



To: Peoples Gas and North Shore Gas

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Re: PGL-NSG Advanced Thermostat 2022-2023 Free Ridership Research Results

1. Executive Summary

The Peoples Gas and North Shore Gas (PGL-NSG) Advanced Thermostat net-to-gross (NTG) research asked free ridership (FR) questions in five surveys to cover advanced (smart) thermostats as a measure offered jointly through the ComEd Marketplace, the PGL-NSG Home Energy Rebate (HER) and Home Energy Jumpstart (HEJ) programs.

The HER FR surveys targeted program participants who received a rebate for an advanced thermostat through the program in CY2022 and CY2023. The HEJ FR surveys targeted residential customers who received a direct install advanced thermostat in the second half of 2022 or the first quarter of 2023. Guidehouse crafted the participant survey questions following the algorithm prescribed in the TRM¹ and an alternative algorithm that was described in Guidehouse's memo to the Illinois Stakeholder Advisory Group (SAG).²

This memo also presents findings on Peoples Gas / North Shore Gas customers who purchased smart (advanced) thermostats via ComEd's Marketplace.³ The FR values were derived from research gathered via web surveys with Peoples Gas or North Shore Gas customers who purchased qualifying advanced thermostats through ComEd's Marketplace in the second half of 2022 or the first quarter of 2023.

Table 1 summarizes the Peoples Gas / North Shore Gas FR findings based on participant feedback. These results will inform Guidehouse's September 2023 recommendations to SAG of NTG values to be used for this measure in PY2024.

¹ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 11.0.

² Guidehouse's memo, SAG Deviation Memo for Res FR 2023-05-10, describes the alternative protocols and the motivations for the deviations from the TRM.

³ The ComEd Marketplace is an online store that offers incentives on advanced thermostats jointly with Nicor Gas, North Shore Gas, and Peoples Gas.

Table 1. Net-to-Gross Research Results for PGL-NSG Advanced Thermostat PY2023

Strata	Free Ridership
Online Marketplace	0.10
HEJ	0.12
HER	0.22
Overall	0.11

Source: Evaluation team research

2. Free Ridership Survey Disposition

The evaluation team administered a personalized online survey to participants who had purchased and received a rebate for an advanced thermostat or a direct install advanced thermostat during the last half of 2022 and first quarter of 2023. Free ridership Online Marketplace surveys were sent in two waves, one wave encompassing participants from the last half of 2022 and the second wave for those who participated in the first quarter of 2023. Free ridership HEJ and HER surveys were sent in one wave. Two reminder emails were sent to all FR waves to increase participation in the survey. Table 2 reports survey representation for the free ridership batteries.

Table 2. Free Ridership Decision Maker Survey Disposition

Interview Type	Survey Sample	Target Completes	Survey Responses	Analyzed Responses	Response Rate
Online Marketplace	3,524	n/a	138	122	4%
HEJ	77	8	12	9	16%
HER	56	10	37	33	66%
Total or Weighted Average	3,697	-	187	164	5%

Source: Evaluation team research; response rate based on survey responses relative to total sample.

2.1 Online Marketplace Survey Disposition

The evaluation team distributed 57,355 surveys to ComEd customers who purchased any qualifying measures during the specified time frame through ComEd’s Appliance Rebate Program. Of these customers, 276 were identified to be North Shore Gas customers based on cities corresponding to North Shore Gas’ service territory and 3,248 were mapped using the same methods to Peoples Gas’ service territory. Seven North Shore Gas and 115 Peoples Gas survey respondents purchased an advanced thermostat through ComEd’s Marketplace and provided complete data that could be used in the North Shore Gas and Peoples Gas FR analysis. An additional 16 survey respondents purchased an advanced thermostat through ComEd’s Marketplace but either did not recall receiving the rebate (n = 5) or the surveys were incomplete and couldn’t be used in analyses (n = 11). In alignment with previous NTG research, North Shore Gas and Peoples Gas FR responses were combined to calculate a composite NTG, resulting in an overall response rate of 4% for the Online Marketplace survey. Table

summarizes the FR survey disposition data for individual respondents for each gas utility and combined.

Table 3. Online Marketplace Free Ridership Survey Disposition

Utility	Survey Sample	Survey Responses	Analyzed Responses	Response Rate
North Shore Gas	276	7	7	3%
Peoples Gas	3,248	131	115	4%
Total or Weighted Average FR Responses	3,524	138	122	4%

Source: Evaluation team research; response rate based on survey responses relative to total sample.

