



# **Small Business Program Evaluation Report**

**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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## E. Executive Summary

This report presents a summary of the findings and results from the impact and process evaluation of the Small Business program (SBP) in its fourth year of operation, which is gas program year 4 (GPY4).<sup>1</sup> The Peoples Gas (PG) and North Shore Gas (NSG) Small Business programs were no longer jointly implemented with Commonwealth Edison (ComEd) in GPY4.<sup>2</sup>

The Small Business program is designed to assist qualified PG and NSG non-residential customers<sup>3</sup> to achieve natural gas energy savings by educating them about energy efficiency (EE) opportunities through on-site assessments conducted by the implementation contractor's Energy Advisors (EAs) and steam trap audits by specially-trained trade allies (TAs). The program provides installation of no-cost direct-install (DI) measures,<sup>4</sup> with further savings available to participating customers through incentives of 30 to 100 percent offered for select standard incentive measures. Franklin Energy Services, LLC (Franklin) was the primary implementation contractor (IC) for the PG and NSG Small Business programs.

The GPY4 SBP gross impact evaluation approach involved use of the Illinois Statewide Technical Reference Manual (TRM)<sup>5</sup> for deemed gross savings of most program measures and secondary evaluation research for verification of savings from measures with custom savings assumptions. The GPY4 verified net impact evaluation approach applied the net-to-gross ratio (NTGR) approved through the Illinois Energy Efficiency Stakeholders Advisory Group (SAG) consensus process.<sup>6</sup> The evaluation also included a process evaluation and focused research to investigate net-to-gross for future use.

### E.1 Program Savings

Table E-1 summarizes the natural gas savings from the GPY4 PG Small Business program. The Navigant evaluation team verified net savings of 495,591 therms.

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<sup>1</sup> The GPY4 program year began June 1, 2014 and ended May 31, 2015.

<sup>2</sup> Prior to GPY4 the PG and NSG programs were jointly administered with the ComEd Small Business Energy Savings (SBES) Program.

<sup>3</sup> To qualify, participants must be PG or NSG commercial or industrial customers that use less than 60,000 therms per year.

<sup>4</sup> No-cost direct-install measures include low-flow showerheads and faucet aerators, pre-rinse spray valves, programmable thermostats, and domestic hot water (DHW) pipe insulation.

<sup>5</sup> See <http://www.ilsag.info/technical-reference-manual.html>.

<sup>6</sup> See <http://www.ilsag.info/> for more information.

**Table E-1. GPY4 PG SBP Natural Gas Savings**

Program/Path	Ex Ante Gross Savings <sup>7</sup> (Therms)	Ex Ante Net Savings <sup>8</sup> (Therms)	Verified Gross RR <sup>9</sup>	Verified Gross Savings (Therms)	NTGR <sup>10</sup>	Verified Net Savings <sup>11</sup> (Therms)
Custom	53,634	36,471	1.48	79,247	0.68	53,887
Direct Install	14,987	14,837	1.26	18,922	0.99	18,733
Standard Incentive	428,200	423,918	1.00	427,243	0.99	422,971
<b>GPY4 SBP Total</b>	<b>496,821</b>	<b>475,226</b>	<b>1.06</b>	<b>525,412</b>		<b>495,591</b>

Source: Evaluation analysis of GPY4 program tracking data and Illinois Statewide Technical Reference Manuals.<sup>12</sup>

Table E-2 summarizes the natural gas savings from the GPY4 NSG Small Business program. Navigant verified net savings of 37,593 therms.

**Table E-2. GPY4 NSG SBP 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)
Direct Install	826	834	1.25	1,029	0.99	1,018
Standard Incentive	36,565	36,923	1.01	36,944	0.99	36,575
<b>GPY4 SBP Total</b>	<b>37,391</b>	<b>37,757</b>	<b>1.02</b>	<b>37,973</b>		<b>37,593</b>

Source: Evaluation analysis of GPY4 program tracking data and Illinois Statewide Technical Reference Manuals.

Engineering review of a sample of custom projects resulted in increased verified savings for the PG Program. Additional adjustment of the savings input assumptions for some direct install measures using the TRM (v3.0) resulted in increased savings for both PG and NSG. This produced a 106 percent verified gross realization rate for the PG SBP and a 102 percent verified gross realization rate for the NSG SBP.

<sup>7</sup> 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”.

<sup>8</sup> 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)

<sup>9</sup> Verified Gross Realization Rate (RR) = Verified Gross Savings/Ex Ante Gross Savings.

Verified Gross Savings = RR \* Ex Ante Gross Savings

<sup>10</sup> 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](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)

<sup>11</sup> Verified Net Savings = NTGR \* Verified Gross Savings

<sup>12</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM).

Illinois\_Statewide\_TRM\_Effective\_060114\_Version\_3.0\_022414\_Clean.pdf;

Illinois\_Statewide\_TRM\_Effective\_060115\_Final\_02-24-15\_Clean.pdf (Version 4.0 for measure errata corrections).

Available at the Illinois Commerce Commission (ICC): <http://www.icc.illinois.gov/electricity/TRM.aspx>

Details of the Small Business program savings adjustments are provided in the program-level analysis in Section 3.

## E.2 Program Savings by Measure End-use

Table E-3 summarizes the natural gas savings from the PG SBP by measure end-use.

**Table E-3. GPY4 PG SBP Natural Gas Savings**

Measure	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Space Heating	33,610	33,273	0.96	32,302	0.99	31,979
Hot Water	101,750	100,732	1.03	104,866	0.99	103,817
Steam Trap	296,048	293,089	1.00	296,162	0.99	293,200
Water Efficiency Measures	2,020	2,000	1.00	2,020	0.99	2,000
Programmable/Reprogram Thermostat	9,759	9,661	1.11	10,816	0.99	10,708
Custom Measures	53,634	36,471	1.48	79,246	0.68	53,887
<b>Total</b>	<b>496,821</b>	<b>475,226</b>	<b>1.06</b>	<b>525,412</b>		<b>495,591</b>

Source: Evaluation analysis of GPY4 program tracking data.

Table E-4 summarizes the natural gas savings from the GPY4 NSG SBP by measure end-use.

**Table E-4. GPY4 NSG SBP Natural Gas Savings**

Measure	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Space Heating	2,223	2,245	0.93	2,064	0.99	2,044
Hot Water	4,608	4,653	1.04	4,802	0.99	4,754
Steam Trap	26,871	27,133	1.00	26,865	0.99	26,595
Water Efficiency Measures	1,992	2,012	1.00	1,993	0.99	1,973
Programmable/Reprogram Thermostat	1,697	1,714	1.33	2,249	0.99	2,227
<b>Total</b>	<b>37,391</b>	<b>37,757</b>	<b>1.02</b>	<b>37,973</b>		<b>37,593</b>

Source: Evaluation analysis of GPY4 program tracking data.

## E.3 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 Small Business program evaluation.

Navigant conducted in-depth interviews with program trade allies (TAs) in August and September 2015 for the purpose of researching free-ridership (FR) and spillover (SO): six who participated in the PG SBP and six who participated in the NSG SBP. In selecting the samples, TAs were stratified on the basis of



size. During the interviews Navigant discovered that three of the NSG TAs had also completed projects for customers in the PG service territory. Free ridership and spillover research values that can support deeming in the future are presented in the following table.

