

Memorandum

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Re: ComEd Fridge & Freezer Recycling Program PY9 Recommended NTGR Updates

1. INTRODUCTION

This memorandum presents the evaluation research¹ PY9 net-to-gross ratio (NTGR) estimates for refrigerators, freezers and room air conditioners recycled through ComEd's Fridge & Freezer Recycling (FFR) Program.

2. 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 NTGR which quantifies the percentage of the gross program impacts that can reliably be attributed to the program.

The PY9 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 includes surveys 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 Reclaim 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 had not picked them up. A total of 325 surveys were completed.
- *Telephone surveys with nonparticipating retailers associated with unit replacements.* The evaluation team obtained contact information, and attempted to conduct interviews with the six 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 telephone surveys.

¹ It should be noted that the NTGR estimates presented here are the evaluation verified estimates (based on the PY9 participating customer and non-participating retailer surveys).

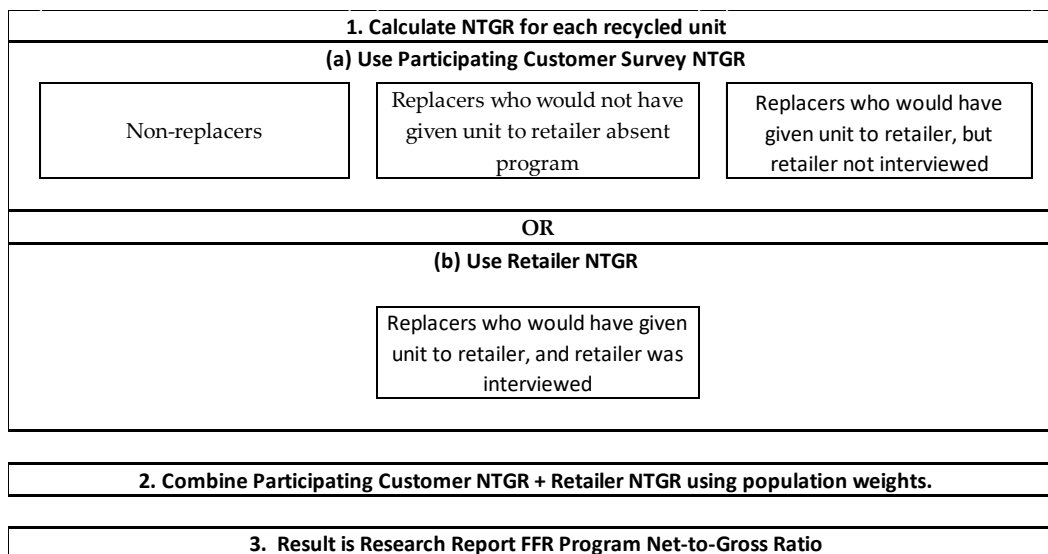
The retailer interviews and participating customer telephone surveys provide all inputs needed for the calculation of the program's net-to-gross ratio. The participating customer survey provide the self-reported percentage of units that: (1) would have been kept and used; (2) would have been kept by 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 NTGR 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 is determined based on the disposal practices of each nonparticipating 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 four major retailers that sold replacement units to participating customers. NTGRs were ultimately calculated for three of the four retailers interviewed.

Figure 2-1. below provides a graphical representation of this framework.

Figure 2-1. Research Report NTG Framework



2.1 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 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 of these four 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.

2.2 Participating Customer Findings

Of those survey respondents that replaced their units, 30 percent (n=67 of 225) indicated they would have had their unit removed by the dealer (i.e., retailer). The remaining 70 percent (n=158 of 225), 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, 53 out of 146 refrigerator respondents (36 percent) and 36 of 79 freezer respondents (46 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 0.649 for refrigerators, and 0.522 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 = 225),
 - Over half (53 percent, n = 120) thought of giving the unit away to a charity or a private party
 - Another 43 percent (n = 97) considered having the garbage collector remove the unit
 - Approximately one third of respondents (30 percent, n = 67) considered having the unit hauled to a dump, landfill, or recycling center
 - Only 16 percent (n = 36) considered selling to a private party or appliance dealer
 - Just 11 percent (n = 25) thought of using Craigslist to dispose of their unit
- Among the options available to freezer respondents (n = 100),
 - A majority of respondents (55 percent, n = 55) considered giving the unit away
 - A quarter of respondents (23 percent, n = 23) considered selling to a private party or appliance dealer
 - Almost one-third (30 percent, n = 30) considered having the unit hauled to a dump, landfill, or recycling center
 - Also 11 percent (n = 11) thought of using Craigslist to dispose of their unit

