Guidehouse

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CC:	Laura Agapay-Read, Jeff Erickson, Guidehouse
From:	Steph Grisell, Celina Aguilar, Guidehouse; Theresa Wells, George Frymire, Mike Frischmann, EcoMetric
Date:	August 27, 2025
Re:	Peoples Gas and North Shore Gas Home Energy Rebate Participant & Trade Ally Free Ridership and Spillover Survey Results

1. Executive Summary

This memo presents findings from the net-to-gross (NTG) study of the Peoples Gas and North Shore Gas (PGL/NSG) Home Energy Rebate (HER) Program. The participant free ridership (FR) results for this program are estimated according to the FR algorithm specified in the deviation memo[1] Guidehouse provided to the Illinois Stakeholder Advisory Group (IL SAG) in 2023. The team gathered FR and spillover (SO) information via online surveys to two populations: 1) participating PGL/NSG HER customers[2] to assess the impact of the program on the customer's decision to pursue energy efficient upgrades and 2) active trade allies[3] to assess the program impact on the contractor's decision to recommend and sell energy efficient equipment. Guidehouse surveyed residential customers and trade allies who participated in the program between January 2023 through March 2024. Note that this memo does not address advanced thermostats.[4]

Table 1 summarizes the Home Energy Rebate Program FR and SO research findings based on the participant and trade ally research and includes results from GPY2 research on non-participant spillover from inactive trade allies. The NTG ratio of 0.86 for all measures is a blended value of the participant and trade ally NTG results.

Table 1. Net-to-Gross Research Results for Home Energy Rebate Program

Program Measure	Free Ridership	Participant Spillover	Active Trade Ally Spillover	Inactive Trade Ally Nonparticipant Spillover*	NTG Ratio
HVAC, Weatherization	0.37	0.04	0.08	0.11	0.86

*Inactive trade ally NPSO is from previous research. See Section 6.
Note: Numbers may not sum due to rounding.
Source: Evaluation team analysis

[1] https://www.ilsag.info/wp-content/uploads/SAG-Deviation-Memo-for-Res-FR-2023-05-10.pdf

[2] All participant samples excluded participants in disadvantaged communities as savings for those participants have deemed NTG values as described in the Energy Efficiency Policy Manual Section 7.4.

[3] In this memo we use the term "trade ally" to refer to the contractors who help deliver the program to residential customers.

[4] For details on advanced thermostat NTG values, please refer to the PGL/NSG Advanced Thermostat NTG memo available on the SAG site. https://www.ilsag.info/wp-content/uploads/PGL-NSG-Advanced-Thermostat-FR-Memo-2023-09-27-Final.pdf

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These results will inform Guidehouse's September 2025 recommendations to the IL SAG of NTG values to be used for this program in PY2026.

2. Free Ridership and Spillover Research Sample Disposition

Guidehouse fielded the participant and trade ally online surveys using Qualtrics web survey software. The team emailed survey invitations and launched the survey with free-ridership questions to a random sample of customers who participated in the program from October 2023 through March 2024 and another online survey with spillover questions to a random sample of customers who participated in the program January 2023 through September 2023. The assumption is that the gap in participation time would allow enough time for spillover to occur. Guidehouse combined responses from two trade ally free ridership and spillover surveys spanning from January 2023 to December 2023, and January 2024 to December 2024, respectively. After the initial survey invitation email, the team emailed two to encourage completion of the survey. Guidehouse offered a $10 Tango e-gift card to qualified program participants who completed the survey and $50 Tango e-gift card to qualified trade allies who completed the survey.

Table 2 and Table 3 present the survey fielding disposition for the surveys.

Table 2. Participant and Trade Ally Free Ridership Survey Fielding Disposition

Population	Total Population of Unique Participants	Number of Participants Sampled	Target Completes	Actual Completes	Analyzed Completes	Response Rate
Participants	1,045	1,045	75	133	133	13%
Trade Allies	600	477	30	49	49	10%

Source: Evaluation team analysis

Table 3. Participant and Trade Ally Spillover Survey Fielding Disposition

Population	Sample of Unique Participants	Target Completes	Actual Completes	Additional Efficiency Improvements	Qualified for Spillover
Participants	1,019	350	110	69	17
Trade Allies	477	30	35	17	8