**Table E-5. Impact Estimate Parameters for Future Use**

Parameter	Description	Value	Data Source
Free Ridership	Small Business Retrofit Projects	0.03	GPY4 Trade Ally Interviews
Spillover	Small Business Retrofit Projects	0.00	GPY4 Trade Ally Interviews

Source: Navigant Research and Analysis.

#### **E.4 Program Volumetric Detail**

Table E-6 and Table E-7 present GPY4 program participation reported by the IC for the PG and NSG programs. Detailed volumetric breakdown of the measure type and savings quantity are provided in the program-level analysis in Section 3.

**Table E-6. GPY4 PG SBP Primary Participation Detail**

Participation	Direct Install	Standard Incentive	Custom	Program Total
Participants <sup>13</sup>	182	150	12	344
Total Measures <sup>14</sup>	1,299	1,014	12	2,325
Completed Projects	312	180	12	504

Source: Navigant analysis of GPY4 program tracking data.

**Table E-7. GPY4 NSG SBP Primary Participation Detail**

Participation	Direct Install	Standard Incentive	Program Total
Participants	14	27	41
Total Measures	99	114	213
Completed Projects	22	35	57

Source: Navigant analysis of GPY4 program tracking data.

<sup>13</sup> Participants are defined based on the project site address and number of accounts (ID).

<sup>14</sup> For evaluation reporting purpose, if a measure quantity is reported in the tracking system in linear feet, MBH, dwelling units or in square feet, Navigant treated each row entry of such measure as one measure quantity in this table.

## E.5 Findings and Recommendations

The following provides insight into key program findings and recommendations. The full set of findings and recommendations is presented in Section 6.<sup>15</sup>

### Verified Net Savings.

**Finding 1.** The GPY4 PG Small Business program achieved verified net energy savings of 495,591 therms. This is 110 percent of the program goal of 448,599 therms.<sup>16</sup> The NSG program achieved verified net energy savings of 37,593 therms. This is 137 percent of the program goal. The verified net savings were calculated using deemed net-to-gross (NTG) estimates approved through the Illinois Stakeholders Advisory Group consensus process.

### Verified Gross Savings and Realization Rate.

**Finding 2.** The GPY4 PG SBP achieved verified gross energy savings of 525,412 therms. This produced a program verified gross realization rate of 106 percent. The NSG SBP achieved verified gross energy savings of 37,973 therms, with overall verified gross realization rate of 102 percent. The programs accurately tracked gross savings for most TRM (v3.0) deemed measures. However, the tracking system and the “Master Measure Database” (MMDB) spreadsheet default savings for some measures need updates. Deemed savings for several measures (e.g., aerators, showerheads, and programmable thermostats) were adjusted upward after reviewing the TRM default commercial/industrial (C&I) savings input assumptions.

**Recommendation 1.** The MMDB and the default values that feed into the tracking system should receive additional verification checks when updated with the approved version of the Illinois TRM. Where the TRM provides deemed input parameters for small business buildings, the program should use them instead of miscellaneous assumptions, if a custom value is not available.

**Finding 3.** The PG GPY4 SBP completed twelve (12) custom projects. The evaluation team stratified and sampled 6 out of the 12 custom projects and performed engineering file reviews and analyses of the claimed savings, including billing analysis for some projects. Overall, we estimated a verified gross savings realization rate of 148 percent based on a statistical relative precision of 7 percent at the 90 percent confidence level. The sample realization rate was applied to the population of custom ex ante savings to calculate the overall verified savings from custom measures. Our analysis revealed that some of the custom input assumptions were very conservative, without full documentation for the sources of assumptions or post-inspection reports, in some cases. Details of the custom review findings are presented in the tracking system review in Section 3 and in the findings and recommendations in Section 6 of this report.

**Recommendation 2.** The IC should more fully document the sources used for custom savings input assumptions and correction factors. Improving these initial input assumptions, or

<sup>15</sup> 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.

<sup>16</sup> PG-NSG Realized Savings\_091515.xlsx

choosing alternative estimation methods that reduce uncertainty, will improve the accuracy of the initial savings estimates.

#### **Program Volumetric Findings.**

**Finding 7.** The PG GPY4 program involved 344 participants (property accounts) who implemented a total of 2,325 measures from 504 projects. Standard incentive and direct-installed deemed measures contributed 81 and 4 percent, respectively, of the verified gross savings for the PG GPY4 SBP, while savings from custom projects contributed 15 percent of the GPY4 verified gross savings. The NSG GPY4 program involved 41 participants who implemented a total of 213 measures from 57 projects. Standard incentive measures accounted for 97 percent of program savings, while direct-installed measures contributed the remaining 3 percent. In terms of measures, savings from steam traps produced the bulk of the GPY4 savings for PG and NSG (56 and 71 percent, respectively), followed by hot water measures (20 and 13 percent, respectively).

#### **Process/Net-To-Gross Findings.**

**Finding 8.** Based on GPY4 trade ally interviews, Navigant estimated FR for the PG and NSG Small Business programs to be 0.02 and 0.07, respectively. No significant SO was found for either program. The weighted average FR for both programs was 0.03.

**Recommendation 6.** Despite differences between the FR scores derived from the PG and NSG TA interviews, we recommend using the weighted-average FR estimate of 0.03 because of the considerable overlap between the two TA samples (three of the six interviewed NSG TAs also completed projects for customers in the PG service territory in GPY4).

**Finding 9:** Navigant conducted in-depth interviews with a total of twelve SBP-affiliated TAs in GPY4 during August to September 2015: six who participated in the PG SBP and six who participated in the NSG SBP. Ten of the twelve trade allies interviewed from both utilities indicated they were satisfied with the program, mostly because the program increased their business. The trade allies described a range of positive attributes of the program and Franklin Energy, but also offered suggestions for improvements. Several described past and future hiring as a result of the program. The trade allies agreed that customers are satisfied with the program. Two trade allies provided negative comments about the program. One Peoples Gas' trade ally said he was frustrated with the Program because of the lack of consistency and standardization between the utilities. A North Shore Gas trade ally complained that the program asks for too much documentation. The broader picture of the SBP is one of a successful program that supports small businesses.

## 1 Introduction

### 1.1 Program Description

The Small Business program is designed to assist qualified PG and NSG non-residential customers<sup>17</sup> to achieve natural gas energy savings by educating them about energy efficiency (EE) opportunities through on-site assessments conducted by the implementation contractor's Energy Advisors (EAs). The purpose of the audit is to educate the business owner while providing the benefits of the program through the direct install measures. The audit report may also suggest the customer install measures through the Prescriptive or Custom Program. The program provides installation of no-cost direct-install (DI) measures,<sup>18</sup> with further savings available to participating customers through incentives of 30 to 100 percent offered for select standard incentive measures. Franklin Energy Services, LLC (Franklin) is the primary implementation contractor (IC) for the PG and NSG Small Business programs. If the customer is interested, Franklin Energy will help the owner arrange for bids and apply for applicable rebates from the Custom or Prescriptive Program.

