARCH NET IMPACT FINDINGS

The primary objective of the research findings net savings analysis for the FFR Program is to determine the program's net effect on customers' electricity usage. This requires estimating what would have happened in the absence of the program. Thus, after gross program impacts adjusted for part-use have been assessed, net program impacts are derived by estimating a NTG which quantifies the percentage of the gross program impacts that can reliably be attributed to the program.

The CY2018 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 surveys of the largest retailers¹ associated with unit replacements. Responses from the existing participant survey are used to guide the analytical approach for the retailer associated units as well as the non-replaced units picked up by Reclaim at customers' homes. The "no program" question battery probes 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.

Version 7.0 of the TRM includes changes to the NTG algorithm of version 6.0 so that the program induced replacement factor is no longer necessary for calculation of NTG.

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 had not picked them up. A total of 361 surveys were completed.

¹ Note that the FFR program no longer includes a participating retailer component. It was dropped from the program in PY8.

- *Telephone surveys with retailers associated with unit replacements.* These interviews shed light on the disposition of used appliances absent the program for those participants that indicated, absent ComEd's program, they would have given the unit 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 telephone surveys. Retailer interviews were last completed in PY9. Results of those interviews are used in the CY2018 analysis.

The retailer interviews and participating customer telephone surveys provide all inputs needed for the calculation of the program's NTG ratio. The participating customer survey provides 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 would be 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 is then calculated from these results.

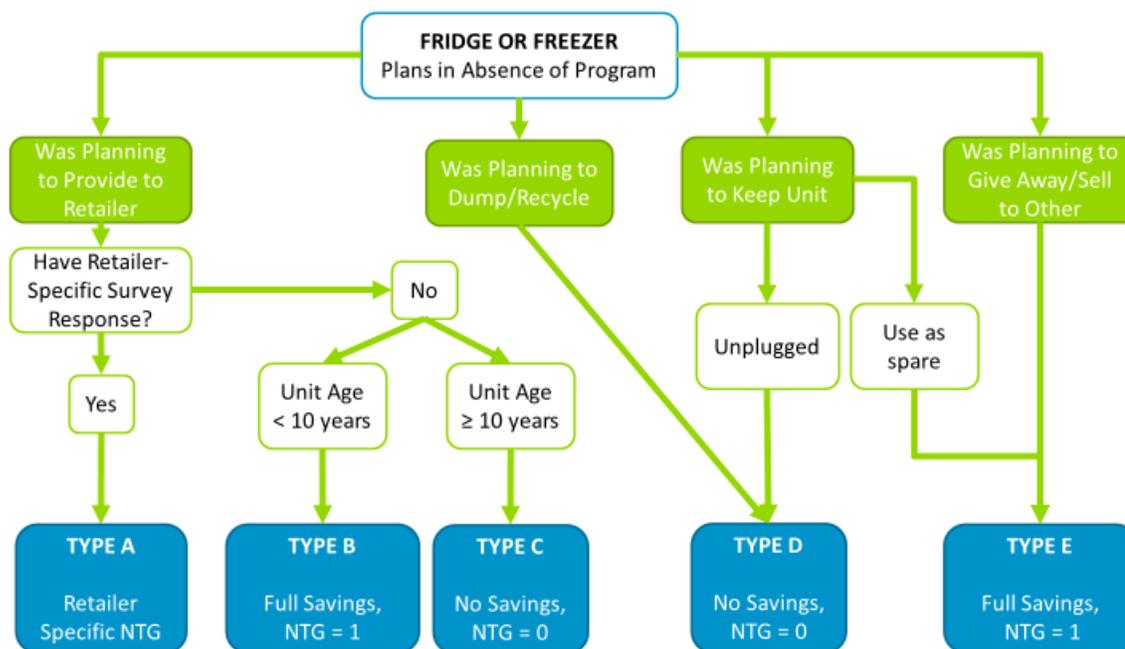
The program NTG is a weighted average resulting from calculations for three categories of participants. Figure 0-1. below provides a graphical representation of this framework.

1. Participating customer survey responses are used directly in the calculation of the NTG for two types 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.

