



BUSINESS PROGRAM
Evaluation Report
C&I Custom Program

FINAL

Energy Efficiency Plan:
Gas Plan Year 4
(6/1/2014-5/31/2015)

Presented to
Peoples Gas and North Shore Gas

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Prepared by:

Nick Beaman
Navigant Consulting

Charles Ampong
Navigant Consulting

Katherine Wolf
Navigant Consulting

www.navigant.com

**Submitted to:**

Peoples Gas
North Shore Gas
200 East Randolph Street
Chicago, IL 60601

Submitted by:

Navigant Consulting, Inc.
30 S. Wacker Drive, Suite 3100
Chicago, IL 60606

Contact:

Randy Gunn, Managing Director
312.583.5714
Randy.Gunn@Navigant.com

Kevin Grabner, Associate Director
608.497.2323
kevin.grabner@navigant.com

Robert Neumann, Associate Director
312.583.2176
rob.neumann@navigant.com

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E. Executive Summary

This report presents a summary of the findings and results from the impact and process evaluation of the Peoples Gas (PG) and North Shore Gas (NSG) C&I Custom Rebate Program, which is part of the comprehensive Business Program.¹ This report covers evaluation activities for measures installed and gas savings realized through the Custom Incentives path. The program is in its fourth year of implementation (GPY4)². Franklin Energy Services LLC., (Franklin Energy, or FES) implements the program with trade ally engagement and technical support for program delivery and marketing.

The Custom Incentives path provides incentives on a custom basis; these are applications that include those not covered under the standardized incentives path. For example, air sealing measures may fall into the Custom Incentive category. PG and NSG can fund Retro-Commissioning projects on a negotiated \$/therm saved basis as well as Business New Construction projects under the Custom Incentives path.³ Custom incentives are based on the lesser of a buy down to a one year payback, \$1.60 per therm saved during the first year, or the full incremental cost. PG and NSG may revise eligible measures and incentives as driven by current market conditions, changes to codes and standards, technology, evaluation results, and program management knowledge. Typical market sectors for this program include larger customers in light and heavy manufacturing, steel and metal working, plastics compounding and processing, hospitals, food processing, hotels, commercial laundry and other process heating intensive businesses.

The gross impact evaluation approach for the PG and NSG C&I Custom Program involved retrospective evaluation adjustments to ex ante gross savings on custom measure variables of a selection of sampled projects. Navigant designed the sample sizes to provide a 90/10 confidence and relative precision level for program-level gross savings verification. Franklin Energy provided documentation of project applications and savings, but verified savings were based on engineering review, billing data review, and on-site monitoring and verification (M&V) of sampled measures. To determine net savings, Navigant applied a deemed net-to-gross (NTG) ratio approved for GPY4 through the Illinois Stakeholder Advisory Group (SAG) consensus process. The evaluation team also conducted NTG research through interviews with GPY4 program participant customers and trade allies to determine free ridership and spillover to inform NTG recommendations for GPY6 and beyond. The NTG survey included additional process questions to provide feedback on participants' satisfaction and suggestions for program improvement.

E.1. Program Savings

Table E-1 summarizes the natural gas savings from the GPY4 Peoples Gas C&I Custom Program. Navigant verified program net savings of 1,312,054 therms.

¹ The comprehensive Business Program bundles existing programs into paths, and allows all eligible customers to access any of the five paths as a one-stop-shop based on the customer's needs – the paths are Direct Install, Engineering Assistance, Standard Incentives, Custom Incentives, and Gas Optimization (source: PG & NSG Energy Efficiency Plan for the Second Triennial Plan period of June 1, 2014 – May 31, 2017 —Plan 2).

² The GPY4 program year began June 1, 2014 and ended May 31, 2015.

³ Second Triennial EEP ICC Compliance Filing.pdf

Table E-1. GPY4 Peoples Gas C&I Custom Program Natural Gas Savings

Program/Path	Ex Ante Gross Savings ⁴ (Therms)	Ex Ante Net Savings ⁵ (Therms)	Verified Gross RR ⁶	Verified Gross Savings (Therms)	NTGR ⁷	Verified Net Savings ⁸ (Therms)
Custom GPY4 Total	1,938,008	1,265,520	1.00	1,929,491	0.68	1,312,054

Source: Navigant analysis

Table E-2 summarizes the natural gas savings from the GPY4 North Shore Gas C&I Custom Program. Navigant verified program net savings of 182,790 therms.

Table E-2. GPY4 North Shore Gas C&I Custom Program Natural Gas Savings

Program/Path	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Custom GPY4 Total	263,197	171,868	1.02	268,809	0.68	182,790

Source: Navigant analysis

E.2 Impact Estimate Parameters for Future Use

The evaluation team did not conduct any additional research on impact savings parameters for deeming in future versions of the Illinois TRM as a part of the GPY4 Custom Program evaluation. The net-to-gross (NTG) value for gas savings was deemed for the GPY4 program year, based on the Illinois Stakeholder Advisory Group's (IL SAG) consensus process and from previous evaluation research. The GPY4 evaluation included a customer participant survey to estimate free ridership and spillover values that can be used for deeming in the future. Navigant also interviewed trade allies to obtain their estimate of spillover. Those values are presented in the following table.

⁴ The term "Ex Ante" refers to the forecasted savings reported by the Program Administrator that have not been independently verified through evaluation. Savings that have been independently verified by the Evaluation Contractor are referred to as "Verified".

⁵ GPY4 Ex Ante Net = Values reported in the GPY4 program tracking data

GPY4 Ex Ante Net = (GPY4 Ex Ante Gross * GPY3 Verified Gross RR) * GPY4 Deemed NTGR

GPY4 Ex Ante Gross = GPY4 Ex Ante Net / (GPY3 Verified Gross RR * GPY4 Deemed NTGR)

⁶ Verified Gross Realization Rate (RR) = Verified Gross Savings/Ex Ante Gross Savings.

Verified Gross Savings = RR * Ex Ante Gross Savings

⁷ The Net-to-Gross Ratio (NTGR) used for calculating verified net savings is deemed prospectively through a consensus process managed by the Illinois Energy Efficiency Stakeholders Advisory Group (SAG). Deemed NTGRs (as well historical verified gross Realization Rates) are available at:

http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Peoples_Gas_and_North_Shore_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

⁸ Verified Net Savings = NTGR * Verified Gross Savings

Table E-3. Impact Estimate Parameters for Future Use

Parameter	Description	Value	Data Source
NTG	Custom Projects	0.69	GPY4 NTG Research
Free Ridership	Custom Projects	0.31	GPY4 Participating Customer Survey
Participant Spillover	Custom Projects	0.00	GPY4 Participating Customer Survey
Participant and Nonparticipant Spillover	Custom Projects	0.00	GPY4 Participating Trade Ally Survey

Source: Navigant Research and Analysis.

E.3. Program Volumetric Detail

Table E-4 and Table E-5 below present GPY4 program participation reported by the program administrator Franklin Energy for the Peoples Gas and North Shore Gas programs. The Peoples Gas program implemented 29 custom projects, and the North Shore Gas program implemented 9 custom projects. Custom measures installed in GPY4 included pipe insulation, new burners and controls, economizers, air handling units, boiler and furnace upgrades.

Table E-4. GPY4 Peoples Gas C&I Custom Program Primary Participation Detail

Participation	Program Total
Participants ⁹	25
Installed Projects	29

Source: Navigant analysis of GPY4 program tracking data.

Table E-5. GPY4 North Shore Gas C&I Custom Program Primary Participation Detail

Participation	Program Total
Participants	8
Installed Projects	9

Source: Navigant analysis of GPY4 program tracking data.