In GPY4 the PG and NSG programs were not jointly implemented with the corresponding Commonwealth Edison (ComEd) program.<sup>19</sup>

### 1.2 Evaluation Objectives

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

#### Impact Questions

1. What are the Program's verified gross and net annual energy savings?
2. Did the Program meet its energy saving goals?
3. What is the researched value for net-to-gross ratio (NTGR)?
4. Are the assumptions and calculations in compliance with the TRM? What updates are recommended for the Illinois Technical Reference Manual (TRM)?

#### Process Questions

1. How satisfied are customers and TAs with the program and major program components?
2. How effectively is the SBP being marketed to PG/NSG SB customers?
3. How effectively is the SB program being delivered to PG/NSG SB customers?
4. What are some opportunities for program improvements?
5. What are the effects of no longer having joint cooperation with ComEd?

Navigant's process research for the GPY4 PG and NSG Small Business programs included interviews with the program implementation manager and in-depth interviews with participating trade allies.

<sup>17</sup> To qualify, participants must be PG or NSG C&I customers using less than 60,000 therms per year.

<sup>18</sup> No-cost direct-install measures include low-flow showerheads and faucet aerators, pre-rinse spray valves, programmable thermostats, and domestic hot water (DHW) pipe insulation.

<sup>19</sup> Prior to GPY4, the PG and NSG programs were jointly administered with ComEd's SBES Program.

## 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

The core data collection activities included the following:

1. Reviewing the tracking system to cross-check totals
2. Comparing the use of measure algorithms in the tracking database to their description in Illinois TRM v3.0 to ensure that they were appropriately applied
3. Engineering file review of custom projects
4. Trade ally telephone interviews
5. Interview with the IC program manager

Table 2-1 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	Completions Achieved	When	Comments
Tracking System & Engineering Review	Participating Customers	All	July-September 2015	Review measure gross savings using IL-TRM or through research
Project File Reviews	Participating Customers	6 of 12 projects	August-October 2015	Completed Custom Projects
In-Depth Interviews	Trade Allies	12	August-September 2015	Net-to-Gross and Process Research
In-Depth Interview	Program Management	1	April 2015	Interview IC program manager

*Source: Navigant evaluation team.*

As noted in Table 2-1, the Navigant evaluation team conducted NTG research with GPY4 TAs with the aim of producing free ridership and spillover results to recommend an updated NTGR for GPY6.

## 2.2 Verified Savings Parameters

### Verified Gross Program Savings Analysis Approach

Navigant estimated verified per-unit savings for each program measure using impact algorithms and input assumptions defined by the Illinois TRM for deemed measures<sup>20</sup>, and evaluation research for non-deemed measures. Table 2-2 presents the sources for parameters that were used in verified gross savings analysis, indicating which were examined through GPY4 evaluation research and which were deemed.

**Table 2-2. GPY4 Verified Gross Savings Parameter Data Sources**

What	Who	Completions Achieved
Measure Quantity Installed	Program tracking system	Evaluated
Verified Gross Realization Rate	Program tracking data, TRM, Navigant	Evaluated
Commercial HVAC measure savings assumptions	Illinois TRM, version 3.0, section 4.4†	Deemed
Commercial hot water measure savings assumptions	Illinois TRM, version 3.0, section 4.3†	Deemed
Steam traps savings assumptions	Illinois TRM, version 3.0, section 4.4.16†	Deemed
Commercial food service equipment savings assumptions	Illinois TRM, version 3.0, section 5.3†	Deemed
Commercial pipe insulation savings assumptions	Illinois TRM, version 3.0, section 4.4†	Deemed
Programmable thermostat savings assumptions	Illinois TRM, version 3.0, section 5.3†	Deemed
Custom Analysis and Measures	Project File Review	Evaluated

Source: Navigant analysis of programs data and Illinois TRM documents.

† State of Illinois Technical Reference Manuals, supplemented by Integrys MMDB PY4 -052915.xlsx produced by Franklin.

### Verified Net Program Savings Analysis Approach

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a deemed 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).<sup>21</sup>

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. The additional factor accounts for potential gross realization rate adjustments, and is based on the previous year realization rate. This factor must be

<sup>20</sup> Because the Illinois TRM provides multiple options for selecting input assumptions, Franklin Energy Services supplied the evaluation team with a master measure spreadsheet documenting their approach to compliance with the Illinois TRM (Integrys MMDB PY4 -052915.xlsx).

<sup>21</sup> 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\\_GPY1-5\\_2015-03-01\\_Final.pdf](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)

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)

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 Small Business Program**

Program Path/Measure	Embedded GPY3 RR Adjustment Factors†	Utility	GPY4 Deemed NTG Value	NTGR Source
SBP (all measures except Custom)	1.00	PG	0.99	SAG‡
Custom Incentives	1.00	PG & NSG	0.68	
SBP (all measures except Custom)	1.02	NSG	0.99	

Source: Navigant analysis.

† Navigant evaluation report for the GPY3 SBES Program.

‡ Deemed NTGRs, historical realization rates: [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](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).

### Process Evaluation and Prospective Net-to-Gross Research

Navigant's GPY4 process evaluation activities for the SBP included an interview with the program manager to verify our understanding of the program marketing and outreach strategies in GPY4. Additionally, the GPY4 evaluation team conducted in-depth interviews with representative samples of participating TAs to update the recommended NTGRs for GPY6 and gather feedback on satisfaction with the program and its components.



### 3 Gross Impact Evaluation

This section provides detailed analysis and findings from the file reviews and tracking system review of the measures installed and gross savings by program path and delivery channels. Overall, the PG GPY4 program achieved 525,412 therms verified gross savings, representing 106 percent gross realization rate. The NSG program achieved 37,973 therms verified gross savings, representing 102 percent gross realization rate. The evaluation team made some adjustments to the savings input assumptions used to calculate the measures ex ante savings. These affected the gross realization rates for some measures. Details of the findings are provided below.

#### 3.1 Program Tracking Data Review

The evaluation team downloaded the final data for the SBP impact evaluation from Franklin Energy's Bensight Data Management platform. We 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. We compared the tracking system savings input assumptions to Franklin Energy's "Master Measure Database" spreadsheet (MMDB)<sup>22</sup> that documents their approach to compliance with the Illinois TRM. We verified that the program tracking system was accurately recording measure unit counts, but some measures need updates of the savings input assumptions for consistency with the approved version of the TRM for the GPY4 program.

