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CC: Randy Gunn, Jeff Erickson, Rob Neumann, Navigant

From: Kevin Grabner, Laura Agapay-Read, Paul Higgins, Sharon Mullen, Navigant

Date: September 19, 2018

Re: Weighting Gas Utility Small Business Service Provider and Participant Free Ridership using the TRM Version 7.0 Protocol and CY2019 NTG Recommendations

Introduction

This memo presents our free ridership recommendations for the gas utility Small Business programs for CY2019 based on a new triangulation weighting of Small Business program participant and service provider free ridership results. In the September 7, 2018 NTG meeting, Nicor Gas requested that the triangulation weighting defined in the Illinois TRM version 7.0 methodologies¹ be applied to CY2019. We present the triangulation weighting approach and our results for Nicor Gas and for Peoples Gas (PGL) and North Shore Gas (NSG). Navigant’s recommended free ridership, spillover, and NTG values for gas utility Small Business programs for CY2019 are summarized in Table 9 and Table 10.

The NTG histories for these programs are provided in Appendix 1 (PGL and NSG) and Appendix 2 for Nicor Gas.

Combining Participant and Service Provider Results

For our free ridership recommendation for the program for CY2019, Navigant calculated a weighted average of the participant and service provider free ridership utilizing the triangulation approach² shown in Table 1 to arrive at one recommended free ridership score. Applying the approach, Navigant rated the survey data on three aspects: accuracy, validity, and representativeness, using a scale of 0 to 10 where 10 means “extremely so” and 0 means “not at all” on the following three questions:

1. All things being equal, on a scale of 0 to 10, with 0 being not at all likely and 10 being extremely likely, how likely is the approach to provide a more accurate estimate of free ridership?
2. Similarly, on a scale of 0 to 10, with 0 being not at all valid and 10 being extremely valid, how valid and reliable is the data collected and the analysis performed (i.e., consider non-response bias, missing data (e.g., whether data collected was based on recollection or record keeping?)
3. On a scale of 0 to 10, with 0 being not at all representative and 10 being extremely representative, how representative is the sample (accounting for sampling error {confidence and precision}, and non-response bias, and any sample frame bias)?

¹ Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 7.0, Volume 4: Cross-Cutting Measures and Attachments, effective January 1st, 2019.

² The triangulation approach is presented in TRM version 7.0 for all sectors as an update to TRM version 6.0.

The weight for each free ridership estimate is the average score for that estimate divided by the sum of the average scores for both estimates.

Table 1. Triangulation Weighting Approach

Free Ridership Triangulation Data and Analysis	Participants	Service Providers
How likely is this approach to provide an accurate estimate of free ridership?		
How valid is the data collected/analysis?		
How representative is the sample?		
Calculation		
Average Score		
Sum of Averages		
Weight		

Source: TRM version 7.0.

These weights were subsequently applied to the researched free ridership value for the participants and service providers, then added together:

$$\text{Free Ridership} = ((\text{Participant FR}) * (\text{Participant Weight})) + ((\text{Service Provider FR}) * (\text{Service Provider Weight}))$$

Review of Prior Research

The free ridership research we used for scoring the weighting of service providers and participants was conducted in GPY4 and GPY5. Navigant reviewed the reports that documented our methodology, sample sizes, survey instruments, and results for free ridership research, and then used judgement to assign scores to the triangulation factors. The key aspects we considered are summarized below and in Appendix 1 for PGL and NSG and Appendix 2 for Nicor Gas:

- Peoples Gas and North Shore Gas: Free ridership was estimated from participant telephone survey research conducted with 44 PGL and NSG participants from 207 unique contacts in GPY5³ (achieving a confidence and precision of 90/6). Although confidence and precision are high, non-response bias is a consideration tempering our scoring. A free ridership estimate was developed for service providers from interviews with 12 PGL and NSG trade allies conducted in GPY4⁴, representing 56 percent of rebate project term savings achieved by trade allies. The trade ally free ridership survey asked about their rebated projects, not