Source: Evaluation team analysis

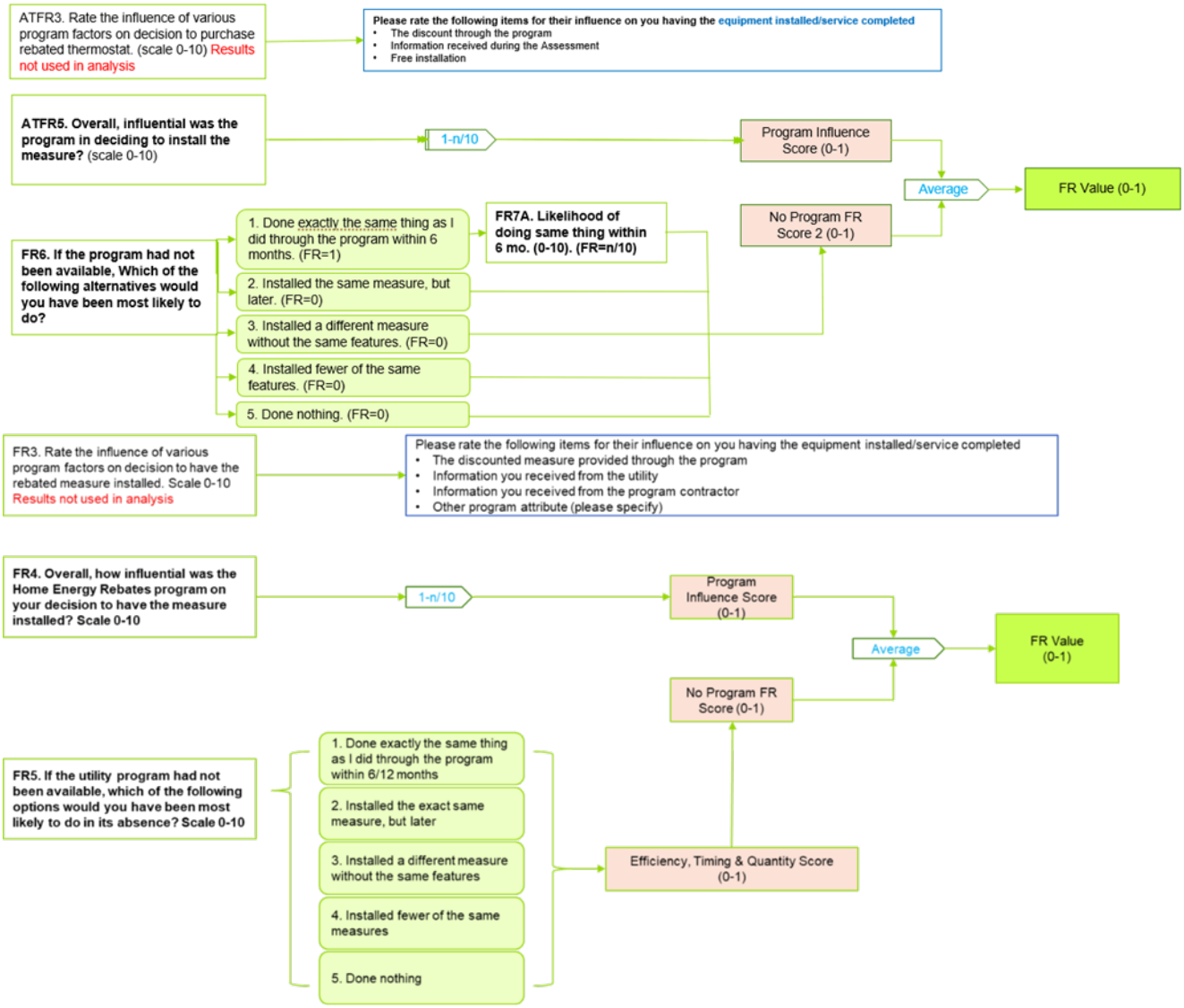
3. Free Ridership and Spillover Protocols

Figure 1 describes the algorithm used to calculate FR for the Home Energy Rebates program participant survey.

3.1 Participant Free Ridership Estimation

Figure 1 describes the residential free ridership algorithm for discounted measures detailed in Guidehouse's 2025 deviation memo and used to calculate FR for the program participant surveys.

Figure 1. Residential Free Ridership Algorithm

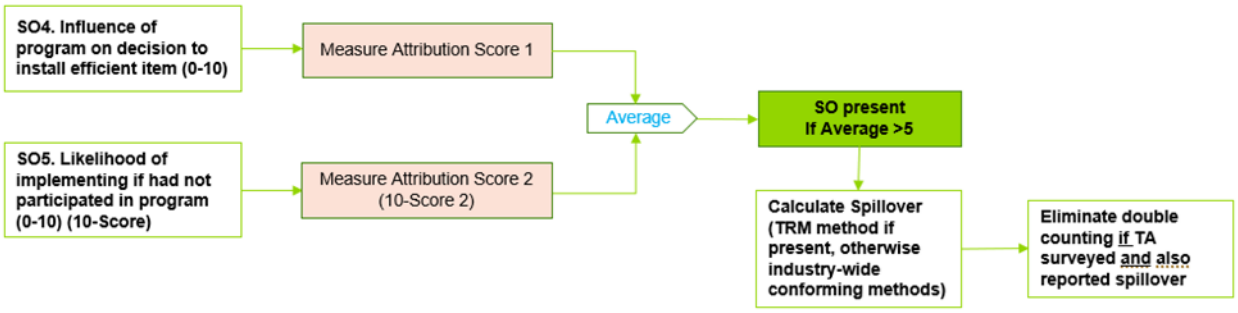


Source: Guidehouse, https://www.ilsag.info/wp-content/uploads/SAG-Deviation-Memo-for-Res-FR-2023-05-10.pdf

3.2 Participant Spillover Estimation

The evaluation team calculated participant spillover based on the TRM Version 13 Vol. 4 algorithm summarized in Figure 2.