The NTG for these customers is determined by their planned disposal method absent the program. Customers are assigned a NTG ratio of zero if they 1) planned to dump or recycle the unit or 2) planned to keep the unit unplugged (Type D below). However, if they planned to 1) keep the unit as a spare, or 2) give away or sell the unit then they are assigned a NTG ratio of 1 (Type E below)

2. If participating customers indicated that they would have used a disposal method involving the retailer they bought the replacement unit from, then they are assigned a NTG associated with that retailer (Type A below). Interviews were completed with four major retailers that sold replacement units to participating customers. NTGs were ultimately calculated for three retailers interviewed in PY9.
3. The third category covers customers who replaced their unit, would have used a disposal method involving the retailer, but where an interview with the retailer was not completed. In these cases, a NTG ratio is assumed based on the age of the recycled unit. If the recycled unit is older (ten years or more) then it is assumed the retailer would not have sold the unit into the secondary market and is a Free Rider (Type C below). If the recycled unit is less than ten years old, the customer is assigned a NTG ratio of 1 (Type B below).

Figure 0-1. Research Report NTG Framework



Source: Evaluation team analysis

Spillover

Information regarding participant spillover was also collected and resulted in a finding of no spillover. Since this program's approach does not support a theory for ways that the program drives meaningful spillover, a finding of no spillover is not surprising. From the survey, there were four respondents who cited the program as being "very influential" for their taking additional energy efficiency actions. However, all four respondents did so by participating in another ComEd residential program (for which the savings were presumably claimed). 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

NTG Inputs

Of those survey respondents that replaced their units, 21 percent of refrigerator respondents (n=50 of 241) and seven percent of freezer respondents (n=8 of 120) indicated they would have had their unit removed by the dealer (i.e., retailer). The remaining 79 percent of refrigerator respondents (n=191 of 241) and 93 percent of freezer respondents (n=112 of 120), 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, 95 out of 191 refrigerator respondents (50 percent) and 48 of 112 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 NTGs (excluding the Program-Induced Replacement factors) are 0.503 for refrigerators, and 0.571 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 NTG.

Other Findings

Additional questions in the participating customer surveys probed deeper into any disposal options other than ComEd's FFR 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 = 241),
 - Almost half (49 percent, n = 119) thought of giving the unit away to a charity or a private party
 - Another 40 percent (n = 97) considered having the garbage collector remove the unit
 - Approximately one third of respondents (31 percent, n = 74) considered having the unit hauled to a dump, landfill, or recycling center
 - Almost one quarter, (23 percent, n = 55) considered selling to a private party or appliance dealer
- Among the options available to freezer respondents (n = 120),
 - Around half of respondents (52 percent, n = 62) considered giving the unit away
 - A quarter of respondents (24 percent, n = 29) considered selling to a private party or appliance dealer
 - Almost one-third (31 percent, n = 37) considered having the unit hauled to a dump, landfill, or recycling center

Retailer Findings

Retailer interviews are attempted every two years; results from the PY9 evaluation are presented here. 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 /or deconstruction of units picked up by the retailer
 - Approach for units outside of ComEd's FFR Program – percentage of units affected
 - Approach prior to the start-up of ComEd's FFR Program – percentage of units affected
- Other disposition of units
 - Percentage that are picked up by a hauler or 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 constructed a retailer-specific NTG, representing one minus the percentage of units that would otherwise have been recycled or deconstructed in the absence of ComEd's FFR Program. As indicated in the table below, the rate of recycling varies significantly by retailer. The retailers

interviewed represent nine percent of the refrigerators and two percent of the freezers recycled by program participants in CY2018.

Figure 0-2: NTG Ratios for Interviewed Retailers²

Retailer	NTG Ratio
Retailer # 1 – national chain	0.15
Retailer #2 – national chain	0.10
Retailer #3 – national chain	0.00

Source: Evaluation team analysis.

Weighted Average NTG

A weighted average of the NTG ratios are then calculated separately for refrigerators and freezers using the proportions of participants who fall into each of the categories of participating customer survey NTG and retailer survey NTG with and without interviews.