2.2 HEJ Survey Disposition

The evaluation team distributed 652 surveys to PGL-NSG customers who received any qualifying direct install measures during the specified time frame through PGL-NSG’s HEJ program. Of those customers who received a direct install advanced thermostat, nine of those customers were identified as North Shore Gas customers and 68 were identified as Peoples Gas’ customers. Two North Shore Gas and eight Peoples Gas survey respondents purchased an advanced thermostat through HEJ and provided complete data that could be used in the North Shore Gas and Peoples Gas FR analysis. An additional two survey respondents received an advanced thermostat through HEJ but either did not recall receiving the thermostat (n = 1) or the survey was incomplete (n = 1) and could not be used in analyses. In alignment with previous NTG research, North Shore Gas and Peoples Gas FR responses were combined to calculate NTG, resulting in an overall response rate of 13% for the HEJ program. Table 4 summarizes the FR survey disposition data for individual respondents for each gas utility and combined.

Table 4. HEJ Free Ridership Survey Disposition

Utility	Survey Sample	Survey Responses	Analyzed Responses	Response Rate
North Shore Gas	9	2	2	22%
Peoples Gas	68	10	7	15%
Total Responses	77	12	9	16%

Source: Evaluation team research; response rate based on survey responses relative to total sample.

2.3 HER Survey Disposition

The evaluation team distributed 97 surveys to PGL-NSG customers who received a discount for an advanced thermostat from PGL-NSG during the specified time frame through PGL-NSG’s HER program. Of those customers, 41 were identified as North Shore Gas customers and 56 were identified as Peoples Gas’ customers. Of the 33 survey respondents who purchased an advanced thermostat through HER and provided complete data that could be used in the North Shore Gas and Peoples Gas FR analysis, 14 were North Shore Gas customers and 19 were Peoples Gas customers. An additional five survey respondents received an advanced thermostat discount through HER but either was a duplicate response (n = 5) or the survey was incomplete (n = 4) and could not be used in analyses. In alignment with previous NTG research, North Shore Gas and Peoples Gas FR responses were combined to calculate NTG, resulting in

an overall response rate of 34% for the HER program. Table 5 summarizes the FR survey disposition data for individual respondents for each gas utility and combined.

Table 5. HER Free Ridership Survey Disposition

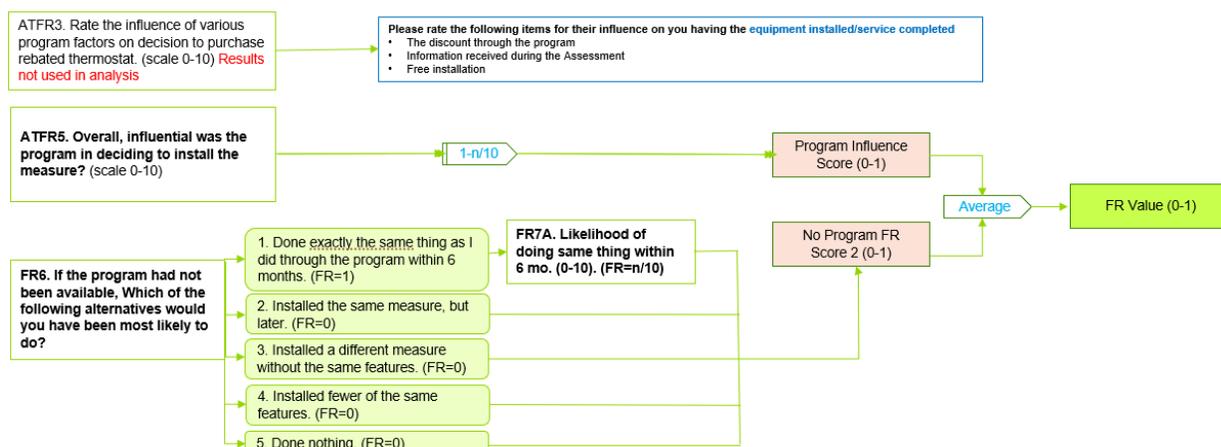
Utility	Survey Sample	Survey Responses	Analyzed Responses	Response Rate
North Shore Gas	41	17	14	41%
Peoples Gas	56	20	19	36%
Total Responses	97	37	33	38%

Source: Evaluation team research; response rate based on survey responses relative to total sample.