Figure 2. TRM Residential Spillover Algorithm

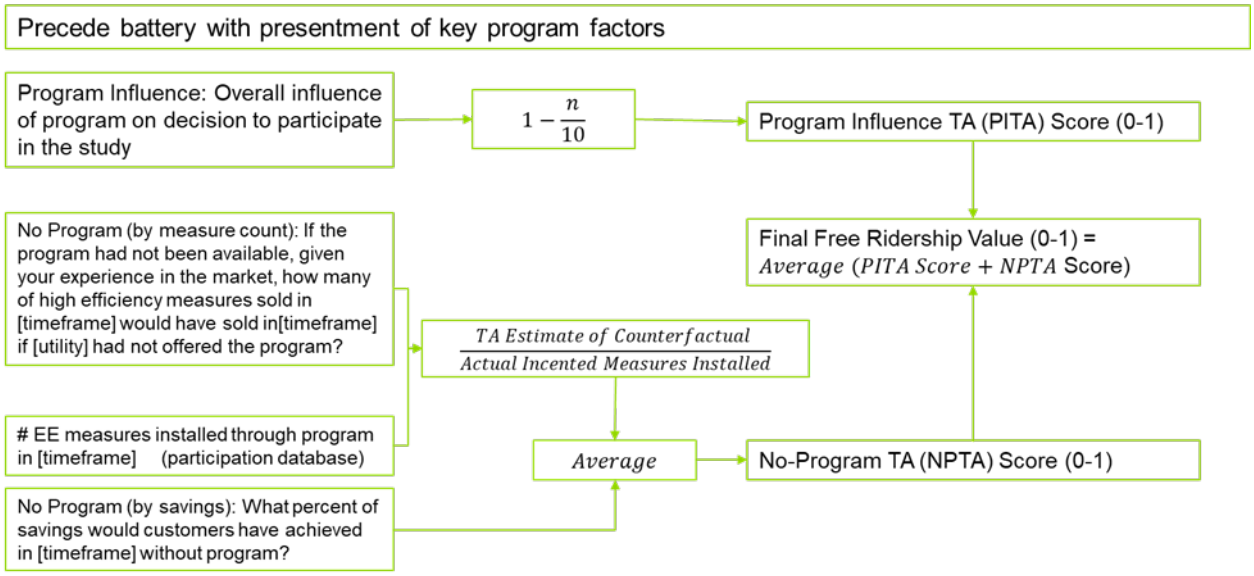


Source: Guidehouse, informed by TRM, Volume 4, Attachment A: Illinois Statewide Net-to-Gross Methodologies, page 62-63.

3.3 Trade Ally Free Ridership Estimation

TRM v13.0 does not specify an approach for measuring the trade ally perspective of participant FR. For this study, Guidehouse used the following method to assess participant FR from a trade ally perspective. This methodology is summarized in Figure 3 below.