Key findings include:

1. The ex ante unit savings from aerators and showerheads were adjusted to reflect the TRM (v3.0) input assumptions for commercial applications. The ex ante savings algorithm for efficient furnaces was inconsistent with the TRM. We used the appropriate input assumptions from the TRM to estimate the furnace savings. We also adjusted the tracking unit savings values for the different sizes of pipe insulation to be consistent with the TRM and the default unit savings produced in the MMDB spreadsheet. We adjusted the savings for water heater measures to be consistent with the MMDB default values.
2. The ex ante savings estimate for programmable thermostats was based on the TRM but averaged across building types. The evaluation team used the actual building type input assumptions to calculate project verified savings.
3. The PG GPY4 SBP completed twelve (12) custom projects. The evaluation team sampled six out of the 12 custom projects and performed engineering file reviews and analysis of the claimed savings, including billing analysis for some projects.
  - a) Two of the application files reviewed included the combustion analyzer results showing equipment efficiency both pre and post retrofit. It is not always possible to get these measurements; however, whenever they can be taken, they should be included with the inspection reports in the application.
  - b) With boiler retrofit measures (and the same may be true for other measures as well) the baseline equipment is reported to achieve design efficiency ratings. This is likely to be conservative. The efficiency of old equipment is expected to degrade over its life and the

<sup>22</sup> Integrys MMDB PY4 -052915.xlsx, *op. cit.*



- baseline efficiency is likely to be significantly less than the nameplate rating. Each custom analysis file includes the previous several years of billing data. For some of the custom calculations there are intermediate steps showing the implementer's estimate of annual use. This calculated value should be compared to the known, billed usage to provide a quick and easy validity check on the engineering analysis.
- c) For domestic hot water (DHW) measures, the current approach assumes the monthly DHW load based on the single lowest use month over a two year billing period. This approach is conservative in estimating savings from DHW measures. As an alternative, defensible approach, the IC may take an average of all months below a given Heating Degree Day (HDD) threshold. Further analysis can inform the most appropriate value to use for this breakpoint, but a value in the range of 100 HDD will generally capture at least 4 months per year with very little space heating load. Over the two year billing history, this provides an average DHW load based on at least eight months of data, as opposed to the current approach that uses the lowest single month.
  - d) In the analysis files, the bottom row of the Checklist Tab provides an "Incentive as a Percent of Total Project Cost" cost-performance metric. This is reasonable for a retrofit project that is optional; but a better metric to record, especially for projects that qualify as replace on burnout, is the incentive as a percent of incremental project cost.
  - e) In the post inspection reports for the attic insulation measures, it appears that the inspector could only readily measure the insulation immediately adjacent to the access hatch. For this measure, it is often difficult to visually verify that the insulation was applied evenly and sufficiently across the full area. For projects involving blown-in (loose fill) attic insulation, consider requiring the TAs to apply a cheap, easy-to-install visual indicator at given intervals in the attic. (e.g., every 10-15 feet in any given horizontal direction; or a continuous chalk line.) The participant and the inspector can then readily verify that the product is uniformly applied and, by periodically checking points on these lines, confirm that the installer is fully meeting the project requirement.
  - f) For project 845840, the database shows a work completion date of 1/12/2015; however, the invoice shows work complete 12/23/14. There were other projects that had similar confusion as to exactly when the work was started and when it was completed. These dates are particularly important for conducting a billing analysis. Ensure dates are being tracked uniformly and diligently across all projects. Ensure that staff are consistent in methodology as to what project milestones are captured and consider adding a field for data work initiated in addition to more carefully tracking the actual work completion date (separately from the date the final application is submitted).

### **3.2 Program Volumetric Findings**

As shown in Table 3-1 and Table 3-2, the PG Small Business program reported 344 participants in GPY4 and distributed 2,325 measures. The NSG Small Business program reported 41 participants in GPY4 and distributed 213 measures.

**Table 3-1. GPY4 PG SBP Primary Participation Detail**

Participation	Direct Install	Standard Incentive	Custom	Program Total
Participants	182	150	12	344
Total Measures <sup>23</sup>	1,299	1,014	12	2,325
Completed Projects	312	180	12	504

Source: Navigant analysis of GPY4 program tracking data.

**Table 3-2. GPY4 NSG SBP Primary Participation Detail**

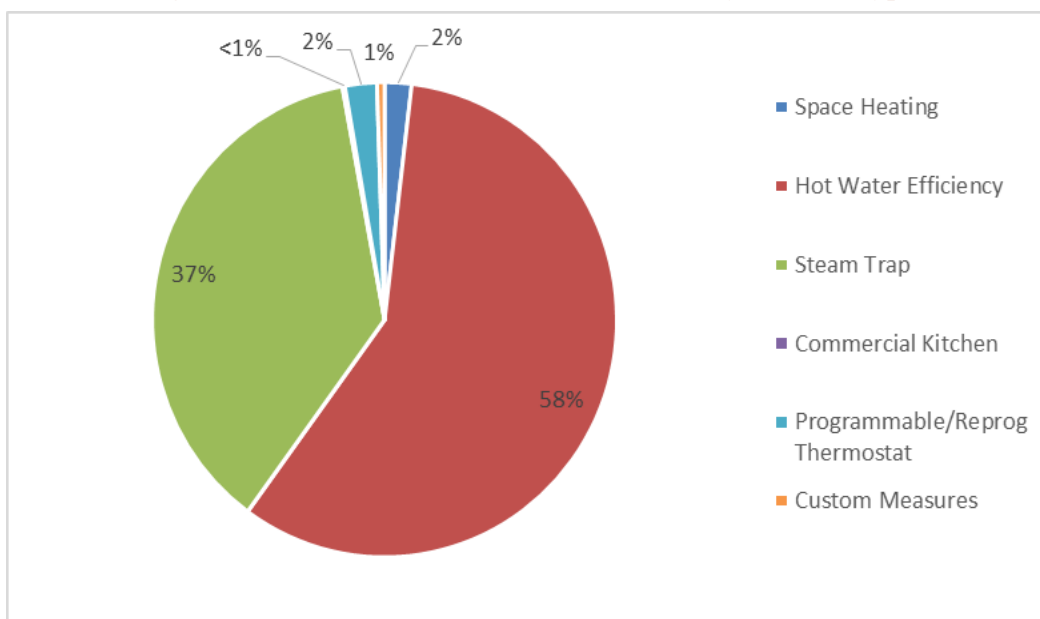
Participation	Direct Install	Standard Incentive	Program Total
Participants	14	27	41
Total Measures	99	114	213
Completed Projects	22	35	57

Source: Navigant analysis of GPY4 program tracking data.

Figure 3-1 and Figure 3-2 disaggregate the measure mix by end-use type. For the PG SBP, hot water efficiency end-use measures, including faucet aerators, showerheads, pre-rinse sprayers, and pipe insulation measures comprised approximately 58 percent of the measure volume in GPY4. Steam traps, including dry cleaner and HVAC, were the second-largest category with 37 percent. Space heating measures (including high efficient boilers and furnaces, boiler tune-ups and boiler reset controls) and programmable/reprogrammable thermostats each accounted for 2 percent of measures. One percent of measures were custom.

<sup>23</sup> For evaluation reporting purpose, if a measure quantity is reported in the tracking system in linear feet, MBH, dwelling units or in square feet, Navigant treated each row entry of such measure as one measure quantity in this table.