³ http://ilsagfiles.org/SAG_files/Evaluation_Documents/Peoples%20Gas%20and%20North%20Shore%20Gas/PG-NSG_GPY5_Evaluation_Reports/PG_NS_GPY5_Small_Business_Program_Evaluation_Report_2017-03-10_Final.pdf

⁴ http://ilsagfiles.org/SAG_files/Evaluation_Documents/Peoples%20Gas%20and%20North%20Shore%20Gas/PG-NSG_GPY4_Evaluation_Reports/PG_NS_GPY4_Small_Business_Program_Eval_Report_2016-03-30_Final.pdf

direct install measures. Responses for participants and trade allies were based on self-reports.

- Nicor Gas: Participant free ridership values are from GPY5⁵ evaluation research conducted by CATI telephone survey with GPY5 decision-makers for two paths: direct install -- 30 respondents of 265 participants (achieving a confidence and precision of 90/6) and prescriptive rebates -- 40 respondents of 498 participants (achieving a confidence and precision of 90/7). Although confidence and precision are high, non-response bias is a consideration tempering our scoring. Due to the small population of Small Business custom projects (15), the GPY5 research completed only five Small Business custom project participant interviews. Participant FR research conducted on the GPY5 Business Custom Program produced a free ridership estimate of 0.21 (achieving a confidence and precision of 90/12),⁶ and 0.21 was judged to be the best available value for a custom path-level free ridership. Interviews with 10 Small Business trade allies representing 81 percent of rebate project therm savings produced a free ridership value of 0.06. The trade ally free ridership survey asked about their rebated projects, not direct install measures. Responses for participants and trade allies were based on self-reports.

Free Ridership Weighting Results

Navigant calculated a weighted average of the participant and service provider free ridership for PGL and NSG applying the scores presented in Table 2 for direct install, and Table 3 for retrofit rebates.

⁵http://ilsagfiles.org/SAG_files/Evaluation_Documents/Nicor%20Gas/Nicor_Gas_GPY5_Evaluation_Reports/Nicor_Gas_GPY5_Small_Business_Program_Evaluation_Report_2017-09-12_Final.pdf

⁶http://ilsagfiles.org/SAG_files/Evaluation_Documents/Nicor%20Gas/Nicor_Gas_GPY5_Evaluation_Reports/Nicor_Gas_GPY5_Custom_Program_Evaluation_Report_2017-10-30_Final.pdf

Table 2. Triangulation Weighting for PGL and NSG Direct Install Measures

Free Ridership Triangulation Data and Analysis	Participants	Service Providers
How likely is this approach to provide an accurate estimate of free ridership?	4	6
How valid is the data collected/analysis?	6	10
How representative is the sample?	7	10
Calculation		
Average Score	5.7	8.7
Sum of Averages	14.3	14.3
Weight	0.40	0.60
Free Ridership	0.15	0.00
Weighted Free Ridership Result	0.06	

Source: PGL and NSG GPY4 and GPY5 evaluation reports and Navigant analysis. In this case, the Service Provider is a program implementation contractor, and their estimate of free ridership is set to zero.

Table 3. Triangulation Weighting for PGL and NSG Retrofit Measures

Free Ridership Triangulation Data and Analysis	Participants	Service Providers
How likely is this approach to provide an accurate estimate of free ridership?	4	8
How valid is the data collected/analysis?	6	6
How representative is the sample?	7	6
Calculation		
Average Score	5.7	6.7
Sum of Averages	12.3	12.3
Weight	0.46	0.54
Free Ridership	0.15	0.03
Weighted Free Ridership Result	0.09	

Source: PGL and NSG GPY4 and GPY5 evaluation reports and Navigant analysis.

Navigant calculated a weighted average of the participant and service provider free ridership for Nicor Gas applying the scores presented in Table 4 for direct install, Table 5 for prescriptive rebates, and Table 6 for custom rebates.