Figure 3. Trade Ally Free Ridership Algorithm

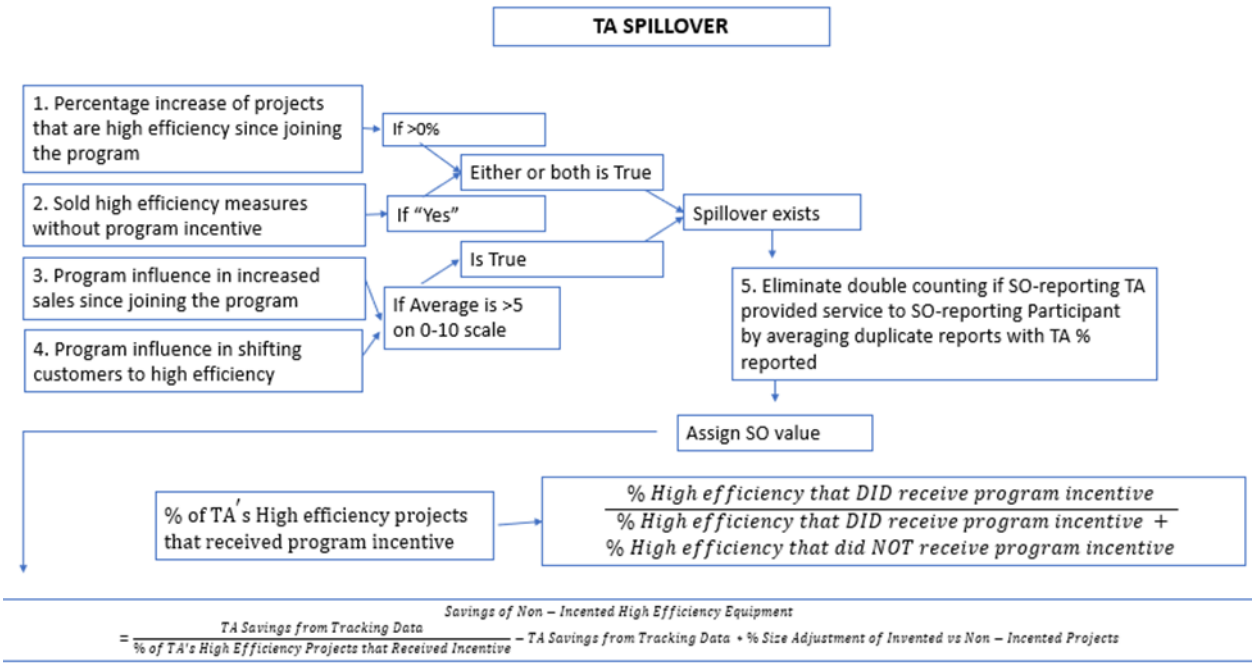


Source: Guidehouse

3.4 Trade Ally Spillover Estimation

The evaluation team quantified the trade ally's perspective of participant spillover using the methodologies laid out in the IL TRM v13 Section 5.2.1. The team assessed trade ally spillover by estimating the increase in installation/sales of high efficiency equipment/products that are influenced by the program but not rebated, as Figure 4 shows.

Figure 4. Trade Ally Spillover Algorithm



Source: Algorithm based on the content from IL TRM v13.0 Vol. 4 - Attachment A – Section 5.2.1.1

4. Participant and Trade Ally Free Ridership Results

Using the protocols detailed above and data collected during the participant and trade ally surveys, Guidehouse calculated FR estimates for the program participants and trade allies. Table 4 below presents their relative precision.[5] Section 4.2 details the process of combining participant and trade ally FR estimates.

Table 4. Participant and Trade Ally Free Ridership Research Results

Population	Free Ridership	Relative Precision @90% CI
Residential Participants	0.48	4.15%
Trade Allies	0.31	0.30%
Combined Results	**0.37**	**NA**

Source: Evaluation Team Analysis

[5] The analysis estimates relative precision at the 90 percent confidence level by calculating the standard error of the NTGR mean and adjusting for the total population size.

4.1 Free Ridership Consistency Check Analysis

The evaluation team checked for consistency in free rider responses by asking respondents to describe in their own words any influence that the program had on their decision to participate in the program, or what they would have done if the program, and its technical assistance and financial incentives, did not exist (see Figure 1).

The evaluation team applied the consistency check protocol specified for non-residential programs in TRM Volume 4, Section 3.1.1.1 which states that a program influence/counterfactual consistency check is triggered when either of the following conditions is met:

1) The Program Influence FR Score is greater than 0.7 AND the Counterfactual FR Score is less than 0.3.

OR

2) The Program Influence FR Score is less than 0.3 AND the Counterfactual FR Score is greater than 0.7.

For respondents whose responses triggered consistency checks, the evaluation team reviewed their verbatim responses to determine the weight of the program influence against the counterfactual responses and timing adjustments to arrive at a free ridership score.

Among participant responses, the evaluation team identified 29 that triggered consistency checks, and after a review of the verbatim responses, nine participants were removed from the free ridership analysis because their verbatim responses were ambiguous and did not clarify the inconsistency.

4.2 Combining Participant and Trade Ally Free Ridership

Guidehouse calculated a combined participant and trade ally FR estimate utilizing the triangulation approach outlined in the IL TRM v13 (Section 5.1 Volume 4). This approach rates the participant and trade ally survey data on three aspects: accuracy, validity, and representativeness, using a scale where 100% means "extremely so" and 0% means "not at all."

1. Accuracy: How likely is the approach to provide an accurate estimate of FR?
    a. We calculated the participant and trade ally portions based on a comparison of their relative precision (RP) values from the FR estimates.
    b. For this program, the Relative Precision (RP) from the participant surveys (0.039) was substantially greater than that of the TA surveys (0.003), indicating that the TA result was more precise (as a smaller RP indicates greater precision). To base our Accuracy score on RP, we normalized and inverted the result using the equation below. This resulted in a weight of 7% for the participant data and 93% for the TA data.

$$Normalized\ Weight = 1 - \left(\frac{Participant\ or\ Trade\ Ally\ RP}{Participant\ RP + Trade\ Ally\ RP}\right)$$

2. **Validity**: How valid are the data collected and the analysis? The evaluation team averaged quantitative and qualitative scoring for Validity.
    a. The quantitative score for participants and trade allies was based on the number of complete interviews relative to their total population. A total of 143 of the 1,045 participant projects completed surveys, resulting in a normalized score of 63% (refer to the formula below). In comparison, 49 out of 600 trade allies completed surveys, yielding a normalized score of 37%.

$$Normalized\ \%\ Weight = \frac{\%\ Complete\ for\ Participant\ or\ TradeAlly}{(\%\ Complete_{Participant} + \%\ Complete_{TradeAlly})}$$

    b. The qualitative score reflects the nature of the surveys. Participant surveys ask project-specific questions and, thus, are likely to have lower recall bias. In contrast, TA surveys cover multiple projects over the year. Alone these factors would lead us to score participant validity higher than TAs. But because residential participants typically do not understand the market or all the ways the program brings home energy savings to the extent that TAs do, we rate TA validity at 60% and participant validity at 40%.
    c. By averaging the quantitative and qualitative scores, the final Validity scores are even with 50% for participants and 50% for trade allies.