E.4. Findings and Recommendations

The following provides insight into key program findings and recommendations.¹⁰

Verified Net Impact

Finding 1. The GPY4 Peoples Gas C&I Custom Program achieved verified net energy savings of 1,312,054 therms. This is approximately 93 percent of the program goal of 1,412,771 therms.¹¹ The

⁹ Participants are defined based on the project site address and number of accounts.

¹⁰ The Executive Summary presents the most important of the Section 6 Findings and Recommendations. Findings and Recommendations in the Executive Summary are numbered to match Section 6 for consistent reference to individual findings and recommendations. Therefore, gaps in numbering may occur in the Executive Summary.

¹¹ PG-NSG Realized Savings_091515.xlsx

North Shore Gas program achieved verified net energy savings of 182,790 therms. This is approximately 88 percent of the program goal of 208,080 therms. The evaluation team used the SAG approved 68 percent NTG ratio to estimate the Custom Program verified net savings – identical to the NTG used by the implementation contractor. Due to a cap on portfolio expenditures, budgeted dollars for individual program paths are periodically shifted to other programs to meet portfolio-level results and maintain market presence. Navigant will assess final performance toward goals at the “Business Program” and portfolio level when all GPY4 results are verified.

Verified Gross Savings and Realization Rate

Finding 2. Navigant estimated a verified gross realization rate of 100 percent for the Peoples Gas program and 102 percent for the North Shore Gas program and applied that to calculate the verified gross savings for the programs. The PG C&I Custom Program achieved 1,929,491 therms verified gross savings and the NSG program achieved 268,809 therms verified gross savings.

Program Tracking Data Review

Finding 3. The tracking system records the project gross ex ante savings in the input field for retrofit total quantity, but not the actual unit quantity of custom type measures installed.

Recommendation 1. The implementation contractor should create a separate field for tracking program gross savings, and track the measure description and unit quantity of custom measures installed (e.g. linear feet of pipe insulation, capacity or units of space heating equipment, etc.).

Finding 4. Most of the M&V savings adjustments were due to using the most up to date information collected from the customers during on-site visits or through telephone conversation.

Recommendation 2. The implementation contractor should ensure the savings calculation workbooks are updated with the most up to date information from the customer before closing out the project for incentive payment.

Finding 5. The ex ante net savings recorded in the tracking system are based on a combined GPY4 NTG ratio of 0.68 and GPY3 ex ante gross realization rate of 0.96, which gives an adjustment factor equal to 65.28 percent based on previous deemed and researched values. Navigant observed that the program implementer rounded the adjustment factor to one digit 65.3 percent. This minor difference could affect the conversion of the ex ante net therms to gross therms when we compare results with the claimed gross savings in the project documentation.

Process Findings.

Finding 6. The program participants reported very high overall levels of satisfaction with the program, where the average score given was 9.5 out of 10. The trade allies reported a slightly lower level of satisfaction than the participants, with an average satisfaction rating of 8.0.

Finding 7. Navigant found that 46 percent of the Custom participants surveyed reported that they first participated in the Peoples Gas and North Shore Gas Prescriptive Rebate Program, and that their experience in the Prescriptive Rebate program influenced their decision to participate in the Custom Program. One-third of the Custom trade allies surveyed reported low levels of awareness of the Prescriptive Rebate Program.

Recommendation 3. To increase Custom Program participation and leverage marketing expenditures, consider implementing a marketing effort targeted at PG and NSG Prescriptive Rebate Program participants to promote the Custom Rebate Program. Implement an effort to

educate Custom trade allies about the Prescriptive Rebate Program to help increase participation in both programs.

Net Impact Findings.

Finding 8. Navigant conducted NTG and process research with GPY4 participant customers and trade allies with the aim of informing an updated NTG ratio for GPY6. The evaluation was able to estimate free ridership of 31 percent, but was unable to identify any participants or trade allies who generated spillover savings as a result of their participation in the program. A Net-to-Gross ratio of 0.69 was estimated for the C&I Custom Rebate Program GPY4 participants at a relative precision of $\pm 19\%$ at a 90% confidence level.

1 Introduction

1.1 Program Description

This report presents a summary of the findings and results from the impact and process evaluation of the Peoples Gas (PG) and North Shore Gas (NSG) C&I Custom Rebate Program, which is part of the comprehensive Business Program.¹² This report covers evaluation activities for measures installed and gas savings realized through the Custom Incentives path. The program is in its fourth year of implementation (GPY4)¹³ and is implemented by Franklin Energy Services LLC., (Franklin Energy or FES) with trade ally engagement and technical support for program delivery and marketing.

The Custom Incentives path provides incentives on a custom basis - these applications include any application not covered under the standardized “prescriptive” incentives path. For example, process heating measures may fall into the Custom Incentive category. Savings calculations are generally dependent on site-specific conditions. PG and NSG can fund Retro-Commissioning projects on a negotiated \$/therm saved basis as well as Business New Construction projects under the Custom Incentives path.¹⁴ Custom incentives are based on the lesser of a buy down to a one year payback, \$1.60 per therm saved during the first year, or the full incremental cost. PG and NSG may revise eligible measures and incentives as driven by current market conditions, available funds, changes to codes and standards, technology, evaluation results, and program management knowledge. Typical market sectors for this program include larger customers in light and heavy manufacturing, steel and metal working, plastics compounding and processing, hospitals, food processing, hotels, commercial laundry and other process heating intensive businesses.

1.2 Evaluation Objectives

The Evaluation team identified the following key researchable questions for GPY4.

1.2.1 Impact Questions

1. What are the program’s verified gross savings, using field measurement and verification (M&V) and engineering research to estimate savings?
2. What are the program’s verified net savings?
3. What is the researched value for Net-to-Gross (NTG) ratio?
4. What are the results and findings from field data collection?

1.2.2 Process Questions

1. Has the program been successful in recruiting additional participants? In what ways can the program increase customer participation? Are customers satisfied with the program?

¹² The comprehensive Business Program bundles existing programs into paths, and allows all eligible customers to access any of the five paths as a one-stop-shop based on the customer’s needs – the paths are Direct Install, Engineering Assistance, Standard Incentives, Custom Incentives, and Gas Optimization (source: PG & NSG Energy Efficiency Plan for the Second Triennial Plan period of June 1, 2014 – May 31, 2017 —Plan 2).

¹³ The GPY4 program year began June 1, 2014 and ended May 31, 2015.

¹⁴ Second Triennial EEP Compliance Filing.pdf

2. What is the level of awareness of the Prescriptive Rebate Program among Custom Rebate Program participants and trade allies? How does Prescriptive Rebate Program participant affect Custom Rebate Program participation?
3. Are trade allies satisfied with the program? In what ways can the program increase trade ally engagement?

Two objectives from the evaluation plan were not researched in GPY4, and will be reconsidered for GPY5:

1. How can the program outreach and marketing strategies be improved to increase program participation from the middle sized market or customers (60K to 500K therms)?
2. How can training opportunities be improved to increase trade ally participation?

2 Evaluation Approach

This section provides an overview of the data collection methods, gross and net impact evaluation approaches, and process evaluation approaches that occurred for the GPY4 evaluation.

2.1 Overview of Data Collection Activities

Table 2-1 below summarizes data collection methods, data sources, timing, and completed sample sizes to answer the evaluation research questions.