3. Free Ridership Protocols

The evaluation team applied a free ridership protocol that deviates from the TRM and was described in Guidehouse’s May, 5, 2023 memo to SAG⁴. This algorithm is depicted in Figure 1.⁵

Figure 1. Alternative Advanced Thermostat Free Ridership Algorithm



Source: SAG Deviation Memo for Res FR 2023-05-10

4. Detailed NTG Results

As detailed in Figure 1, FR was calculated based on averaging two component scores, the program influence (PI) score and the no program (NP) influence score.

The Online Marketplace FR estimate was calculated by combining the results from both survey waves using therm savings for each wave as a weight. The HEJ and HER FR estimates were averaged from all eligible responses. Table 6 outlines the average PI, NP, and FR estimates for

⁴ SAG Deviation Memo for Res FR 2023-05-10.

⁵ Although the PGL-NSG Advanced Thermostat free ridership surveys included questions for both the TRM FR algorithm and the alternative FR algorithm, this NTG results memo presents the results of the alternative algorithm. See also [Illinois Residential Free Ridership Algorithm Test Results 2023-08-XX \[forthcoming\]](#) which describes the way the evaluation team tested the TRM and alternative algorithms. The team found that the alternative protocol more frequently matched verbatim responses than did the established TRM protocol.

each advanced thermostat program researched as part of the PGL-NSG FR study (after all consistency check adjustments, described in 4.1.).

Table 6. Free Ridership Component Scores

Utility	Average Program Influence Score	Average No Program Score	Free Ridership
Online Marketplace	0.10	0.10	0.10
North Shore Gas	0.07	0.21	0.14
Peoples Gas	0.10	0.10	0.10
HEJ	0.13	0.10	0.12
North Shore Gas	0.30	0.00	0.15
Peoples Gas	0.09	0.13	0.11
HER	0.26	0.20	0.22
North Shore Gas	0.24	0.16	0.20
Peoples Gas	0.28	0.23	0.24

Source: Evaluation team research

Note: Component scores for PI and NP exclude inconsistent responses.

4.1 Free Ridership Consistency Check Analysis

In the process of performing the consistency check analysis, the evaluation team follows a specific protocol to review inconsistent responses.⁶ When a respondent’s PI and NP scores are inconsistent with each other, the evaluation flags the responses for a consistency check. Inconsistent PI and NP scores indicate either high program influence and high likelihood of purchasing an advanced thermostat without a rebate, or low program influence and low likelihood of making the purchase without a rebate. Two evaluators independently review each flagged respondent’s PI and NP score and compare these to their verbatim response to the following question:

Please describe in your own words any impact that the [program] and \$[discount amount] had on your decision to purchase the thermostat?

The evaluator then determines whether the verbatim 1) reflects the PI and NP score and requires no adjustment to the FR value; 2) reflects only one of the two scores, requiring omitting the inconsistent score to calculate the FR; and 3) does not answer the question, indicating the respondent failed to address the question and removing the respondent from the analyzed sample. In general, for surveys with more than 30 flagged responses, the evaluation team checks consistency for 30 randomly selected inconsistent responses. The team then conducts a t-test of the original FR values and the consistency check-adjusted values. If the t-test indicates a statistically significant difference, then the evaluation team is to check consistency for all inconsistent responses; if it indicates no statistically significant difference, then no adjustments are needed.

The Online Marketplace had more than 30 inconsistent responses, and the t-test indicated no statistically significant difference between the original FR values and the consistency check-

⁶ 2022 Illinois TRM Version 11.0, Volume 4, Section 4.4.1.1.3.

adjusted FR value. This result indicated that no consistency check adjustments were needed; thus, none were applied (including the 30 that were checked). Table 7 includes an overview of how flagged responses were evaluated for each survey.

Table 7. Consistency Check Adjustments

Adjustment	Online Marketplace	HEJ	HER
Evaluated to require no Exclusion	0	0	0
Evaluated to Exclude NP Score	0	1	4
Evaluated to Exclude PI Score	0	0	0
Omitted after Evaluation	0	0	3

Source: Evaluation team research

4.2 Confidence and Precision Analysis

Table 8 summarizes Guidehouse’s draft FR recommendations to be used in 2024 based on research presented in this memo and the estimate of relative precision.

Table 8. Free Ridership and Relative Precision at 90% Confidence Level

Strata	Free Ridership	Relative Precision
Program		
Online Marketplace	0.10	4%
HEJ	0.12	15%
HER	0.22	8%
Measure		
Advanced Thermostat	0.11	4%

Source: Evaluation team research