3. **Representativeness**: How representative is the sample?
    a. We assigned 46% weight to the participant portion and 54% weight to the trade ally portion, which is the normalized percentage of program savings represented by survey respondents.

Table 5. Free Ridership Triangulation Weighting Approach

Free Ridership Triangulation Data and Analysis	Participant	Trade Ally
How likely is this approach to provide an accurate estimate of free ridership?	7%	93%
How valid is the data collected/analysis?	50%	50%
How representative is the sample?	46%	54%
Average Score (Weight)	**35%**	**65%**

Source: Evaluation Team analysis

Applying these participant and trade ally weights to the FR estimates yields the blended FR estimates shown in the equation below.

$$\begin{aligned} Free\ Ridership &= (Participant\ FR) * (Participant\ Weight) + (TA\ FR) * (TA\ Weight) \\ &= 0.48 * 0.35 + 0.31 * 0.65 \\ &= 0.37 \end{aligned}$$

The evaluation team used this formula to combine the (0.48) participant free ridership with the (0.31) service provider free ridership to produce the combined weighted free ridership of 0.37.

4.3 Participant and Trade Ally Spillover Results

Of the 113 participant survey respondents included in the participant spillover analysis, 69 reported that they had installed additional energy efficient measures. Of those, 17 indicated they had not received program incentives or influence. All 17 participants passed the spillover attribution screening criteria,[6] and the evaluation team estimated gross energy savings from these spillover measures at 622 therms. The gross energy savings of the 113 participants who responded to the survey was 15,629 therms, which resulted in a participant spillover rate of 4%.

Of the 40 trade allies included in the trade ally analysis, 17 reported selling additional non-program incented high efficiency lighting measures. Eight of these 17 passed the spillover attribution screening criteria, and the estimated gross energy savings from these spillover measures was 7,233 therms. The gross energy savings of the 35 trade allies who responded to the survey were 96,077 therms which resulted in a trade ally spillover rate of 7.5%.

To ensure that spillover from the participant and trade ally sources did not lead to double counting, the evaluation team examined the data to exclude any reported spillover transactions from participants who purchased their measure from a trade ally who reported spillover. We found only one participant who qualified for spillover and was a customer of a qualified trade ally spillover respondent and removed that participant's spillover savings from the participant spillover rate calculation (and doing so did not change the participant spillover rate).

Table 6 presents the participant and trade ally spillover results, as well as the total spillover calculated, which is the sum of those results. This is then combined with the FR rate to estimate the NTG ratio.

Table 6. Spillover Research Results

Population	Spillover Results
Participant Spillover	0.04
Trade Ally Spillover	0.08
Total Spillover	**0.12**

Source: Evaluation team analysis

[6] Respondents who did not receive a rebate or received a rebate but not from PLG/NSG and answers to the program influence and counterfactual questions resulted in a spillover score greater than 5.

5. Final NTG Results and Recommendations

The final NTG value is calculated as 1- free ridership + spillover, using averaged values from participants and savings weighted values from trade allies using the following formula:

$$NTG = 1 - [(Participant\ FR * Participant\ Weight) + (TA\ FR * TA\ Weight)] + Participant\ Spillover + Active\ TA\ Spillover + Inctive\ TA\ Spillover$$

The final combined components of the NTG are shown in Table 7.

Table 7. Summary of Free Ridership, Spillover and NTG Results

Program Measure	Free ridership	Participant Spillover	Active Trade Ally Spillover	Inactive Trade Ally Nonparticipant Spillover*	NTG Ratio
HVAC, Weatherization	0.37	0.04	0.08	0.11	0.86

*Inactive trade ally NPSO is from previous research. See Section 6.
Source: Evaluation team analysis