Table 4. Triangulation Weighting for Nicor Gas Direct Install Measures

Free Ridership Triangulation Data and Analysis	Participants	Service Providers
How likely is this approach to provide an accurate estimate of free ridership?	4	6
How valid is the data collected/analysis?	6	10
How representative is the sample?	7	10
Calculation		
Average Score	5.7	8.7
Sum of Averages	14.3	14.3
Weight	0.40	0.60
Free Ridership	0.23	0.00
Weighted Free Ridership Result	0.09	

Source: Nicor Gas GPY5 evaluation report and Navigant analysis. In this case, the Service Provider is a program implementation contractor, and their estimate of free ridership is set to zero.

Table 5. Triangulation Weighting for Nicor Gas Prescriptive Rebate Measures

Free Ridership Triangulation Data and Analysis	Participants	Service Providers
How likely is this approach to provide an accurate estimate of free ridership?	4	8
How valid is the data collected/analysis?	6	6
How representative is the sample?	7	8
Calculation		
Average Score	5.7	7.3
Sum of Averages	13.0	13.0
Weight	0.44	0.56
Free Ridership	0.34	0.06
Weighted Free Ridership Result	0.18	

Source: Nicor Gas GPY5 evaluation report and Navigant analysis.

Table 6. Triangulation Weighting for Nicor Gas Custom Rebate Measures

Free Ridership Triangulation Data and Analysis	Participants	Service Providers
How likely is this approach to provide an accurate estimate of free ridership?	3	8
How valid is the data collected/analysis?	0	6
How representative is the sample?	0	8
Calculation		
Average Score	1.0	7.3
Sum of Averages	8.3	8.3
Weight	0.12	0.88
Free Ridership	0.21	0.06
Weighted Free Ridership Result	0.08	

Source: Nicor Gas GPY5 evaluation reports and Navigant analysis.

Free Ridership Comparison with Previous Recommendation

The free ridership results we recommended for CY2018 (GPY7) for equally weighting program participants and service providers are compared with triangulation weighting from TRM version 7.0, in Table 7 for PGL and NSG, and Table 8 for Nicor Gas.

Table 7. PGL and NSG Summary of Free Ridership with TRM v7.0 versus 50/50 Weighting

Small Business Program Path	Free Ridership Weighting from TRM v7.0 Methodology	2018 (GPY7) Free Ridership 50/50 Weighting
Direct Install*	0.06	0.09
Retrofit Rebates	0.09	0.09

* In the 2018 free ridership recommendation, the trade ally free ridership estimate of 0.03 was averaged with the participant result. The trade ally free ridership survey asked about their rebated projects, not direct install measures. In this case, the Service Provider is a program implementation contractor, and their estimate of free ridership was set to zero.

Table 8. Nicor Gas Summary of Free Ridership with TRM v7.0 versus 50/50 Weighting

Small Business Program Path	Free Ridership Weighting from TRM v7.0 Methodology	2018 (GPY7) Free Ridership 50/50 Weighting
Direct Install*	0.09	0.14
Prescriptive Rebates	0.18	0.20
Custom Rebates	0.08	0.13

** In the 2018 free ridership recommendation, the trade ally free ridership estimate of 0.06 was averaged with the participant result. The trade ally free ridership survey asked about their rebated projects, not direct install measures. In this case, the Service Provider is a program implementation contractor, and their estimate of free ridership was set to zero.*

NTG Recommendations for CY2019 Small Business Programs

For CY2019, Navigant recommends using the TRM v7.0 methodology to weight the participant and service provider free ridership scores because the weighted triangulation method appropriately gives more weight to more certain results. The TRM v7.0 weighting methodology is not applied to spillover. For CY2019, Navigant is recommending participant spillover of 0.01 and zero non-participant spillover for Peoples Gas, North Shore Gas, and Nicor Gas. A summary of our recommended NTG values for CY2019 are provided in Table 9 and Table 10.