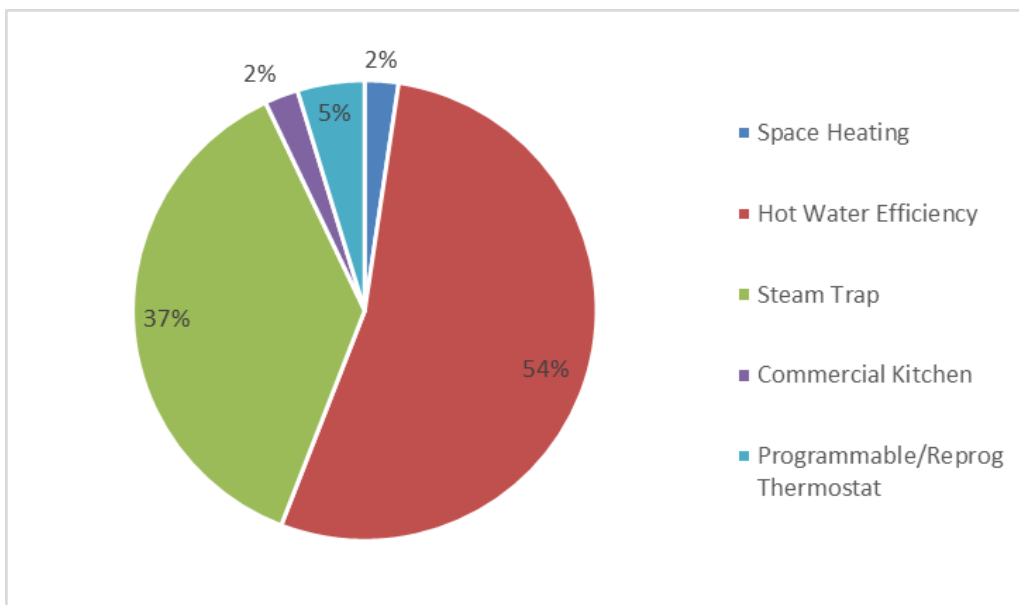
**Figure 3-1. PG: Number of Measures Installed by End-use Type**



Source: Navigant Analysis

For the NSG SBP, hot water efficiency end-use measures comprised approximately 54 percent of the measure volume in GPY4, followed by the steam traps with 37 percent, programmable/reprogrammable thermostats with 5 percent, commercial kitchen measures with 2 percent, and space heating measures contributed 2 percent.

**Figure 3-2. NSG: Number of Measures Installed by End-use Type**



Source: Navigant Analysis

Table 3-3 and Table 3-4 provide additional details on measures, install types and counts for each program.

**Table 3-3. PG GPY4 SBP Measure Count**

Measure	Unit	Install Type	Ex Ante Measure Count	Verified Measure Count
Bathroom Aerators	Each	Standard Incentive	15	15
	Each	Direct Install	960	960
Kitchen Aerators	Each	Direct Install	66	66
Showerheads	Each	Direct Install	221	221
High Efficient Boilers	MBH	Standard Incentive	27,387	27,387
High Efficient Furnaces	Each	Standard Incentive	25	25
Prog./Reprog. Thermostat	Unit	Standard Incentive	42	42
	Unit	Direct Install	9	9
Boilers Reset Controls	MBH	Standard Incentive	3,000	3,000
Boiler Tune Ups	MBH	Standard Incentive	26,192	26,192
Pipe Insulation (DHW/Steam/HW Boiler)	Linear Foot	Standard Incentive	3,246	3,246
	Linear Foot	Direct Install	348	348
Other Measures - (Pipe Insulation-Prescriptive) <sup>24</sup>	Linear Foot	Standard Incentive	63,753	63,753
	Linear Foot	Direct Install	174	174
Pre Rinse Sprayers	Each	Direct Install	32	32
Energy Star Fryers	Each	Standard Incentive	4	4
Steam Traps (Dry Cleaner)	Each	Standard Incentive	84	84
Steam Traps (HVAC)	Each	Standard Incentive	767	767
Custom Measures	Each	Custom	12	12

Source: Navigant analysis of program tracking data.

<sup>24</sup> We identified 25 projects in the SBP market segment that would save more energy than is reasonable when compared to the customer's annual gas usage. In those instances, Franklin Energy has capped the savings from one project at 20% of the customer's annual gas usage. In those projects, there are additional retrofits for the actual measures installed (usually steam traps and pipe insulation) with the correct values included. Each of those measures is then rejected, but remains on the project.

**Table 3-4. NSG GPY4 SBP Measure Count**

Measure	Unit	Install Type	Ex Ante Measure Count	Verified Measure Count
Bathroom Aerators	Each	Standard Incentive	7	7
	Each	Direct Install	74	74
Kitchen Aerators	Each	Direct Install	19	19
Showerheads	Each	Direct Install	3	3
High Efficient Boilers	MBH	Standard Incentive	2	2
High Efficient Furnaces	Each	Standard Incentive	3	3
Prog./Reprog. Thermostats	Unit	Standard Incentive	9	9
	Unit	Direct Install	1	1
Infrared Salamander Broilers	Each	Standard Incentive	2	2
Large Gas Water Heaters	MBH	Standard Incentive	1	1
Pipe Insulation (DHW/HW)	Linear Foot	Standard Incentive	672	672
	Linear Foot	Direct Install	90	90
Other Measures - (Pipe Insulation-Prescriptive)	Linear Foot	Standard Incentive	862	862
Pre Rinse Sprayers	Each	Direct Install	1	1
Energy Star Fryers	Each	Standard Incentive	3	3
Steam Traps (Dry Cleaner)	Each	Standard Incentive	37	37
Steam Traps (HVAC)	Each	Standard Incentive	42	42
Water Heaters 0.67 EF	Each	Standard Incentive	2	2

Source: Navigant analysis of program tracking data.

### 3.3 Gross Program Impact Parameter Estimates

As described in Section 2, above, Navigant estimated verified per unit savings for each program measure using impact algorithms and input assumptions defined in the Illinois TRM and documentation of TRM compliance provided by Franklin Energy Services. Table 3-5 presents the key parameters and the references used in the verified gross savings calculations.

**Table 3-5. GPY4 SBP Ex Ante and Verified Gross Savings Parameters**

Measure	Ex Ante Gross Savings (Therms/Unit)	Verified Gross Savings (Therms/Unit)	Method	Data Source
Bathroom Aerators	5.51 or 5.62	6.86	Deemed	Sections 4.3.2 TRM V3.0
Kitchen Aerators	5.51 or 5.62	6.86	Deemed	Sections 4.3.2 TRM V3.0
Showerheads	17.43 or 17.78	21.74	Deemed	Sections 4.3.3 TRM V3.0
Boiler Tune-ups	0.19	0.19	Deemed	Sections 4.4.3 TRM V3.0
Boilers Reset Controls	0.93	0.93	Deemed	Sections 4.4.4 TRM V3.0
High Efficient Boilers	Vary	Vary. Verified as reasonable	Deemed	Sections 4.4.10 TRM V3.0
High Efficient Furnaces	223.81 or 224.24	171.25	Deemed	Sections 4.4.11 TRM V3.0
Energy Star Fryers	505.05*	505	Deemed	Sections 4.2.7 TRM V3.0
Infrared Salamander Broilers	238.66	239	Deemed	Sections 4.2.14 TRM V3.0
Large Gas Water Heaters	1.004	1.004	Deemed	Sections 4.3.1 TRM V3.0
Pipe Insulation (DHW/Steam/HW)	Vary	Vary. Verified as reasonable	Deemed	Sections 4.4.14 TRM V3.0
Pre Rinse Sprayer	108.93 or 111.11	135.35	Deemed	Sections 4.2.11 TRM V3.0
Prog/Reprog Thermostats	Vary	Vary. Verified as reasonable	Deemed	Sections 4.4.18 TRM V3.0
Steam Traps (Dry Cleaner)	513.96 or 514.14	513.93	Deemed	Sections 4.4.16 TRM V3.0
Steam Traps (HVAC)	Vary	Vary. Verified as reasonable	Deemed	Sections 4.4.16 TRM 3.0
Water Heaters (0.67 EF)	166 or 185	148	Deemed	Sections 4.3.1 TRM V3.0
Custom Measures	Vary	Vary. Adjusted	Research	

Source: Navigant analysis of program tracking data and Franklin Energy Services documents. Deemed values are from Illinois TRM V3.0, available at <http://www.ilsag.info/technical-reference-manual.html>.