6. Home Energy Rebates NTG History

GPY1	**Peoples Gas: NTG 0.72; Free ridership 0.28; Participant Spillover 0.00 North Shore Gas: NTG 0.67; Free ridership 0.33; Participant Spillover 0.00** **Method and Source:** Evaluation research consisting of GPY1 participating customer self-reports and participating trade ally interviews. For Peoples Gas: 68 NTG interviews completed from a population of 1,363 participants. For North Shore Gas: 71 NTG interviews completed from a population of 991 participants. No quantifiable participant spillover was found from customer self-reports. Significant qualitative evidence of spillover was found from 30 trade ally interviews, but was not quantified.
GPY2	**Peoples Gas: NTG 0.82; Deemed Free ridership 0.28; Non-Participant Spillover: 0.10 North Shore Gas: NTG 0.80; Deemed Free ridership 0.33; Non-Participant Spillover: 0.13** **Method and Source:** Spillover results for GPY2 based on evaluation research to estimate spillover from non-participating trade allies. For the spillover calculation, 59 interviews were conducted sampled from two groups of non-participating trade allies: 1) Trade allies that dropped out of the program (so- called "drop out" trade allies): those who had participated in GPY1, but did not participate in GPY2; and 2) True non-participating trade allies - those who reported that they were aware of the program, but had never participated. Free-ridership for GPY2 was deemed from GPY1 evaluation research based on SAG consensus. Evaluation did not research free-ridership in GPY2.
GPY3	**Peoples Gas: NTG 0.82; Deemed Free ridership 0.28; Non-Participant Spillover: 0.10 North Shore Gas: NTG 0.80; Deemed Free ridership 0.33; Non-Participant Spillover: 0.13** **Method and Source:** Deemed by SAG consensus from GPY1 and GPY2 evaluation research.
GPY4	**Peoples Gas: NTG 0.82; Deemed Free ridership 0.28; Non-Participant Spillover: 0.10 North Shore Gas: NTG 0.80; Deemed Free ridership 0.33; Non-Participant Spillover: 0.13** **Method and Source:** Deemed by SAG consensus. Values from GPY1 and GPY2 evaluation research.
GPY5	**Peoples Gas and North Shore Gas:** **NTG 0.81; Free ridership 0.30; Participant Spillover 0.00; Non-Participant Spillover: 0.11** **Method and Source:** A single value was developed for both PGL and NSG programs based on weighting GPY4 values 60% PGL to 40% NSG. Weighting based on GPY5 planning values.

GPY6	**Peoples Gas and North Shore Gas:** **NTG 0.81; Free ridership 0.30; Participant Spillover 0.00; Non-Participant Spillover: 0.11** **Method and Source:** A single value was developed for both PGL and NSG programs based on weighting GPY4 values 60% PGL to 40% NSG, no changes for GPY6.
2018 (GPY7)	**For all program measures except Duct Sealing, Air Sealing, and Insulation** **NTG:** 0.64 **Free ridership:** 0.49 **Method:** Value is from GPY5 evaluation on-line survey completed with 119 GPY5 HER Program participants. The FR result is based on applying the TRM v6.0 NTG methodologies. Overall program FR value uses GPY5 HER Program verified gross savings to weight measure category free ridership: AFUE 95+ (FR=0.48, weight=75%); programmable thermostats (FR=0.64, weight=11%); other measures in survey (FR is not based on enough responses to report statistically significant results at the measure level, weight = 14%). Program measures that were not researched were assigned the overall FR average. This NTG value is not recommended for air sealing, insulation, or duct sealing. Navigant described our concerns with the TRM v5.0 NTG algorithm and offered an alternative approach in an August 23, 2016 memo. Our alternative was not adopted for TRM v6.0, but the approach that did make it into TRM v6.0 addresses what we believed were weaknesses of TRM v5.0 and produces results similar to our August 23 recommended alternative. Navigant recommends the algorithm in TRM v6.0 over the algorithm in TRM v5.0 to estimate free ridership for residential prescriptive rebate programs. A Navigant memo dated December 30, 2016 provides further discussion. **Participant Spillover:** 0.02 **Method**: The PSO value is from GPY5 evaluation telephone survey research conducted with 100 GPY4 Nicor Gas HEER Program participants. The PSO result is based on applying the TRM v5.0 methodologies to identify spillover candidates, and estimating spillover savings using the Illinois TRM and Nicor Gas program data from GPY4. The TRM version 6.0 participant spillover methodology advises using a lower, more inclusive spillover threshold score of 5.0 rather than 7.0. Navigant re-examined our survey responses applying a threshold of 5.0, but no additional gas spillover was found. A Navigant memo dated December 16, 2016 provides further discussion. Navigant recommends the PSO value from the Nicor Gas study for PGL & NSG. The last participant spillover study for the PGL & NSG HER Program was conducted in GPY1, where evidence of PSO was found, but it was not quantified. **Non-Participant Spillover**: 0.11