The resulting NTG is then applied to the average unit energy consumption per unit recycled by the respective retailers or by Recleim and is also weighted by the number of units recycled by each retailer or Recleim. The result produces a weighted NTG for refrigerators and freezers that considers both non-retailer and retailer based NTGs. Figure 0-3 presents the non-retailer and retailer-based recycling channels and the resulting weighted NTG by appliance type.

Figure 0-3: CY2018 Research Findings NTG for Retailer and Non-Retailer Participants and for CY2018 and PY9 Weighted Average

Unit Type	CY2018 NTG Non-Retailer	CY2018 NTG Retailer	CY2018 NTG Weighted Average	PY9 Weighted Average
Refrigerator	0.49	0.07	0.40	0.50
Freezer	0.56	0.01	0.52	0.48
Room ACs	0.50	---	0.50	0.50

Source: Evaluation team analysis.

Appendix A provides the detailed NTG framework and documents the calculation of the NTGs for refrigerators and freezers.

Given the significant difference between retailer and non-retailer NTGs (i.e., 0.49 versus 0.07 for refrigerators), we recommend that the program modify the media channels utilized or the program messaging content accordingly to focus participation more on long-term secondary units. Free ridership can be reduced by reorienting the program towards those customers who have true secondary units and de-emphasizing 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 CY2020 program design.

² Results from PY9 Research.

APPENDIX A: DETAILED CALCULATION OF CY2018 FRIDGE FREEZER RECYCLING PROGRAM NTG RATIO

Participant Survey Q. Now suppose that ComEd Fridge and Freezer Recycling program hadn't been available. Which one of these alternatives would you have been most likely to do, if the ComEd Fridge and Freezer Recycling program had not been available?	Have it removed by the retailer you got your new or replacement [appliance] from [Ref: 50 of 241, 21%] [Frz: 8 of 120, 7%]	Do we have a retailer-specific NTGR for the respondent's associated retailer per RETAILER SURVEY?	Yes		Retailer NTGR (Type_A) = NTGR of associated retailer per RETAILER SURVEY [Ref: 0.076] [Frz: 0.05] [Ref: 21 of 241, 9%] [Frz: 2 of 120, 2%]	Retailer NTG Score = average(NTGRs Type A, B, C) [Ref: 0.072] [Frz: 0.013] Retailer Weight = count of respondents [Ref: 50 of 241, 21%] [Frz: 8 of 120, 7%]	Program NTGR = (Retailer NTG * Retailer Weight + Nonretailer NTG * Nonretailer Weight) / (Retailer Weight + Nonretailer Weight) [Ref: 0.403] [Frz: 0.519]
			No	Unit Age <10 Years Retailer NTGR (Type_B) = 1 [Ref: 2 of 241, 1%] [Frz: 0 of 120, 0%]	Respondent NTGR (Type_C) = 0 [Ref: 27 of 241, 11%] [Frz: 6 of 120, 5%]		
	Haul it to the dump or landfill	[Ref: 3 of 241, 1%] [Frz: 5 of 120, 4%]			Respondent NTGR (Type_D) = 0 [Ref: 95 of 241, 39%] [Frz: 48 of 120, 40%]	Nonretailer NTG Score = average(NTGRs Type D, E) [Ref: 0.489] [Frz: 0.556]	
	Haul it to the recycling center	[Ref: 38 of 241, 16%] [Frz: 8 of 120, 7%]					
	Hire your garbage collector or someone else to haul it away	[Ref: 49 of 241, 20%] [Frz: 29 of 120, 24%]			Respondent NTGR (Type_E) = 1 [Ref: 91 of 241, 38%] [Frz: 60 of 120, 50%]	Nonretailer Weight = count of respondents [Ref: 191 of 241, 79%] [Frz: 112 of 120, 93%]	
	Keep it and store it unplugged	[Ref: 5 of 241, 2%] [Frz: 6 of 120, 5%]					
	Keep it and use it as a spare	[Ref: 17 of 241, 7%] [Frz: 9 of 120, 8%]					
	Sell it to a private party	[Ref: 24 of 241, 10%] [Frz: 12 of 120, 10%]					
	Give it away to a private party	[Ref: 25 of 241, 10%] [Frz: 23 of 120, 19%]					
Industries or a church	[Ref: 25 of 241, 10%] [Frz: 16 of 120, 13%]						

Source: Evaluation team analysis.