Table 9. PGL and NSG Summary of Recommended NTG Values for CY2019 Small Business

Small Business Program Path	Free Ridership	Participant Spillover	Non-Participant Spillover	NTG
Direct Install	0.06	0.01	0	0.95
Retrofit Rebates	0.09	0.01	0	0.92

Table 10. Nicor Gas Summary of Recommended NTG Values for CY2019 Small Business

Small Business Program Path	Free Ridership	Participant Spillover	Non-Participant Spillover	NTG
Direct Install	0.09	0.01	0	0.92
Prescriptive Rebates	0.18	0.01	0	0.83
Custom Rebates	0.08	0.01	0	0.93

Appendix 1: People Gas (PGL) and North Shore Gas (NSG) Small Business Program NTG History

	Small Business Program
GPY1	<p>NTG 0.99</p> <p>Free ridership 0.02</p> <p>Participant Spillover 0.01</p> <p>Method and Source: Evaluation research consisting of GPY1 participating customer self-report combined with trade ally input. Customer self-reports: 30 participant NTG interviews completed covering 31 projects from a population of 396 projects. Basic method of participant free ridership analysis was applied. One percent participant spillover was found from customer self-reports. Customer participant self-reported free-ridership was 18 percent for Peoples Gas and North Shore Gas. Trade ally interviews: Three trade allies interviewed representing 98% of ex ante program therm savings. Individual trade ally responses to free-ridership questions were weighted by their respective fuel-specific program savings contributions and combined for a fuel-specific overall free-ridership rate. This approach resulted in an evaluation estimate of 2 percent free-ridership for gas measures.</p>
GPY2	<p>Peoples Gas: Deemed NTG 0.99; Free ridership 0.02; Participant Spillover: 0.01</p> <p>North Shore Gas: Deemed NTG 0.99; Free ridership 0.02; Participant Spillover: 0.01</p> <p>Method and Source: Deemed by SAG consensus from GPY1 evaluation research.</p>
GPY3	<p>Peoples Gas: Deemed NTG 0.99; Free ridership 0.02; Participant Spillover: 0.01</p> <p>North Shore Gas: Deemed NTG 0.99; Free ridership 0.02; Participant Spillover: 0.01</p> <p>Method and Source: Deemed by SAG consensus from GPY1 evaluation research.</p>
GPY4	<p>NTG 0.99; Free ridership 0.02; Participant Spillover: 0.01</p> <p>Method and Source: Based on evaluation recommendation. Did not reach consensus.</p>
GPY5	<p>NTG 0.93 (for Direct Install and Retrofit Incentives)</p> <p>Free ridership 0.09</p> <p>Spillover 0.02</p> <p>Method: The GPY5 NTG value uses an equal-weight average of the free-ridership estimate from participant survey research performed on ComEd participants during EPY7 with the free-ridership estimate derived from PG/NSG trade ally interviews in GPY1. For participant spillover, the EPY7 ComEd result was 2%, the Nicor Gas GPY1 result was 2%, and PG/NSG</p>