	Method: Non-participant spillover value for 2018 (GPY7) is based on GPY2 evaluation research conducted for Peoples Gas and North Shore Gas to estimate spillover from non-participating trade allies. For statewide consistency, the methodology and survey instrument were derived from evaluation research completed for Ameren Illinois by Cadmus. For the spillover calculation, 59 interviews were conducted sampled from two groups of non-participating trade allies: 1) Trade allies that dropped out of the PGL or NSG program (so-called "drop out" trade allies): those who had participated in GPY1, but did not participate in GPY2; and 2) True non-participating trade allies - those who reported that they were aware of the PGL and NSG program, but had never participated. The value of 0.11 is a weighted average of 0.10 for Peoples Gas and 0.13 for NSG. **For Duct Sealing, Air Sealing, and Insulation** **NTG:** 0.90 **Free ridership:** 0.10 **Spillover:** 0.00 **Method**: The free ridership value was taken from the "Home Energy Savings Program GPY2/EPY5 Evaluation Report" prepared for Nicor Gas and ComEd (Navigant, 3/25/2014). Results for Nicor Gas for the weatherization component were: FR=0.10. No recommendation was made for spillover. The GPY5 HER FR research did not have a representative mix of duct sealing, air sealing and insulation measures, which contribute significant portions of the PGL & NSG program savings. Navigant concludes the GPY5 overall HER Program NTG (0.64) is not reasonable for duct sealing, air sealing, and insulation. Duct sealing, air sealing, and insulation FR and PSO research is planned for the first half of 2017. Navigant may recommend updated free ridership and spillover values using data from the PGL & NSG Home Energy Rebate Program survey planned for the first half of 2017 if results are final prior to May 30, 2017.
2019-2020	**Home Energy Rebate (HVAC and other equipment, excluding Smart Thermostats, Duct Sealing, Air Sealing, and Insulation Measures)** **NTG: 0.63; Free Ridership: 0.49; Participant Spillover: 0.01; Non-Participant Spillover: 0.11** **Method:** FR and PSO: 2017 Survey of 74 GPY6 HVAC/Other Equipment participants and 60 participating trade allies. Memo: Net-to-Gross Research Results from GPY6 for the Peoples Gas and North Shore Gas Home Energy Rebate Program, Navigant, 5/26/17 NPSO: 2013 Survey of 59 non-participating trade allies. Residential Prescriptive Rebate Program GPY2 Evaluation Report, Navigant, 2/10/14

	Home Energy Rebate - Duct Sealing, Air Sealing, and Insulation Measures NTG: 0.73 to 0.78, measure-level and program-level values described below Method: FR and PSO: 2017 Survey of 86 GPY6 Air Sealing, Duct Sealing, and Insulation participants and 60 participating trade allies. Memo: Net-to-Gross Research Results from GPY6 for the Peoples Gas and North Shore Gas Home Energy Rebate Program, Navigant, 5/26/17 All scenarios of Air Sealing plus Attic Insulation Installed in the Same Project (with or without additional measures installed in the same project) Method: Applies only in scenarios where air sealing and attic insulation are installed at the same time, and only if the savings for natural gas heating are estimated using the Illinois TRM Version 7.0, Section 5.6.1 (Air Sealing) and Section 5.6.5 (Ceiling/Attic Insulation) adjustment factor of 72% that was derived from air sealing and insulation research by Navigant (2018). See Navigant (2018) ComEd and Nicor Gas Air Sealing and Insulation Research Report. The 72% adjustment factor was derived from a gas consumption data regression analysis with an experimental design that does not require further net savings adjustment. Either NTG Approach Option 1 or Option 2 are acceptable. NTG Application Approach Option 1: Measure-level NTG values for air sealing, duct sealing, and insulation a. All scenarios of Air Sealing plus Attic Insulation Installed in the Same Project (with or without additional measures installed in the same project) NTG: Use 72% TRM savings adjustment factor and no further NTG adjustment b. Air Sealing and Insulation Measures: Measure-level NTG value of 0.73 applies to any single measure or combined set of air sealing and insulation measures, alone or in combination with other measures installed in the same project, EXCLUDING the net savings for air sealing and attic insulation installed in the same project (those net savings are always calculated separately): NTG 0.73 Free ridership 28% Spillover 1% c. Duct Sealing Measures. Measure-level NTG value of 0.78 for duct sealing applies only if the measure level NTG of 0.73 is used for air sealing (w/o attic insulation) and other insulation measures.

	NTG 0.78 Free ridership 23% Spillover 1%
2021-2023	Home Energy Rebate (HVAC and other equipment, excluding Smart Thermostats, Duct Sealing, Air Sealing, and Insulation Measures) NTG: 0.74; Free Ridership: 0.44; Participant Spillover: 0.02; Non-Participant Spillover: 0.16 FR and PSO: Guidehouse 2020 survey of 100 analyzed completes from 2018 participants (any measure) for PSO; 63 analyzed completes from 2019 for FR (HE furnace participants); and 41 analyzed completes of 2019 active participating trade allies. Since HE furnaces comprise 92% of HVAC equipment savings, Guidehouse recommends applying FR results to other HVAC equipment (predominantly HE boilers and tankless water heaters) NPSO: IATSO (0.11): 2013 Survey of 59 non-participating trade allies. Residential Prescriptive Rebate Program GPY2 Evaluation Report, Navigant, 2/10/14 ATSO (0.05): The spillover measures reported by participants (PSO: 0.02) and active trade allies (ATSO: 0.05) in the 2020 survey research did not overlap, therefore the spillover results are additive. The inactive trade allies spillover estimate (IATSO): 0.11) does not overlap with either participants or active trade allies. All scenarios of Air Sealing plus Attic Insulation Installed in the Same Project (whether or not additional measures are installed in the same project) Method: Applies only in scenarios where air sealing and attic insulation are installed at the same time, and only if the savings for natural gas heating are estimated using the Illinois TRM Version 8.0, Section 5.6.1 (Air Sealing) and Section 5.6.5 (Ceiling/Attic Insulation) adjustment factor of 72% that was derived from air sealing and insulation research by Navigant (2018). See Navigant (2018) ComEd and Nicor Gas Air Sealing and Insulation Research Report. The 72% adjustment factor was derived from a gas consumption data regression analysis with an experimental design that does not require further net savings adjustment. Home Energy Rebate - Air Sealing (without adding attic insulation), Insulation Measures (excluding attic insulation), and Duct Sealing