2.3 Retailer Findings

Interviews were attempted with six major retailers of new refrigerators and freezers. These firms were the ones most commonly named by participants as the source of their replacement units. The purpose of these interviews was to learn of their appliance disposal practices in the absence of ComEd's program. Interviews were completed with four of the six retailers, and findings from three of these four firms were incorporated into the NTG calculation². 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
 - 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 constructed a retailer-specific NTGR, 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 retailers interviewed represent 40 percent of the new units purchased by program participants.

² The fourth firm indicated they resold or gave away used units to as many as 15 different firms, whose names they did not provide. This made it difficult to follow up with the reseller to determine their disposal practices. For these reasons, the NTG ratio for units replaced through this retailer were based on the NTGR Non-Retailer values.

Figure 2-2: PY9 Net-to-Gross Ratios for Nonparticipating Retailers

Retailer	NTGR ratio	Percentage of Program Units Given to Retailer Absent the Program (Survey based)
Retailer # 1 – national chain	0.15	8%
Retailer #2 – national chain	0.10	20%
Retailer #3 – national chain	0.00	12%
Total Retailer Units		40% of new units

2.4 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 ratio

NTGR_r = retailer-based net-to-gross ratio

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

The resulting NTGR is then applied to the average unit energy consumption per unit recycled by the respective retailers or by Reclaim and is also weighted by the number of units recycled by each retailer or Reclaim. The result produces a weighted NTGR for refrigerators and freezers that considers both non-retailer and retailer based NTGRs. Figure 2-3 presents the non-retailer and retailer based recycling channels and the resulting weighted NTGR by appliance type.

Figure 2-3: PY9 Research Findings Net-to-Gross for Retailer and Non-Retailer Participants

Unit Type	NTGR Non-Retailer	NTGR Retailer	NTGR Weighted Average (before PIR)
Refrigerator	0.649	0.072	0.503
Freezer	0.522	0.067	0.477
Room ACs	0.50	---	0.50

Source: Evaluation Team analysis.

2.5 Program-Induced Replacements

The final NTGR 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, induced kWh values per unit of 501 kWh for refrigerators and 468 kWh for freezers were assumed, which are 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 NTGR causes the value to decline by the magnitude of the adjustment, similar to the effect of free ridership.

Table 2-1 and Table 2-2 below illustrate the PIR calculation used for refrigerators and freezers, respectively. For those who replaced a refrigerator, 13 percent cited the FFR Program as having induced the replacement, and of those, 60 percent (or 7 percent of replacers) said the incentive was the primary factor in their replacement decision. Similarly, for freezer replacers, 19 percent said the program caused them to replace their unit and of those, 29 percent (or 2 percent of replacers) cited the incentive as the causal factor. The resulting PIR factors associated with incentives only are -3.8 percent for refrigerators and -1.4 percent for freezers.

Table 2-1. PY9 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	84%	Yes	13%	Yes	60%	7%	501	4,481	2,244,746
		No	87%	No	40%	4%	0	2,987	0
		No				73%	0	49,987	0
No	16%				16%	0	10,753	0	
Totals								67,208	2,244,746
Weighted Average Program Induced Replacement Factor (all units)							33.4		-3.8%

Table 2-2: PY9 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	36%	Yes	19%	Yes	29%	2%	468	220	103,110
		No	81%	No	71%	5%	0	551	0
		No				29%	0	3,195	0
No	64%				64%	0	7,050	0	
Totals								11,016	103,110
Weighted Average Program Induced Replacement Factor (all units)							9.4		-1.4%

After accounting for PIR, the final NTGRs are shown below in Table 2-3.

Table 2-3: PY9 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	0.649	0.072	0.503	-0.038	0.464
Freezer	0.522	0.067	0.477	-0.014	0.463
Room ACs	0.50	---	0.50	---	0.50