	<p>Small Business Program</p>
	<p>GPY1 result was 1%. A value of 2% for participant spillover was set for all three utilities. This results in a NTGR of 0.93. For ComEd PY7 NTG research, Navigant conducted a CATI survey of 70 program projects drawn at random from a sample frame of 4,441 projects with ex-ante savings of 5,000 kWh or greater, representing 82 percent of PY7 projects and 98 percent of PY7 expected savings. Sample size chosen to attain +/- 10 percent precision at 90 percent confidence.</p>
GPY6	<p>NTG 0.93 for Direct Install, Retrofit (custom and prescriptive projects)</p> <p>Free ridership 0.09; average of participant (0.16) and trade ally (0.03)</p> <p>Participant Spillover 0.02</p> <p>Non-Participant Spillover 0.00</p> <p>Method: The GPY6 NTG value uses an equal-weight average of the 16 percent free-ridership estimate from participant survey research performed on ComEd participants during EPY7 (described in GPY5 above) with the three percent free-ridership estimate derived from PGL and NSG trade ally interviews in GPY4. The PGL and NSG GPY4 trade ally free ridership is based on 12 trade ally interviews from a population of 55. The GPY4 trade ally interviews found no spillover. For participant spillover, the EPY7 ComEd result was 2%, the Nicor Gas GPY1 result was 2%, and PG/NSG GPY1 result was 1%. A value of 2% for participant spillover was set for all three utilities.</p>
2018 (GPY7)	<p>NTG 0.92 for Direct Install and Retrofit (custom and prescriptive projects)</p> <p>Free ridership 0.09; equal weighted average of participant (0.15) and trade ally (0.03) results</p> <p>Participant Spillover 0.01</p> <p>Non-Participant Spillover 0.00</p> <p>Method: The 2018 (GPY7) NTG value uses an equal-weight average of the 15 percent free ridership estimate from participant telephone survey research conducted on 44 PGL & NSG participants from GPY5, and a three percent free-ridership estimate for 12 PGL & NSG trade allies from interviews conducted in GPY4. The participant free ridership estimate was based on "Option 1" of the TRM v5.0 NTG protocol which is now the protocol in TRM v6.0. The PGL and NSG GPY4 trade ally free ridership is based on a representative stratified sample of 12 trade ally interviews from a population of 55. The GPY4 trade ally interviews found no spillover. For participant spillover, both GPY5 and GPY1 results for PGL & NSG were 1 percent.</p>

Source: http://ilsaqfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/PGL_and_NS_G_NTG_Summary_GPY1-7_2017-03-01_Final.pdf

Appendix 2: Nicor Gas Small Business Program NTG History

	Small Business Program
GPY1	<p>NTG 1.00</p> <p>Free ridership 2%</p> <p>Spillover 2%</p> <p>Method: Customer self-report combined with trade ally input. 24 participant surveys completed from a population of 272. Basic method of participant free-ridership analysis was used. No participant spillover was found. Customer participant self-reported free-ridership was 20 percent for Nicor. Individual trade ally responses (representing over 80% of PY1 program savings) to free-ridership questions were weighted by their respective fuel-specific program savings contributions and combined for a fuel-specific maximum overall free-ridership rate. This approach resulted in an evaluation estimate of 0.02 free-ridership for gas measures that was balanced by spillover of 0.02 resulting in a NTG ratio of 1.00 for Nicor.</p>
GPY2	<p>NTG 1.00</p> <p>Free ridership 2%</p> <p>Spillover 2%</p> <p>Method: SAG deemed NTG ratio based on GPY1 evaluation research.</p>
GPY3	<p>NTG 1.00</p> <p>Free ridership 2%</p> <p>Spillover 2%</p> <p>Method: SAG deemed NTG ratio based on GPY1 evaluation research.</p>
GPY4	<p>NTG 1.00</p> <p>Free ridership 2%</p> <p>Spillover 2%</p> <p>Method: NTG values for GPY4 were deemed using values from GPY3, and reported in Table 14 of the Nicor Gas filed Energy Efficiency Plan for GPY4-GPY6.</p>
GPY5	<p>NTG 0.93</p> <p>Free ridership 9%</p> <p>Spillover 2%</p> <p>Method: The GPY5 NTG value uses an equal-weight average of the free-ridership estimate from participant survey research performed on ComEd participants during EPY7 with the</p>