Table 2-1. Primary Data Collection Activities and Samples

What	Who	Completes	When	Comments
On-site M&V Audit	Participating Customers	8	September - October 2015	Gross savings verification research
Engineering File Review	Participating Customers	7	September - October 2015	Review sample of projects files with custom inputs
Telephone Survey	Participating Customers	13	September - October 2015	FR, SO, Process
Telephone Survey	Trade Allies	6	September - October 2015	SO and Process

Source: Navigant evaluation team.

2.2 Verified Savings Parameters

Navigant conducted on-site measurement and evaluation (M&V) and engineering project file reviews on a random sample of projects to verify the Custom Programs' gross savings and gross realization rates. Net savings were deemed for the C&I Custom Program in GPY4. Navigant conducted NTG and process research with GPY4 participant customers and trade allies with the aim of informing an updated NTG ratio for GPY6.

2.2.1 Verified Gross Savings Analysis Approach

The gross impact analysis of the Peoples Gas and North Shore Gas C&I Custom Programs was based on evaluation estimates of gross therm savings from a sample of projects drawn from the combined population of the two utility programs. A total of 15 custom projects targeting a 90/10 level of confidence and relative precision for program-level verified savings were sampled from the program tracking database combined population of 38 projects. Projects were stratified at the tracking record level using the population gross therm savings determined from program tracking data. Strata were defined by project size, based on gross energy savings boundaries that placed about one-third of program-level savings into each stratum. Stratum 1 consisted of large projects with project-level ex ante savings greater than 800,000 therms, stratum 3 consisted of small projects with ex ante gross energy savings less than 74,500 therms, and stratum 2 consisted of the medium sized projects in between. Table 2-2 shows a profile of the sample selection.

Table 2-2. Profile of GPY4 Gross Impact Sample by Strata (PG and NSG Combined)

Program	Population Summary				Sample	
	Sampling Strata	Number of Project (N)	Ex Ante Gross Savings (Therms)	Therms Weights	n	Ex Ante Therms
Custom	1	1	837,966	0.38	1	837,966
	2	6	685,935	0.31	6	685,935
	3	31	677,305	0.31	8	279,527
TOTAL		38	2,201,206	1.00	15	1,803,428

Source: Navigant analysis of GPY4 programs tracking data

Navigant completed eight on-site visits out of the 15 Custom projects sampled and conducted desk file reviews on the remaining seven projects. Navigant collaborated with the program implementation contractor through emails and telephone conversations where clarifications were needed to verify the savings input assumptions of the sampled projects, including collection of trend and billing data.

The total sample of 15 projects accounts for 82 percent of the ex ante gross savings from the Peoples Gas and North Shore Gas Custom program population. The Custom sample is comprised of 12 Peoples Gas projects (92 percent of Custom sample gross savings) and three North Shore Gas projects (eight percent of Custom sample gross savings). Navigant extrapolated the estimated measure-level and project-level realization rates to the program population for Peoples Gas and North Shore Gas, using a ratio estimation method to yield evaluation-adjusted verified gross energy savings.

2.2.2 Verified Net Savings Analysis Approach

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a deemed net-to-gross ratio (NTGR). In GPY4, the NTGR estimates used to calculate the verified net savings were based on past evaluation research and approved through a consensus process managed through the Illinois Energy Efficiency Stakeholders Advisory Group (SAG).¹⁵

Franklin Energy combines an additional adjustment factor with the net-to-gross ratio when converting ex ante gross to ex ante net savings for tracking and reporting. Based on the previous year realization rate, the additional factor accounts for potential gross realization rate adjustments. This factor must be accounted for when converting ex ante net savings reported in the tracking system to ex ante gross savings. The equations for GPY4 are:

GPY4 Ex Ante Net = Values reported in the GPY4 program tracking data

GPY4 Ex Ante Net = (GPY4 Ex Ante Gross * GPY3 Verified Gross RR) * GPY4 Deemed NTGR

GPY4 Ex Ante Gross = GPY4 Ex Ante Net / (GPY3 Verified Gross RR * GPY4 Deemed NTGR)

¹⁵ Source: Deemed NTGR values are available on the Illinois Energy Efficiency Stakeholders Advisory Group web site.

http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Peoples_Gas_and_North_Shore_Gas_NTG_Summary_GPY_1-5_2015-03-01_Final.pdf

Table 2-3 presents the Realization Rate and NTGRs used to calculate the program-level net savings.

Table 2-3. Net-to-Gross Ratios for Evaluation of the GPY4 C&I Custom Program

Program Path/Measure	Embedded GPY3 RR Adjustment Factors†	Utility	GPY4 Deemed NTG Value	NTGR Source
Custom Incentive	0.96	PG & NSG	0.68	IL-SAG

Source: †Navigant evaluation report for the GPY3 Custom Program is available at <http://www.ilsag.info/evaluation-documents.html>.

‡ Deemed Net-to-Gross Ratios (as well as historical Realization Rates) are available from:

http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Peoples_Gas_and_North_Shore_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

GPY4 NTG Research Approach

The evaluation team conducted NTG research through interviews with GPY4 program participant customers and trade allies to determine free ridership and spillover to inform NTG recommendations for GPY6 and beyond. The research provided an adjustment for free ridership (the portion of impact that would have occurred even without the program) and spillover (the portion of impact that occurred outside of the program, but would not have occurred in the absence of the program).

Navigant calculated participant free ridership using an algorithm approach based on survey self-report data. The analysis relied on interview results from 13 participant customers who installed custom measures. Navigant attempted to contact all participants in the gross impact sample. Navigant stratified projects at the tracking record level using the population ex ante gross therms savings. Navigant defined the strata by project size, based on ex ante gross energy savings boundaries that place about one-third of program-level savings into large, medium and small stratum, targeting a 90/10 level of confidence and relative precision for each path. Navigant factored in program influence on participating customers through interviews with trade allies in GPY4 if triggered by customer NTG responses for the largest projects, or with contacts identified for multiple smaller projects. Participant customer spillover research was quantified using survey self-report data for measure description and quantities, while per unit savings values were drawn from the Illinois TRM and measure research.

Navigant examined the existence of participating trade ally spillover using survey self-report data. The evaluation team attempted a census survey on all trade ally participants in the gross impact sample until we completed the required sample design of six respondents. The survey asked trade allies and other contractors about their total sales of program-eligible equipment, rebated and non-rebated. Navigant used these responses to calculate an overall increase in the sales of program qualified measures. Spillover results were calculated from the sales of qualifying equipment that does not receive an incentive from PG or NSG if the program influence scoring from the trade ally survey responses exceeded a threshold.

Navigant calculated the NTG ratio using the following algorithm.

$$NTGR = 1 - Participant\ Free\ Ridership + Participant\ Spillover + Trade\ Ally\ Spillover$$

2.3 *Process Evaluation*

The GPY4 process evaluation activities for the C&I Custom Program involved interviews with program staff and the implementation contractor staff to verify information about marketing and outreach strategies made in GPY4 that impacted customer and trade ally participation and satisfaction. The NTG research survey conducted for GPY4 included a set of process questions to provide feedback from participant customers and trade allies about satisfaction with the program, barriers to participation and suggestions for improvement.

3 Gross Impact Evaluation

The gross impact analysis involved tracking data review and verification of measure savings based on findings from the engineering desk reviews and on-site M&V of the sample of 15 projects. Navigant calculated the sample gross realization rates and applied it to the population using a ratio estimation technique, as explained in Appendix 7.1.1. Overall, the Peoples Gas GPY4 program achieved 1,929,491 therms verified gross savings, representing 100 percent gross realization rate. The North Shore Gas program achieved 268,809 therms verified gross savings, representing 102 percent gross realization rate. This report provides details of the findings below.