\* Note: Small per unit savings differences (less than one percent) usually represent rounding differences that occur when using the TRM algorithms and inputs, and do not represent errors in the ex ante values. Errors will be identified in the text.

### 3.4 Verified Gross Program Impact Results

As shown in Table 3-6, the GPY4 PG SBP reported ex ante gross energy savings of 496,821 therms. Evaluation adjustments resulted in verified gross energy savings of 525,412 therms, reflecting the program's gross realization rate of 106 percent.

**Table 3-6. GPY4 PG SBP Impact Results**

Measure Category	Quantity Unit	Verified Measure Quantity	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)
<b>Standard Incentive</b>					
Bathroom Aerators	Each	15	84	1.22	103
Boiler Reset Controls	MBH	3,000	2,791	1.00	2,791
Boiler Tune Ups	MBH	26,192	4,868	1.00	4,874
Energy Star Fryers	Each	4	2,020	1.00	2,020
High Efficient Boilers	MBH	27,387	20,345	1.00	20,356
High Efficient Furnaces	Each	25	5,606	0.76	4,281
Pipe Insulation (DHW/Steam/HW)	Linear Foot	66,999	87,584	1.00	87,600
Prog/Reprog Thermostats	Unit	42	8853	1.02	9057
Steam Traps (HVAC/Dry Cleaner)	Each	851	296,048	1.00	296161
<i>Standard Incentive Subtotal</i>			428,199	1.00	427,243
<b>Direct Install</b>					
Bathroom Aerators	Each	960	5,392	1.22	6,584
Kitchen Aerators	Each	66	371	1.22	453
Pipe Insulation (DHW/HW Boiler)	Linear Foot	522	834	1.19	991
Pre Rinse Sprayers	Each	32	3,556	1.22	4,331
Prog/Reprog Thermostats	Unit	9	906	1.94	1,759
Showerheads	Each	221	3,929	1.22	4,804
<i>Direct Install Subtotal</i>			14,988	1.26	18,922
<b>Custom Measures</b>					
Custom Measures		12	53,634	1.48	79,247
<b>PG GPY4 SBP Total</b>			<b>496,821</b>	<b>1.06</b>	<b>525,412</b>

*Sources: Program tracking data and Navigant analysis*

As shown in Table 3-7, the GPY4 NSG SBP reported ex ante gross energy savings of 37,390 therms. Evaluation adjustments resulted in verified gross energy savings of 37,973 therms, reflecting the program's gross realization rate of 102 percent.

**Table 3-7. GPY4 NSG SBP Impact Results**

Measure Category	Quantity Unit	Verified Measure Quantity	Ex Ante Gross Savings (therms)	Verified Gross Realization Rate	Verified Gross Savings (therms)
<b>Standard Incentive</b>					
Bathroom Aerators	Each	7	39	1.25	48
Energy Star Fryers	Each	3	1,515	1.00	1,515
High Efficient Boilers	MBH	2	1,551	1.00	1,551
High Efficient Furnaces	Each	3	671	0.77	514
Infrared Salamander Broilers	Each	2	477	1.00	478
Large Gas Water Heaters	MBH	1	600	1.00	602
Pipe Insulation (DHW/Steam/HW)	Linear Foot	1,534	2,929	1.00	2,928
Prog/Reprog Thermostats	Unit	9	1,616	1.33	2,148
Steam Traps (HVAC/Dry Cleaner)	Each	79	26,871	1.00	26,864
Water Heaters 0.67 EF	Each	2	295	1.00	296
<i>Standard Incentive Subtotal</i>			36,564	1.01	36,944
<b>Direct Install</b>					
Bathroom Aerators	Each	74	407	1.25	508
Kitchen Aerators	Each	19	105	1.25	130
Pipe Insulation (DHW)	Linear Foot	90	72	1.25	90
Pre Rinse Sprayers	Each	1	109	1.24	135
Prog/Reprog Thermostats	Unit	1	81	1.25	101
Showerheads	Each	3	52	1.25	65
<i>Direct Install Subtotal</i>			826	1.25	1,029
<b>NSG GPY4 SBP Total</b>			<b>37,390</b>	<b>1.02</b>	<b>37,973</b>

*Source: Program tracking data and Navigant analysis*

The PG SBP standard incentive component contributed 81 percent of the verified gross savings in GPY4, and the direct install measures contributed 4 percent. The custom component also contributed 15 percent of the verified gross savings. The NSG SBP standard incentive component contributed 97 percent of the verified gross savings in GPY4 and the direct install contributed 3 percent.



## 4 Net Impact Evaluation

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a NTGR. As noted in Section 2, the NTGR used to calculate the net verified savings for the GPY4 Small Business program was deemed through a consensus process managed by the Illinois SAG.

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

**Table 4-1. PG and NSG GPY4 Program NTGR Values**

Program Path/Measure	Utility	GPY4 Deemed NTGR Value <sup>†</sup>	NTGR Source <sup>‡</sup>
SBP (all measures except Custom)	PG	0.99	SAG
Custom Incentives	PG & NSG	0.68	
SBP (all measures except Custom)	NSG	0.99	

Source: Navigant analysis.

<sup>†</sup>Navigant evaluation report for the GPY3: <http://www.ilsag.info/evaluation-documents.html>.

<sup>‡</sup> Deemed NTG ratios 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](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 natural gas savings from the GPY4 PG SBP by program path. Navigant verified PG SBP net savings of 495,591 therms, or 110 percent of the program goal of 448,599 therms.<sup>25</sup>

**Table 4-2. GPY4 PG SBP 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	53,634	36,471	1.48	79,247	0.68	53,887
Direct Install	14,987	14,837	1.26	18,922	0.99	18,733
Standard Incentive	428,200	423,918	1.00	427,243	0.99	422,971
<b>GPY4 SBP Total</b>	<b>496,821</b>	<b>475,226</b>	<b>1.06</b>	<b>525,412</b>		<b>495,591</b>

Source: Evaluation analysis of GPY4 program tracking data.

Table 4-3 summarizes the natural gas savings from the GPY4 NSG SBP by program path. Navigant verified NSG SBP net energy savings of 37,593 therms, or 137 percent of the program goal.