	<p>free-ridership estimate derived from Nicor Gas trade ally interviews in GPY1. For participant spillover, the EPY7 ComEd result was 2%, the Nicor Gas GPY1 result was 2%, and PGL/NSG GPY1 result was 1%. A value of 2% for participant spillover was set for all three utilities. This results in a NTGR of 0.93. For ComEd PY7 NTG research, Navigant conducted a CATI survey of 70 program projects drawn at random from a sample frame of 4,441 projects with ex-ante savings of 5,000 kWh or greater, representing 82 percent of PY7 projects and 98 percent of PY7 expected savings. Sample size chosen to attain +/- 10 percent precision at 90 percent confidence.</p>
<p>GPY6</p>	<p>NTG 0.93 for Direct Install, Retrofit (custom and prescriptive projects).</p> <p>Free ridership 0.09; average of participant (0.16) and trade ally (0.03)</p> <p>Participant Spillover 0.02</p> <p>Non-Participant Spillover 0.00</p> <p>Method: The GPY6 NTG value uses an equal-weight average of the 16 percent free-ridership estimate from participant survey research performed on ComEd participants during EPY7 (described in GPY5 above) with the three percent free-ridership estimate derived from PGL and NSG trade ally interviews in GPY4. The PGL and NSG GPY4 trade ally free ridership is based on 12 trade ally interviews from a population of 55. The GPY4 trade ally interviews found no spillover. The GPY4 PGL & NSG trade ally free ridership was considered the best available research value for Nicor Gas, based on similarities in program design and measure mix, and trade ally overlap.</p> <p>For participant spillover, the EPY7 ComEd result was 2%, the Nicor Gas GPY1 result was 2%, and PG/NSG GPY1 result was 1%. A value of 2% for participant spillover was set for all three utilities.</p>
<p>2018 (GPY7)</p>	<p>Direct Installation: NTG 0.87; Free ridership 0.14, average of participant (0.23) and trade ally (0.06); Participant Spillover: 0.01; Non-Participant Spillover 0.00.</p> <p>Prescriptive Rebates: NTG 0.81; Free ridership 0.20, average of participant (0.34) and trade ally (0.06); Participant Spillover: 0.01; Non-Participant Spillover 0.00.</p> <p>Custom Incentives: NTG 0.88; Free ridership 0.13, average of participant (0.21) and trade ally (0.06); Participant Spillover: 0.01; Non-Participant Spillover 0.00.</p> <p>Comprehensive Project Roll-up Average: NTG 0.81; Free ridership 0.20, average of participant (0.34) and trade ally (0.06); Participant Spillover: 0.01; Non-Participant Spillover 0.00.</p> <p>Method: Participant free ridership values are from GPY5 evaluation research conducted by CATI telephone survey with GPY5 decision-makers for these two paths: 30 respondents for direct install (90/6); 40 respondents for prescriptive rebates (90/7). The GPY5 research applied the TRM v6.0 NTG algorithms.</p> <p>Due to the small population of Small Business custom projects, the GPY5 research completed only five Small Business custom project participant interviews, achieving a 90/23 result.</p>

	<p>Participant FR research conducted on the GPY5 Business Custom Program produced a free ridership estimate of 0.21, at 90/12, and 0.21 is judged to be the best available value for a custom path-level free ridership. The GPY5 Business Custom Program research used TRM v6.0 NTG algorithms.</p> <p>Participant spillover of 0.01 is a program-level research result from 75 interviews with Small Business Program GPY5 participants. The GPY5 research applied the TRM v6.0 NTG algorithms.</p> <p>Interviews with 10 trade allies representing 81 percent of program therm savings produced a free ridership value of 0.06, applicable at the program-level, but did not find evidence of PSO or NPSO.</p> <p>The comprehensive roll-up NTG value covers Direct Install, Prescriptive, and Custom Small Business path participants. Participant free ridership of 0.34 is a program-level research result from 75 interviews with Small Business Program GPY5 participants, weighted by GPY5 path savings. The GPY5 research applied the TRM v6.0 NTG algorithms. The roll-up NTG value may be used instead of the path-level NTGs.</p>
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Source: http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/Nicor_Gas_NTG_Summary_GPY1-7_2017-03-01_Final.pdf