3.1 *Program Tracking Data Review*

Navigant downloaded the final data for the C&I Custom Program impact evaluation from the Franklin Energy's Bensight Data Management platform. Navigant reviewed the tracking data to verify the completeness and accuracy of the tracking system data to identify any issues that would affect the impact evaluation of the program.

Navigant observed from the tracking system that as standard practice, Franklin Energy converts project level gross savings to ex ante net savings for tracking and reporting by combining the GPY3 realization rate (0.96) and GPY4 deemed net-to-gross ratio (0.68) as an adjustment factor to account for potential gross realization rate adjustments. The product of these two factors is 65.28 percent, but Franklin Energy used 65.3 percent. This minor difference produced 674 therms difference when we compared results with the claimed gross savings in the project documentation. For example, Project # 357275 was tracked with 547,192 net therms, but applying the combined gross-NTG factor of 65.28 percent to back-out gross therms produced 838,223 ex ante gross therms compared to 837,966 therms we found documented in project files as claimed gross savings.

The tracking system records the project gross ex ante savings in the input field for retrofit total quantity, but not the actual unit quantity of custom type measures installed. The implementation contractor should create a separate field for tracking program gross savings, and track the measure description and unit quantity of custom measures installed (e.g. linear feet of pipe insulation, capacity or units of space heating equipment, etc.).

Most of the M&V savings adjustments were due to using the most up to date information collected from the customers during on-site visits or through telephone conversation. Navigant recommends that the implementation contractor should ensure the savings calculation workbooks are updated with the most up to date information from the customer before closing out the project for incentive payment.

3.2 *Program Volumetric Findings*

As shown in Table 3-1 and Table 3-2 the Peoples Gas C&I Custom Program implemented 29 custom projects from 25 participants. The North Shore Gas program implemented 9 custom projects from 8 participants. Custom measures installed in GPY4 included pipe insulation, new burners and controls, boiler economizers, air handling units, and boiler and furnace upgrades.

Table 3-1. GPY4 Peoples Gas C&I Custom Program Primary Participation Detail

Participation	Program Total
Participants ¹⁶	25
Installed Projects	29

Source: Navigant analysis of GPY4 program tracking data.

Table 3-2. GPY4 North Shore Gas Custom Program Primary Participation Detail

Participation	Program Total
Participants	8
Installed Projects	9

Source: Navigant analysis of GPY4 program tracking data.

3.3 Gross Program Impact Parameter Estimates

The verified gross realization rates for the sample were determined as the ratio of the verified gross energy savings to ex ante gross energy savings reported in the project documentation. Table 3-3 summarizes the results of the sample-based verified gross realization rates by strata for the Peoples Gas and North Shore Gas combined sample.

Overall, eight projects out of the fifteen sample projects had a realization of 100 percent, five had realization rates between 94 percent and 99 percent, and two projects had over 100 percent realization rate. These balanced out after strata weighting to produce a verified gross realization rate of 100 percent for the combined population (PG program had 100 percent realization rate and NSG had 102 percent realization rate), with an overall relative precision at ± 2 percent at a 90 percent confidence level.

Table 3-3. Gross Impact Realization Rate Results for the Custom Program

Program	Sampling Strata	Sample-Based Ex Ante Gross Savings (Therms)	Sample-Based Verified Gross Realization Rate ¹⁷	Sample-Based Verified Gross Savings (Therms)
Custom	1	837,966	0.96	807,324
	2	685,935	1.01	695,822
	3	279,527	1.03	286,893
Custom Total		1,803,428	1.00	1,790,040
Overall Confidence Interval and Relative Precision (90/10) on RR			2 percent	

Source: Navigant analysis

¹⁶ Navigant defined participants based on the project site address and number of accounts.

¹⁷ These are sample weighted therms realization rate values rounded to 2 digits. Direct application to the ex ante gross savings (to get sample verified gross savings) will produce rounding differences.

3.4 Verified Gross Program Impact Results

Navigant applied the sample strata verified gross realization rates to the population strata to achieve the program level verified gross savings. As shown in Table 3-4, the evaluation research adjustments resulted in verified gross energy savings of 1,929,491 therms for the GPY4 Peoples Gas C&I Custom Program. This reflects a verified gross realization rate of 100 percent.

Table 3-4. Peoples Gas GPY4 Verified Gross Impact Savings Estimates

Program Delivery	Sample	Energy Savings (Therms)	90/10 Significance?
C&I Custom			
Verified Gross Realization Rate‡	15	100 percent	Yes
Verified Gross Savings‡		1,929,491	

Source: Navigant analysis of GPY4 programs tracking data

‡ Based on evaluation research on a sample drawn from a population that combined Peoples Gas and North Shore Gas.

Note: Gross realization rate is rounded to two digits. Direct application may produce rounding differences.

Table 3-5 shows the evaluation research adjustments resulted in verified gross energy savings of 268,809 therms for the GPY4 North Shore Gas C&I Custom Program. This reflects a verified gross realization rate of 102 percent.

Table 3-5. North Shore Gas GPY4 Verified Gross Impact Savings Estimates

Program Delivery	Sample	Energy Savings (Therms)	90/10 Significance?
C&I Custom			
Verified Gross Realization Rate‡	15	102 percent	Yes
Verified Gross Savings‡		268,809	

Source: Navigant analysis of GPY4 programs tracking data

‡ Based on evaluation research on a sample drawn from a population that combined Peoples Gas and North Shore Gas.

Note: Gross realization rate is rounded to two digits. Direct application may produce rounding differences.

4 Net Impact Evaluation

Navigant calculated verified net energy savings by multiplying the verified gross savings estimates by a net-to-gross ratio. As noted in Section 2, Navigant used the approved, deemed NTGR to calculate the net verified savings for the GPY4 C&I Custom Program.

Table 4-1 below presents the NTGR used to calculate the program-level net savings.

Table 4-1. Peoples Gas and North Shore Gas GPY4 Custom Program NTGR Value

Program Path/Measure	Utility	GPY4 Deemed NTG Value	NTGR Source
Custom Incentive	PG & NSG	0.68	IL-SAG

Source: †Navigant evaluation report for the GPY3 Custom Program is available at <http://www.ilsag.info/evaluation-documents.html>.

‡ Deemed Net-to-Gross Ratios (as well as historical Realization Rates) are available from:

http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Peoples_Gas_and_North_Shore_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

Table 4-2 summarizes the net natural gas savings from the GPY4 Peoples Gas C&I Custom Program.

Table 4-2. GPY4 Peoples Gas C&I Custom Program Natural Gas Savings

Program/Path	Ex Ante Gross Savings ¹⁸ (Therms)	Ex Ante Net Savings ¹⁹ (Therms)	Verified Gross RR ²⁰	Verified Gross Savings (Therms)	NTGR ²¹	Verified Net Savings ²² (Therms)
Custom GPY4 Total	1,938,008	1,265,520	1.00	1,929,491	0.68	1,312,054

Source: Evaluation analysis of GPY4 program tracking data.

Table 4-3 summarizes the net natural gas savings from the GPY4 North Shore Gas C&I Custom Program.

¹⁸ The term “Ex Ante” refers to the forecasted savings reported by the Program Administrator that have not been independently verified through evaluation. Savings that have been independently verified by the Evaluation Contractor are referred to as “Verified”.

¹⁹ GPY4 Ex Ante Net = Values reported in the GPY4 program tracking data

GPY4 Ex Ante Net = (GPY4 Ex Ante Gross * GPY3 Verified Gross RR) * GPY4 Deemed NTGR

GPY4 Ex Ante Gross = GPY4 Ex Ante Net / (GPY3 Verified Gross RR * GPY4 Deemed NTGR)

²⁰ Verified Gross Realization Rate (RR) = Verified Gross Savings/Ex Ante Gross Savings.