<sup>25</sup> PG-NSG Realized Savings\_091515.xlsx

**Table 4-3. GPY4 NSG SBP 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)
Direct Install	826	834	1.25	1,029	0.99	1,018
Standard Incentive	36,565	36,923	1.01	36,944	0.99	36,575
<b>GPY4 SBP Total</b>	<b>37,391</b>	<b>37,757</b>	<b>1.02</b>	<b>37,973</b>		<b>37,593</b>

*Source: Evaluation analysis of GPY4 program tracking data.*

## 5 Process Evaluation Research

Navigant's GPY4 process research activities for the Small Business program included interviews with program management to verify our understanding of the program design, administration, marketing, and delivery in GPY4. Additionally, the GPY4 evaluation team conducted in-depth interviews with representative samples of participating trade allies (TAs) to update the recommended NTGRs for GPY6 NTG discussions with the SAG, and gather feedback on satisfaction with the program and its components. The NTG research approach and findings are presented in Appendix 7.2.

### 5.1 Trade Ally Interview Findings

Navigant conducted in-depth interviews with a total of twelve SBP-affiliated TAs in GPY4 during August to September 2015: six who participated in the PG SBP and six who participated in the NSG SBP.<sup>26</sup> The sample frame consisted of an initial list of TAs affiliated with each utility's GPY4 program, obtained from preliminary extracts of the programs' tracking databases drawn from Franklin's Bensight platform. These were sorted by the size of each trade ally's aggregate SBP GPY4 ex ante gross savings to date and sorted into three strata: small, medium and large. Interviewed TAs were drawn at random from each stratum.

#### Trade Ally Sample

Six TAs affiliated with the PG SBP were interviewed. They included:

- A small lighting company that also installs thermostats
- An energy consulting company that specializes in steam traps
- A construction installation contractor
- An HVAC company that also installs lighting
- A company that installs energy saving projects
- A company that mostly installs residential HVAC equipment but also installs commercial water heaters and boilers

Six TAs affiliated with the NSG SBP were interviewed. They included:

- An HVAC firm that works with C&I customers
- A full service mechanical contractor
- A company that installs furnaces and boilers
- A design and build mechanical firm
- A building retrofit company
- A company that "does everything related to energy efficiency"

Peoples Gas trade allies reported from two to fourteen employees. Size of the companies for North Shore gas were slightly larger ranging from one employee to fifty employees. One company was an outlier and reported five to six hundred employees.

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<sup>26</sup> In the course of the sampling process it became apparent that there was not a strict separation between the groups of trade allies: three of the six interviewed NSG trade allies had also completed SBP projects for customers in the PG service territory. Two trade allies indicated they also performed work in the Nicor Gas program territory.

Four of the six Peoples Gas' trade allies always concentrated mostly on small businesses as their target market. The steam trap company primarily focused on large businesses like hospitals; the construction installation contractor also concentrated on larger businesses. Four of the six North Shore Gas trade allies generally concentrated on small businesses. One marketed to small businesses because of this program.

### **Trade Ally Satisfaction and Perspectives**

In this section, trade ally satisfaction is presented in addition to trade allies' views of customer satisfaction.

#### **Trade Ally Satisfaction**

Trade allies from both utilities indicated they were satisfied with the program, mostly because the program increased their business:

- "The Program provides me with an opportunity to grow a business that wouldn't exist without the Program."
- "It is an added sales pitch and incentive for the customers."
- "It does enable our business to thrive and the savings are real."
- "It is easy to apply and the customers get their equipment on time."
- "We sell more projects because of the program. It makes it more affordable for customers to purchase products and save on energy than if they did not have these incentives."
- "It helps provide added value to our customers and helps move more projects forward."
- "It helps increase sales."
- "I'm getting new customers that wouldn't have the work done without the rebate."
- "Last year there were some snags with getting rebates. Since then the process has been fixed on both sides. I'm pretty satisfied."

A Peoples Gas trade ally, although satisfied with the Program, also provided negative comments: he said the decrease in the incentive prevented him from growing his business this past year. He thought that customers were not knowledgeable enough about the program. Another trade ally was mostly satisfied with the program but indicated that paperwork makes program participation a little difficult.

On the other side of the coin, two trade allies provided purely negative comments about the program. One Peoples Gas' trade ally said he was frustrated with the Program because of the lack of consistency and standardization between the utilities. A North Shore Gas trade ally complained that the program asks for too much documentation.

#### **Customer Satisfaction**

Peoples Gas' trade allies agreed that customers are satisfied with the program. Reasons for customer satisfaction with the Program include:

- "Because the equipment is free or almost free and provides value to the customer."
- "The process works smoothly and quickly."
- "Customers are pleased with the equipment."

North Shore Gas trade allies reported that their customers liked the rebates and the savings from the Small Business program.

### **Effectiveness of the Incentive**

Peoples Gas' trade allies reported the incentive levels are effective at encouraging customers to install energy efficient equipment with the exception of insulation. North Shore Gas trade allies thought the incentive was effective except for a few who thought they were low for the most expensive high efficiency equipment.

### **Loan Options**

Half of the Peoples Gas trade allies were able to provide qualified customers with a loan. One offered in-house financing; the other two have a relationship with local financial institutions. However, most of the North Shore Gas trade allies do not offer loans anymore. Only one trade ally offered a loan option. The percent of projects that were financed ranged from zero to 15 percent. However, few customers requested financing for their projects in either service area.

### **Marketing**

According to the trade allies, Peoples Gas and North Shore Gas and the program implementers can boost program awareness with trade allies by:

- Providing more outreach to suppliers, i.e., to the places where contractors buy product.
- Through literature or advertisement at distributorships.
- Get marketing materials to the Trade Allies earlier. A trade ally remarked that the Energy Advisor has to visit with the sales team before trade allies can receive necessary marketing materials.
- Mailings and personal contact with trade allies.
- Educate the supply houses
- "Franklin Energy could reach out to the major engineering firms to do some test cases... Perhaps increase representation at the major trade shows. I think Franklin Energy should aim for the big firms that do not want to bother with this."

Two of the twelve trade allies said that most contractors know about the program. Their success with the Program is dependent on their willingness to fill out the paperwork.

As shown in Table 5-1, four trade allies reported that they participate in other utility programs and refer small business customers to other programs. Three trade allies participate in other utility programs but do not refer customers, while another three of them did not participate in other programs but do refer small business customers to them. And finally, two of the twelve trade allies reported that they neither participate nor refer small customers to other programs. In each situation, trade allies serving both utilities are found in each category.

**Table 5-1. Trade Allies' Involvement with Other Peoples Gas and North Shore Gas Programs.**

Trade Ally ID	Participate in Other Programs	Refer Small Business Customers to Other Programs
3	Yes, MF and C&I	Yes, through association
7	C&I	Yes C&I
8	Yes, all of them PG, NSG, C&I, residential	No, other than the ones we are working in
4	Depends on customer interest	Yes, Water Heaters
5	Yes, C&I	No
6	Yes, Furnaces	No
10	Yes	No
11	No	Yes, insulation rebates
1	No	Yes, MF Program
12	No	Yes
2	No	No
9	No	No

*Source: Navigant analysis of trade ally interview responses.*

## Marketing Support

Of the twelve trade allies, about half reported that the implementer, Franklin Energy, provides adequate or successful marketing support. A few of the comments were:

- “They (Franklin Energy) are fairly supportive. When we ask for someone on the ground, they will come. They always come prepared with marketing materials. They have also been good at sending leads.”
- “We always have an engineer that comes with us on projects.”
- “Very good support when we need someone to meet with or talk to customers.”
- “Lots of information through our association with them.”
- “We have gotten leads from Franklin Energy.”
- “At energy efficiency conferences, there will be a member of the company, then we always have an energy engineer that comes with us on projects.”
- “Utility representatives are always willing to join us in meetings with customers.”