APPENDIX B: FRIDGE FREEZER RECYCLING PROGRAM NTG HISTORY

	Fridge Freezer Recycling
EPY8	<p>Recommendation (based upon PY6 research):</p> <p>NTG Fridge, Retailer: 0.29 <i>without Vendor #1</i> NTG Fridge, Non-Retailer: 0.77 NTG Fridge, Weighted Average Retailer and Non Retailer: 0.53</p> <p>NTG Freezer, Retailer: 0.30 <i>NTG without Vendor #1</i> NTG Freezer, Non-Retailer: 0.58 NTG Freezer, Weighted Average Retailer and Non Retailer: 0.57</p> <p>NTG Room ACs: 0.50 NTG Room AC, Non-Retailer: 0.50</p> <p>FR Fridge, Retailer: 0.71 FR Fridge, Non-Retailer: 0.23 FR Fridge, Weighted Average: 0.47</p> <p>FR Freezer, Retailer: 0.70 FR Freezer, Non-Retailer: 0.58 FR Freezer, Weighted Average: 0.43</p> <p>Based upon PY6 Participant and Retailer Surveys. PY6 data sources include telephone surveys with participating customers, telephone surveys with nonparticipating customers, in-depth interviews with participating retailers and telephone surveys with non-participating retailers associated with unit replacements.</p> <p>Information regarding participant spillover was also collected, but ultimately did not support a finding of any spillover.</p>
EPY9	<p>NTG Fridge Overall (including PIR): 0.51 NTG Fridge, Retailer (<i>excluding Vendors #1&#2</i>): 0.22 NTG Fridge, Non-Retailer: 0.62 NTG Fridge, Weighted Average Retailer and Non Retailer: 0.54</p> <p>NTG Freezer Overall (including PIR): 0.58 NTG Freezer, Retailer (<i>excluding Vendors #1&#2</i>): 0.25 NTG Freezer, Non-Retailer: 0.63 NTG Freezer, Weighted Average Retailer and Non Retailer: 0.60</p> <p>NTG Room ACs: 0.50 NTG Room AC, Non-Retailer: 0.50</p> <p>FR Fridge, Retailer: 0.78 FR Fridge, Non-Retailer: 0.38 FR Fridge, Weighted Average: 0.46 FR Freezer, Retailer: 0.75 FR Freezer, Non-Retailer: 0.37 FR Freezer, Weighted Average: 0.40</p>

	<p>SO is negligible for this program. NTG Research Source: PY7 Retailer and participant surveys</p>
CY2018	<p>NTG Fridge Overall (including PIR): 0.51 NTG Fridge, Retailer (<i>excluding Vendors #1&#2</i>): 0.22 NTG Fridge, Non-Retailer: 0.62</p> <p>NTG Freezer Overall (including PIR): 0.58 NTG Freezer, Retailer (<i>excluding Vendors #1&#2</i>): 0.25 NTG Freezer, Non-Retailer: 0.63</p> <p>NTG Room ACs: 0.50</p> <p>FR Fridge, Retailer: 0.78 FR Fridge, Non-Retailer: 0.38 FR Freezer, Retailer: 0.75 FR Freezer, Non-Retailer: 0.37</p> <p>SO is negligible for this program. NTG Research Source: PY7 Retailer and participant surveys</p>
CY2019	<p>NTG Fridge: 0.50</p> <p>NTG Freezer: 0.48</p> <p>NTG Room ACs: 0.50</p> <p>FR Fridge: 0.50 FR Freezer: 0.52 FR Room ACs: 0.50</p> <p>SO is negligible for this program. NTG Research Source: PY9 Retailer and participant surveys</p>

Source:
http://ilsagfiles.org/SAG_files/NTG/2019_NTG_Meetings/Corrected_NTG_Values/ComEd_NTG_History_and_CY2019_Recommendations_Aerator_and_Showerhead_Correction_2019-04-12.pdf