Verified Gross Savings = RR * Ex Ante Gross Savings

²¹ The Net-to-Gross Ratio (NTGR) used for calculating verified net savings is deemed prospectively through a consensus process managed by the Illinois Energy Efficiency Stakeholders Advisory Group (SAG). Deemed NTGRs (as well historical verified gross Realization Rates) are available at:

http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Peoples_Gas_and_North_Shore_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

²² Verified Net Savings = NTGR * Verified Gross Savings

Table 4-3. GPY4 North Shore Gas C&I Custom Program Natural Gas Savings

Program/Path	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Custom GPY4 Total	263,197	171,868	1.02	268,809	0.68	182,790

Source: Evaluation analysis of GPY4 program tracking data.

Peoples Gas verified net energy savings of 1,929,491 therms is 93 percent (-7 percent) of the program goal of 1,412,771 therms.²³ The North Shore Gas program verified net energy savings of 182,790 therms is 88 percent of the program goal of 208,080 (-12 percent). Due to a cap on portfolio expenditures, budgeted dollars for individual program paths are periodically shifted to other programs to meet portfolio-level results. Navigant will assess final performance toward goal at the “Business Program” and portfolio level when all GPY4 results are verified.

²³ PG-NSG Realized Savings_091515.xlsx

5 Process Evaluation

The process component of the Custom Program evaluation focused on:

- Participant Influences
- Program Marketing, including efforts to increase participation
- Participation in Other Programs
- Program Satisfaction

Navigant organized the process evaluation results by the process research questions. The primary data sources for the process evaluation included the telephone surveys with thirteen program participants and six participating trade allies.

5.1 Participant Influences

The participants were asked a series of questions to determine what program aspects and other factors influenced their decision to purchase the rebated measures. Participants were asked to rate how important each component was on a scale from zero to ten, where zero meant “not at all important” and ten meant “extremely important.” Table 5-1 below presents the average importance score and the number of responses given a score of eight or above for each factor. As can be seen in the table below, the influencing factor with the highest score was the payback on the investment *with the incentive*. The average importance score was a 9.5, and all but one of the participants rated the importance at above an eight or above. The next most important factor were any project identification, savings estimates, or recommendation from a Peoples Gas or North Shore Gas energy assessment, which also received an average influence score of 9.5.

The program incentive itself received an average importance score of 8.8, which was higher than the other program aspects (such as the recommendation of the Peoples Gas or North Shore Gas program representative or information provided in program marketing materials), except for the energy assessment recommendation.

Table 5-1. GPY4 Importance of Individual Factors on the Decision to Implement the Project

Program and Non-Program Factors	Average Importance Score	Responses > 7	N
Payback with the incentive	9.5	12 92%	13
PG/NSG energy assessment recommendation	9.5	12 92%	13
Recommendation from a design or consulting engineer	9.0	10 91%	11
Availability of the program incentive	8.8	11 85%	13
Recommendation from a PG/NSG program representative or account manager	8.8	10 83%	12
Information from the program of any PG/NSG marketing materials	8.5	8 73%	11
Recommendation from a vendor/contractor	8.3	9 75%	12
Previous experience with the measure	7.9	6 67%	9
The standard practice in the business/industry	7.7	8 62%	13
Corporate policy or guidelines	7.4	10 77%	13

Source: Navigant analysis of participant survey responses

The Custom Rebate Program participants were asked if they were aware of the Custom Rebate Program before or after they finalized the specifications for the measure that they received a rebate for. All of the participants (100 percent, n = 13) stated that they learned about the program *before* finalizing the specifications.

5.2 Marketing and Efforts to Increase Participation

As part of the trade ally survey, Navigant asked participating trade allies about the program marketing. Half (three) of the participating contractors interviewed reported that they had received marketing materials produced by Peoples Gas or North Shore Gas that they could use to market the program to their customers. All three contractors reported that they do use the materials to promote the program to their customers, one specifically mentioning that he used Energy Jump Start marketing materials. When asked if the level of marketing done directly to customers by the program had been appropriate so far, trade allies split their opinions. Half of the trade allies felt that there was a high level of awareness among their customers, and half felt that information about the program was not widely available to customers. Two of the trade allies mentioned that the marketing materials could be improved by the creation of sector specific materials, specifically for multi-family and industrial customers.

When asked about specific promotions that they felt had been especially successful in marketing the program to customers, five of the six trade allies could not name a specific marketing effort. However, the contractor who did mention a marketing effort as being especially successful specifically mentioned the Energy Efficiency Expos. When asked about marketing directed at contractors, a majority (82 percent) stated that they felt that the level of marketing directed at contractors has been appropriate. One of the trade allies mentioned the Brief Trade Update email newsletter as being “very informative”. Another trade ally mentioned a promotional effort that the program had instituted earlier in the program cycle, stating that it “generated a lot of attention”, and indicated that another promotional effort focused on trade allies would have the same affect.

Due to a cap on portfolio expenditures, budgeted dollars for individual program paths are constrained and periodically shifted to other programs to meet portfolio-level goals. Compared with GPY3, the Peoples Gas program had low participation in GPY4 in terms of project count and lower savings than the targeted goal, but GPY4 net therms savings were higher than GPY3. The North Shore Gas GPY4 program participation has stayed near the same level from GPY3, although program savings fell below savings target and also below savings achieved in GY3. To grow the program, the implementation contractor should consider increasing awareness among PG and NSG commercial customers and continue to promote the program at the Energy Efficiency Expos, and should engage in sector specific marketing efforts, especially to multi-family and industrial customers.

5.3 *Participation in Other Programs*

The survey asked trade allies who participated in the Custom survey to gage their level of familiarity of the Peoples Gas and North Shore Gas Prescriptive Rebate Program, using a scale from zero to ten, where zero is “not at all familiar” and ten is “very familiar”. The average familiarity rating was a 4.7, but the familiarity levels varied greatly. One-third (two, n = 6) of the trade allies rated their familiarity at a 0 or 1, indicating that they were not at all familiar with the program. Three of the trade allies rated their familiarity at between a five and seven, indicating that they were familiar with the program, and one trade ally rated their level of familiarity at a nine, indicating that they were very familiar with the program.

The four trade allies who indicated that they had at least some familiarity with the program reported that they had customers who also applied for rebates from the C&I Prescriptive Program. When asked if there were any differences between the programs, only one trade ally mentioned any, and stated that “it seems like the custom rebate pays more than the prescriptive program”.

When the Custom Program customer participants were asked if they were aware of any other Peoples Gas or North Shore Gas Energy Efficiency Programs, the majority of them stated that they were (77 percent, n = 13). Of the ten participating customers who were aware of other efficiency programs, all of them were aware of the C&I Prescriptive Program, and one participant was also aware of the Small Business Program. However, only three of the participants were actually able to name the Prescriptive Program, and the rest referred to the program by the measures rebated, such as the “steam trap program”, the “insulation and steam trap rebates”, or the “boiler controls and steam traps rebates”.

Slightly less than half of the Custom participants surveyed (six, n = 13) reported that they had also participated in the Peoples Gas or North Shore Gas Prescriptive Program. Again, only one of these participants were actually able to name the program, and the rest referred to the type of measure they received a rebate for (such as the “steam trap rebate”). All of the participants who participated in both programs reported that they participated in the Prescriptive Rebate Program first, before the Custom Rebate Program. When asked how influential their experience with the Prescriptive Rebate Program was on their decision to participate in the Custom Rebate Program, all of the participants stated that their experience was influential, and five of the six participants stated that their experience was “very influential”, giving it the highest rating possible.