	NTG: Measure-level values described below Method: FR: Navigant research of free ridership from a telephone survey administered to ComEd EPY9/GPY6 and CY2018 Weatherization Rebates Program participants that were joint with PGL, NSG and Nicor Gas. Navigant conducted the net-to-gross (NTG) research in Fall 2018 with EPY9/GPY6 and CY2018 participants and in Spring 2019 with only CY2018 duct sealing participants. Analyzed completes: Attic Insulation (61), Air Sealing (68), Duct Sealing (79). Wall insulation FR is a weighted average value, applied to other insulation measures. Survey was fuel neutral and used TRM v7.0 protocols. Navigant recommended updating older gas research with these newer joint values, described in Navigant memo to ComEd July 19, 2019. PSO: 2017 Survey of 86 GPY6 Air Sealing, Duct Sealing, and Insulation participants and 60 participating trade allies. Memo: Net-to-Gross Research Results from GPY6 for the Peoples Gas and North Shore Gas Home Energy Rebate Program, Navigant, 5/26/17 a. Air Sealing (conducted without adding attic insulation): NTG 0.77 Free ridership 24% Spillover 1% b. Insulation measures, excluding ceiling/attic insulation, including Wall, Floor Above Crawlspace, Basement Sidewall; Rim/Band Joist: NTG 0.79 Free ridership 22% Spillover 1% c. Duct Sealing Measures: NTG 0.87 Free ridership 14% Spillover 1%
2024-2025	Home Energy Rebate (HVAC and other equipment, excluding Smart Thermostats, Duct Sealing, Air Sealing, and Insulation Measures) NTG: 0.74; Free Ridership: 0.44; Participant Spillover: 0.02; Non-Participant Spillover: 0.16 FR and PSO: Guidehouse 2020 survey of 100 analyzed completes from 2018 participants (any measure) for PSO; 63 analyzed completes from 2019 for FR (HE furnace participants); and 41 analyzed completes of 2019 active participating trade allies. Since HE furnaces comprise 92% of HVAC equipment savings, Guidehouse recommends applying FR results to other HVAC equipment (predominately HE boilers and tankless water heaters) NPSO:

	IATSO (0.11): 2013 Survey of 59 non-participating trade allies. Residential Prescriptive Rebate Program GPY2 Evaluation Report, Navigant, 2/10/14 ATSO (0.05): The spillover measures reported by participants (PSO: 0.02) and active trade allies (ATSO: 0.05) in the 2020 survey research did not overlap, therefore the spillover results are additive. The inactive trade allies spillover estimate (IATSO): 0.11) does not overlap with either participants or active trade allies. Advanced Thermostats NTG: 0.89; Free Ridership: 0.22; Participant Spillover: NA; Guidehouse recommends NTG = 1 - FR/2 + NPSO for residential advanced thermostat. Here FR is based on Guidehouse research conducted in 2023 with PGL/NSG customers who purchased a discounted advanced thermostat through the Home Energy Rebate program between Q2 2022 and Q1 2023. Guidehouse memo: PLG NSG Advanced Thermostat FR Memo 2023-08-31. (Note that net savings achieved by advanced thermostats are included when calculating residential non-participant spillover with the multiplier, described below.) All scenarios of Air Sealing plus Attic Insulation Installed in the Same Project (whether or not additional measures are installed in the same project) Method: Applies only in scenarios where air sealing and attic insulation are installed at the same time, and only if the savings for natural gas heating are estimated using the Illinois TRM Version 8.0, Section 5.6.1 (Air Sealing) and Section 5.6.5 (Ceiling/Attic Insulation) adjustment factor of 72% that was derived from air sealing and insulation research by Navigant (2018). See Navigant (2018) ComEd and Nicor Gas Air Sealing and Insulation Research Report. The 72% adjustment factor was derived from a gas consumption data regression analysis with an experimental design that does not require further net savings adjustment. Home Energy Rebate - Air Sealing (without adding attic insulation), Insulation Measures (excluding attic insulation), and Duct Sealing NTG: Measure-level values described below Method: FR: Navigant research of free ridership from a telephone survey administered to ComEd EPY9/GPY6 and CY2018 Weatherization Rebates Program participants that were joint with PGL, NSG and Nicor Gas. Navigant conducted the net-to-gross (NTG) research in Fall 2018 with EPY9/GPY6 and CY2018 participants and in Spring 2019 with only CY2018 duct sealing participants. Analyzed completes: Attic Insulation (61), Air Sealing (68), Duct Sealing (79). Wall insulation FR is a weighted average value, applied to other insulation measures. Survey was fuel neutral and used TRM v7.0 protocols. Navigant

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Source: Annual NTG Recommendations