5.4 *Program Satisfaction*

The program participants reported very high overall levels of satisfaction with the program. When asked to rate their overall satisfaction levels using a scale from zero to ten, where zero means “not at all satisfied” and ten means “very satisfied”, the average score was 9.5. Sixty-nine percent (n = 13) of participants reported that they were “very satisfied” with the program, giving it a rating of ten. When asked what they would do to improve the program, most participants had no suggestions, but three participants mentioned that they would like higher incentives. Another participant mentioned that they thought the program could benefit from greater publicity. The participants also reported high levels of satisfaction with the application process, giving it an average satisfaction rating of 9.4 (using the same zero to ten satisfaction scale). All eight of the participants who completed the program application on their own reported that the application forms clearly explained the program requirements and how to participate in the program.

The survey also asked trade allies their overall satisfaction with the program, using the same zero to ten scale as the participants. The trade allies reported a slightly lower level of satisfaction than the customer participants, with an average satisfaction rating of 8.0. While only one of the trade allies rated the program at a ten on the satisfaction scale, no trade ally rated the program at less than a seven. The survey also asked trade allies a series of questions about what they specifically liked and did not like about the program. Three of the trade allies specifically mentioned that they liked working with the staff at Franklin Energy, and one trade ally described them as “knowledgeable, friendly, and quick to respond”.

When asked what they did not like about the program, most of the trade allies did not offer any additional suggestions, but one of the trade allies mentioned that they did not like that the program had run out of funding. By allowing the program to run out of funding during the last year of the program cycle, the program may potentially cause trade allies to disengage from the program when they know funding is running low, and then only re-engage with the program when they know funding will be available at the beginning of the next program cycle.

6 Findings and Recommendations

This section summarizes the key impact and process findings and recommendations.

Verified Net Impact

Finding 1. The GPY4 Peoples Gas C&I Custom Program achieved verified net energy savings of 1,312,054 therms. This is approximately 93 percent of the program goal of 1,412,771 therms.²⁴ The North Shore Gas program achieved verified net energy savings of 182,790 therms. This is approximately 88 percent of the program goal of 208,080 therms. The evaluation team used the SAG approved 68 percent NTG ratio to estimate the Custom program verified net savings – identical to the NTG used by the implementation contractor. Due to a cap on portfolio expenditures, budgeted dollars for individual program paths are periodically shifted to other programs to meet portfolio-level results and maintain market presence. Navigant will assess final performance toward goals at the “Business Program” and portfolio level when all GPY4 results are verified.

Verified Gross Savings and Realization Rate

Finding 2. Navigant estimated a verified gross realization rate of 100 percent for the Peoples Gas program and 102 percent for the North Shore Gas program and applied that to calculate the verified gross savings for the programs. The PG C&I Custom Program achieved 1,929,491 therms verified gross savings and the NSG program achieved 268,809 therms verified gross savings.

Finding 3. Navigant’s M&V research applied retrospective adjustments to the input savings assumptions for some measures. For some steam pipe insulation projects, we applied steam pressure of 80 psig after confirmation with the customers rather than 100 psig used in the ex ante savings workbook. For the largest project #357275, we applied a lower stack temperature for the boiler economizers to estimate project savings after we analyzed temperature trend data from the customer. Overall, eight projects out of the fifteen sample projects had a realization of 100 percent, five had realization rates between 94 percent and 99 percent, and two projects had over 100 percent realization rate.

Recommendation 1. Navigant recommends the implementation contractor ensure the savings calculation workbooks be updated with the most up-to-date information from the customer.

Program Tracking Data Review

Finding 4. The ex ante net savings recorded in the tracking system are based on a combined GPY4 NTG ratio of 0.68 and GPY3 ex ante gross realization rate of 0.96, which should give an adjustment factor equal to 65.28 percent. Navigant observed that the program implementer rounded the adjustment factor to one digit 65.3 percent. This minor difference could affect the conversion of the ex ante net therms to gross therms when we compared results with the claimed gross savings in the project documentation (the difference was 674 therms).

Finding 5. The tracking system records the project gross ex ante savings in the input field for retrofit total quantity, but not the actual unit quantity of custom type measures installed.

²⁴ PG-NSG Realized Savings_091515.xlsx

Recommendation 2. The implementation contractor should create a separate field for tracking program gross savings, and track the measure description and unit quantity of custom measures installed (e.g. linear feet of pipe insulation, capacity or units of space heating equipment, etc.).

Process Findings.

Finding 6. The program participants reported very high overall levels of satisfaction with the program, where the average score given was 9.5 out of 10. The trade allies reported a slightly lower level of satisfaction than the participants, with an average satisfaction rating of 8.0.

Finding 7. Navigant found that 46 percent of the Custom participants surveyed reported that they first participated in the Peoples Gas and North Shore Gas Prescriptive Rebate Program, and that their experience in the Prescriptive Rebate program influenced their decision to participate in the Custom Program. One-third of the Custom trade allies surveyed reported low levels of awareness of the Prescriptive Rebate Program.

Recommendation 3. To increase Custom Program participation and leverage marketing expenditures, consider implementing a marketing effort targeted at PG and NSG Prescriptive Rebate Program participants to promote the Custom Rebate Program. Implement an effort to educate Custom trade allies about the Prescriptive Rebate Program to help increase participation in both programs.

Finding 8. While awareness of the Prescriptive Program was high among the Custom participants surveyed, very few of the participants were able to name the program and instead referred to the program by the measures incented (such as the “steam trap program”). This was true even for Custom participants who also participated in the Prescriptive Program, with 83 percent of participants in both program being unable to name the program.

Recommendation 4. Consider rebranding the Prescriptive Rebate Program with an easier to remember name.

Finding 9. During the last year of the program cycle, the program funding ran out, potentially causing trade allies to disengage with the program until the next program cycle.

Recommendation 5. If portfolio funding allows, maintain consistent funding levels throughout the program cycle to keep trade ally engagement consistent. Franklin Energy staff and the email newsletter received positive feedback and may help maintain trade ally engagement if the program needs to stop accepting applications before the year ends. If program growth is planned, the implementation contractor should consider increasing awareness among PG and NSG commercial customers and continue to promote the program at the Energy Efficiency Expos, and should engage in sector specific marketing efforts, especially to multi-family and industrial customers.

Net Impact Findings.

Finding 10. Navigant conducted NTG and process research with GPY4 participant customers and trade allies with the aim of informing an updated NTG ratio for GPY6. The evaluation was able to estimate free ridership of 31 percent, but was unable to identify any participants or trade allies who generated spillover savings as a result of their participation in the



program. A Net-to-Gross ratio of 0.69 was estimated for the C&I Custom Rebate Program GPY4 participants at a relative precision of $\pm 19\%$ at a 90% confidence level.

7 Appendix

7.1 Detailed Impact Research Findings and Approaches

7.1.1 Gross Impact Results

Gross Impact Sampling

A sample of 15 Custom projects based on a planned target of 90/10 confidence and precision level for program-level verified gross savings was drawn from the PG and NSG program tracking database of a population of 38 (29 PG and 9 NSG) projects to determine verified gross realization rates. The engineering review of the algorithms used by the program to calculate energy savings and the assumptions that feed into those algorithms were assessed and the savings evaluation approach were classified into one of two categories, 1) reasonable and acceptable, or 2) needs revision based on evaluation findings. On-site measurement and verification (M&V) based on IPMVP protocols were conducted for eight out of the 15 selected sites including spot measurements. Table 7-1 shows a profile of the sample selection. Navigant reviewed the sample to verify that there is an accurate representation by measure technology and business type within the overall sample.

Table 7-1. Profile of GPY4 Custom Gross Impact Sample

Project #	Utility	Ex Ante Gross	Sample Strata	M&V	Measure
357275	PG	837,966	1	On-site	Boiler Economizers
174775	PG	156,735	2	On-site	AHU reduction
403407	PG	150,517	2	On-site	New Burner and Controls
350540	NSG	110,920	2	On-site	Pipe Insulation
545530	PG	111,655	2	File Review	Pipe Insulation
545422	PG	81,155	2	On-site	Pipe Insulation
545330	PG	74,953	2	On-site	Pipe Insulation
682181	PG	70,000	3	File Review	Furnace Upgrade
523322	PG	55,357	3	File Review	Pipe Insulation
394062	PG	37,072	3	On-site	Inlet valves and controls
586820	PG	28,660	3	On-site	New Burner
640431	PG	26,874	3	File Review	New Burner
840567	PG	25,824	3	File Review	Pipe Insulation
536449	NSG	19,475	3	File Review	New Burner
828813	NSG	16,265	3	File Review	AHU reduction

Source: Utility tracking data and project files, and Navigant analysis. Ex ante gross based on project documentation.

Engineering Review of Project Files

For each selected project, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimated ex post gross savings based on their review of documentation and engineering analysis.

To support this review, Franklin Energy provided project documentation in electronic format for each sampled project. Documentation included some or all of scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, and vendor proposals), pre-inspection reports and photos (when available), post inspection reports and photos (when conducted), and calculation spreadsheets.

On-Site Data Collection

On-site surveys were completed for a subset of eight of the 15 customer applications sampled. For most projects on-site sources include interviews that are completed at the time of the on-site, visual inspection of the systems and equipment, spot measurements, and (less commonly) short-term monitoring (e.g., less than four weeks). An analysis plan is developed for each project selected for on-site data collection. Each plan explains the general gross impact approach used (including monitoring plans), provides an analysis of the current inputs (based on the application and other available sources at that time), and identifies sources that will be used to verify data or obtain newly identified inputs for the ex post gross impact approach.

The engineer assigned to each project first calls to set up an appointment with the customer. During the on-site audit, data identified in the analysis plan is collected, including monitoring records such as measured temperatures, data from equipment logs, equipment nameplate data, system operation sequences and operating schedules, and, of course, a careful description of site conditions that might contribute to baseline selection.

All engineers who conduct audits are trained and experienced in completing inspections for related types of projects. Each carries properly calibrated equipment required to conduct the planned activities. They check in with the site contact upon arrival at the business, and check out with that same site contact, or a designated alternate, on departure. The on-site audit consists of a combination of interviewing and taking measurements. During the interview, the engineer meets with a business representative who is knowledgeable about the facility's equipment and operation, and asks a series of questions regarding operating schedules, location of equipment, and equipment operating practices. Following this interview, the engineer makes a series of detailed observations and measurements of the business and equipment. All information is recorded and checked for completeness before leaving the site.

Research Findings for the Gross Impact Sample

In Table 7-2 below we present the research findings results for the 15 sampled projects. A total of eight projects out of the 15 sample achieved 100 percent realization rates, while five projects received some adjustments that reduced their realization rates and two had realization above 100 percent.

Table 7-2. GPY4 Summary of Sample EM&V Results

Project ID	Measure Description	Gross Realization Rate	Summary of Adjustment
357275	Boiler Economizers	96 percent	Stack temperature around low 500's not estimated 600F in ex ante calculations
174775	AHU reduction	111 percent	Verified with higher savings
403407	New Burner and Controls	100 percent	OK
350540	Pipe Insulation	100 percent	OK
545530	Pipe Insulation	99 percent	-
545422	Pipe Insulation	97 percent	Changed steam pipe pressure to 80 psig. Changed main boiler pipe to 12" diameter from 10"
545330	Pipe Insulation	95 percent	Changed steam pipe pressure to 80 psig
682181	Furnace Upgrade	100 percent	OK
523322	Pipe Insulation	100 percent	OK
394062	Inlet valves and controls	124 percent	Verified boiler efficiency to be 86 percent at 31 percent load during the site visit.
586820	New Burner	100 percent	OK
640431	New Burner	100 percent	OK
840567	Pipe Insulation	94 percent	-
536449	New Burner	100 percent	OK
828813	AHU reduction	100 percent	OK

Source: Utility tracking data and Navigant analysis.

Table 7-3 provides the relative precision at 90 percent level of confidence for the sample. The mean verified gross realization rate for the combined Custom sample was 100 percent at a relative precision of ± 2 percent at a 90 percent confidence level.

Table 7-3. Gross Therms Realization Rates and Relative Precision at 90 percent Confidence Level

Program/Path	Strata	Relative Precision +or- percent	Low RR	Mean RR	High RR	Std Error
Custom	1	-	-	0.96	-	-
	2	0 percent	1.01	1.01	1.01	-
	3	5 percent	0.98	1.03	1.08	0.03
Custom Total RR (90/10)		2 percent	0.98	1.00*	1.02	0.01

Source: Navigant analysis

* Navigant estimated an overall population realization rate of 1.00 for the combined sample. Based on the strata level ratio estimation verified gross savings for PG and NSG programs, Navigant estimated a 1.00 realization rate for the PG program and a 1.02 realization rate for the NSG program (see Table 4-2 and Table 4-3), and applied the utility-specific realization rates to the utility-specific ex ante savings.

7.1.2 Net Impact Findings

Navigant conducted NTG and process research with GPY4 participant customers and trade allies with the aim of informing an updated NTG ratio for GPY6.

The primary objective of the net savings analysis for the C&I Custom Program was to determine the program's net effect on customers' electricity usage. After gross program impacts have been verified, net program impacts are derived by estimating a Net-to-Gross (NTG) ratio that quantifies the percentage of the verified gross program impacts that can be reliably attributed to the program.

The net program impacts were quantified from the estimated level of free ridership and spillover. Quantifying free ridership requires estimating what would have happened in the absence of the program. A customer self-report method, based on data gathered during participant telephone interviews, was used to estimate the free ridership for this evaluation. The existence of participant spillover was quantitatively examined by identifying spillover candidates through questions asked in the participant telephone interviews. If response data provided evidence participant spillover and the participant was willing to have a follow-up interview by an engineer, an attempt was made to estimate the spillover impacts. Trade allies were also asked a set of spillover questions that cover participants and nonparticipants. The final step is to quantify spillover without double-counting the customer and trade ally estimates.

Once free ridership and spillover has been estimated the Net-to-Gross (NTG) ratio is calculated as follows:

NTG Ratio = 1 – Free Ridership Rate + Customer Participant Spillover + Trade Ally Estimate of Spillover

7.1.2.1 *Participating Customer Net Impact Findings*

Basic Rigor Free Ridership Assessment

Free ridership was assessed using a customer self-report approach following a framework that was developed for evaluating net savings of California's 2006-2008 nonresidential energy efficiency programs, and has been the core non-residential approach used in Illinois since 2009. This method calculates free ridership using data collected during participant telephone interviews concerning the following three items:

- A **Timing and Selection** score (more recently called the **Program Components** score in Illinois) that reflected the influence of the most important of various program and program-related elements in the customer's decision to select the specific program measure at this time;
- A **Program Influence** score that captured the perceived importance of the program (whether rebate, recommendation, or other program intervention) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score is cut in half if they learned about the program after they decided to implement the measures; and
- A **No-Program** score that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available. This score accounts for deferred free ridership by incorporating the likelihood that the customer would have installed program-qualifying measures at a later date if the program had not been available.

This approach and scoring algorithm was identical to that used for the previous Peoples Gas and North Shore Gas Custom Program evaluations, and is the core historical approach used when evaluating other Illinois utility custom programs.

Standard Rigor Free Ridership Assessment

Additional survey batteries examine other project decision-making influences including the vendor, standard practice in the industry, corporate policy for efficiency improvements, and so on.

Participant Spillover

For the GPY4 Custom Rebate Program evaluation, a battery of questions was asked to identify spillover candidates and to encourage spillover candidates to participate in a follow-up interview by an engineer to quantify spillover savings. Below are paraphrased versions of the spillover questions that were asked:

1. Since your participation in the C&I Custom Rebate Program, did you implement any **ADDITIONAL** energy efficiency measures at this facility or at your other facilities within Peoples Gas or North Shore Gas service territory that did **NOT** receive incentives through any utility or government program?

2. On a scale of 0-10, where 0 means “no influence” and 10 means “greatly influenced,” how much did your experience with the C&I Custom Rebate Program influence your decision to install high efficiency equipment on your own?
3. Why do you give the C&I Custom Rebate Program this influence rating?

If the response to question 2 was given a score of 7 or higher, we judged the respondent to be a spillover candidate. Navigant was unable to identify any GPY4 participating customers who experienced spillover as a result of their participation in the program. Three participants indicated that they installed additional measures for which they were expecting to apply for a rebate. The one participant who installed additional measures for which they were not intending to apply for a rebate rated the influence of the Custom Program at a 1 (on the 0-10 influence scale) and therefore was not considered a spillover candidate. In future program evaluations, we will continue to attempt to identify participants who experienced spillover, and will ask spillover candidates the following additional questions:

4. What was the first measure that you implemented?
 - a. Why did you purchase this equipment without the incentive available through the C&I Custom Rebate Program?
5. What was the second measure that you implemented?
 - a. Why did you purchase this equipment without the incentive available through the C&I Custom Rebate Program?
6. Thank you for sharing this information with us. We may have follow-up questions about the equipment you installed outside of the program. Would you be willing to speak briefly with a member of our team?

All respondents who answer “yes” to question 6 indicate that they would be willing to speak with a member of our team and will be contacted by an engineer. The follow-up engineering interview will attempt to confirm that spillover had occurred and the type of equipment involved, and estimate the energy savings.

Participating Customer Net to Gross Scoring

The scoring approach used to calculate free ridership from data collected through participant telephone survey is summarized in Table 7-4.

Table 7-4. Free Ridership Scoring Algorithm for the GPY4 Custom Program

Scoring Element	Calculation
Timing and Selection (Program Components) score. The maximum score (on a scale of 0 to 10 where 0 equals not at all influential and 10 equals very influential) among the self-reported influence level the program had for: A. Availability of the program incentive B. Technical assistance from utility or program staff C. Recommendation from utility or program staff D. Information from utility or program marketing materials E. Endorsement or recommendation by a utility account rep	Maximum of A, B, C, D, and E
Program Influence score. “If you were given a TOTAL of 100 points that reflect the importance in your decision to implement the <ENDUSE>, and you had to divide those 100 points between: 1) the program and 2) other factors, how many points would you give to the importance of the PROGRAM?”	Points awarded to the program (divided by 10) Divide by 2 if the customer learned about the program AFTER deciding to implement the measure that was installed
No-Program score. “Using a likelihood scale from 0 to 10, where 0 is “Not at all likely” and 10 is “Extremely likely”, if the utility program had not been available, what is the likelihood that you would have installed exactly the same equipment?” Adjustments to the “likelihood score” are made for timing: “Without the program, when do you think you would have installed this equipment?” Free ridership diminishes as the timing of the installation without the program moves further into the future.	Interpolate between No Program Likelihood Score and 10 where “At the same time” or within 6 months equals No Program score, and 48 months later equals 10 (no free ridership)
Project-level Free Ridership (ranges from 0.00 to 1.00)	1 – Sum of scores (Program Components, Program Influence, No-Program)/30
GPY4 Project level Net-to-Gross Ratio (ranges from 0.00 to 1.00)	1 – Project level Free Ridership + Participant Spillover
Apply score to other end-uses within the same project?	If yes, assign score to other end-uses of the same project
Apply score to other projects of the same end-use?	If yes, assign score to same end-use of the additional projects

Verified net program savings impacts were determined from reviewing 13 participant responses from the CATI survey. Shown in Table 7-5 is the profile of the net impact of the sample of respondents to the Custom Program CATI survey, in comparison with the Custom Program population.

Table 7-5. Profile of GPY4 Net Impact Sample

Population Summary		Participants Interviewed			
Number of Projects	Ex Ante Gross Energy Savings (Therms)	n	Ex Ante Gross Energy Savings (Therms)	Sampled Projects % of Population	Sampled Therms % of Population
29	1,938,008	13	989,095	45%	51%

Source: Navigant analysis of program tracking data.

The relative precision at a 90% confidence level is provided in Table 7-6. A Net-to-Gross ratio of 0.69 was estimated for the C&I Custom Rebate Program at a relative precision of $\pm 19\%$ at a 90% confidence level.

Table 7-6. NTG Ratio and Relative Precision at 90% Confidence Level

Project Population	NTG Interviews	Relative Precision ($\pm \%$)	Participating Customer Free Ridership	Participating Customer Spillover	NTGR (Weighted Mean)*
29	13	19%	0.31	0.00	0.69

Source: Navigant analysis of participant telephone survey responses

Note: The NTGR shown here is adjusted only for participating customer responses, and does not include trade ally results.

7.1.2.2 Trade Ally Spillover Estimate

Navigant examined the existence of participating trade ally spillover using survey self-report data. The evaluation team attempted a census survey on all trade ally participants in the gross impact sample until we completed the required sample design of six respondents. The survey asked trade allies and other contractors about their total sales of program-eligible equipment, rebated and non-rebated. Navigant used these responses to calculate an overall increase in the sales of program qualified measures. Spillover results were calculated from the sales of qualifying equipment that does not receive an incentive from PG or NSG if the program influence scoring from the trade ally survey responses exceeded a threshold.

Navigant was unable to identify any GPY4 participating trade allies who experienced spillover as a result of their participation in the program. Only one of the trade allies indicated that they installed any qualifying measures that didn't get a rebate, and that trade ally was not able to provide any quantifiable information.

7.1.2.3 Impact Estimate Parameters for Future Use

The GPY4 evaluation included a customer participant survey to estimate free ridership and spillover values that can be used for deeming in the future. Navigant also interviewed trade allies to obtain their estimate of spillover. Those values are presented in the following table.

Table 7-7. Impact Estimate Parameters for Future Use

Parameter	Description	Value	Data Source
NTG	Custom Projects	0.69	GPY4 NTG Research
Free Ridership	Custom Projects	0.31	GPY4 Participating Customer Survey
Participant Spillover	Custom Projects	0.00	GPY4 Participating Customer Survey
Participant and Nonparticipant Spillover	Custom Projects	0.00	GPY4 Participating Trade Ally Survey

Source: Navigant Research and Analysis.

7.2 *Survey Instruments*

7.2.1 Participating Customer Survey Instrument



PG_NSG_Participant
Custom_NTG Survey.

7.2.2 Trade Ally Survey Instrument



PG_NSG
Participating Trade /