Customers hear about the program via outreach from the trade ally:

- “Typically, it is our own outreach.”
- “Either they were contacted by Franklin Energy or they were referred to us by the archdiocese.”
- “Word of mouth or seeing it with other companies.”
- “Most are not aware until we tell them. Some read about it through advertisements in the mail. We make them aware that they are facing replacement.”
- “Word of mouth of our salespeople.”
- “From our sales guys.”
- “Yes,...they have called us because of the program. Through the archdiocese of Chicago.”

Two of the trade allies have not noticed any word-of-mouth marketing among Peoples Gas customers. The other trade allies report small to moderate levels of word-of-mouth referrals. One reported more electrical referrals compared to gas customer referrals.

### **Administration and Delivery**

Each of the Peoples Gas trade allies contact customers about the program using different criteria. For instance, trade allies mentioned the rebates during ‘normal conversations.’ When customers call in, they tell them the rebates for which they qualify. One trade ally focused on the dry cleaner industry, while another focused on churches within the Catholic diocese.

Trade allies from North Shore Gas agree that they market the program whenever they touch a customer.

Half of the trade allies from Peoples Gas (three) indicated the businesses in the program were current customers and another trade ally said the majority of the program participants were current customers. Three trade allies market to targeted geographic areas.

Four of the North Shore Gas trade allies said the mix of new to current customer was about 50/50. Another trade ally said that most of his program participants were current customers.

Only one trade ally of all twelve trade allies said that some of the customers are still confused about how the Small Business program works. The other eleven say customers were not confused.

According to Peoples Gas TAs, after the customer agreed to install the recommended equipment, the trade ally scheduled the installation. Scheduling generally occurs within days or two weeks, although one trade ally needed a purchase order from the customer and another tried to coordinate gas equipment installation with the installation of the lighting. North Shore Gas trade allies said it depended on the equipment that was needed. It could be a couple of months if the trade ally is replacing a boiler – that depends on the manufacturer.

Trade allies from both utilities reported they received payment from two or three weeks to six weeks.

### **Economic Indicators**

All but four of the trade allies in our study agreed that the Small Business program was a competitive advantage for their firm; one in North Shore Gas and three in the Peoples Gas service areas disagreed. Trade allies from North Shore Gas were eloquent on the competitive advantage impact of the program:

- Yes, because we sell more projects because of the program. It makes it more affordable for customers to purchase products and save on energy than if they did not have these incentives.
- Yes. It helps provided added value to our customers and helps move more projects forward.
- It helps increase sales.
- I’m getting new customers that wouldn’t have the work done without the rebate.

One Peoples Gas trade ally was able to hire a new employee for their gas business and one was able to hire a new employee for electric installations. This year, one Peoples Gas trade ally planned to hire another employee. Two North Shore Gas trade allies have already hired new workers because of the



program. One trade ally hired one and one hired 3 new workers. He also planned to hire three new workers this year.

All but one Peoples Gas trade ally responded that they currently participate in the GPY5 Small Business program. Only two North Shore Gas trade allies answered the question and they both were participating in the GPY5 program.



## 6 Findings and Recommendations

The PG and NSG GPY4 Small Business programs performed well and achieved their goals for the program year. With realization rates of 110 percent of PG's program therm goal and 137 percent of the NSG therm goal, both companies' programs achieved solid results. This section summarizes the key impact and process findings and recommendations as detailed below.

### Verified Net Savings.

**Finding 1.** The GPY4 PG Small Business program achieved verified net energy savings of 495,591 therms. This is 110 percent of the program goal of 448,599 therms.<sup>27</sup> The NSG program achieved verified net energy savings of 37,593 therms. This is 137 percent of the program goal. The verified net savings were calculated using deemed net-to-gross (NTG) estimates approved through the Illinois Stakeholders Advisory Group consensus process.

### Verified Gross Savings and Realization Rate.

**Finding 2.** The GPY4 PG SBP achieved verified gross energy savings of 525,412 therms. This produced a program verified gross realization rate of 106 percent. The NSG SBP achieved verified gross energy savings of 37,973 therms, with overall verified gross realization rate of 102 percent. The programs accurately tracked gross savings for most TRM (v3.0) deemed measures. However, the tracking system and the "Master Measure Database" (MMDB) spreadsheet default savings for some measures need updates. Deemed savings for several measures (e.g., aerators, showerheads, and programmable thermostats) were adjusted upward after reviewing the TRM default commercial/industrial (C&I) savings input assumptions.

**Recommendation 1.** The MMDB and the default values that feed into the tracking system should receive additional verification checks when updated with the approved version of the Illinois TRM. Where the TRM provides deemed input parameters for small business buildings, the program should use them instead of miscellaneous assumptions, if a custom value is not available.

**Finding 3.** The PG GPY4 SBP completed twelve (12) custom projects. The evaluation team stratified and sampled 6 out of the 12 custom projects and performed engineering file reviews and analyses of the claimed savings, including billing analysis for some projects. Overall, we estimated a verified gross savings realization rate of 148 percent based on a statistical relative precision of 7 percent at the 90 percent confidence level. The sample realization rate was applied to the population of custom ex ante savings to calculate the overall verified savings from custom measures. Our analysis revealed that some of the custom input assumptions were very conservative, without full documentation for the sources of assumptions or post-inspection reports, in some cases. Details of the custom review findings are presented in the tracking system review in Section 3 and in the findings and recommendations in Section 6 of this report.

**Recommendation 2.** The IC should more fully document the sources used for custom savings input assumptions and correction factors. Improving these initial input assumptions, or

<sup>27</sup> PG-NSG Realized Savings\_091515.xlsx

choosing alternative estimation methods that reduce uncertainty, will improve the accuracy of the initial savings estimates.

**Finding 4.** For boiler retrofit measures where custom inputs are allowable, the baseline burners were assumed to provide their original design efficiency rating. This is a conservative input assumption. The efficiency of old equipment will generally degrade over its life. Therefore the true baseline efficiency is likely to be significantly lower than the rated design (i.e., nameplate) efficiency. Two of the application files Navigant reviewed included the combustion analyzer results showing equipment efficiency both pre- and post-retrofit. However, most of the projects lacked this key detail. While it is not always possible to obtain these measurements, they are critical inputs and greatly improve the accuracy of the overall analysis when they are available.

**Recommendation 3.** When possible, use a combustion analyzer to determine custom inputs for equipment efficiency ratings.<sup>28</sup> For projects where a direct combustion reading is not feasible, consider applying a defensible derating factor based on the equipment's age.

**Finding 5.** Each custom analysis file included the previous several years of billing data. For some of the custom calculations, intermediate steps showing the IC's estimate of annual usage were also shown. This calculated value should be compared to the known, billed usage to provide a quick and easy validity check on the engineering analysis.

**Recommendation 4.** More fully leverage the available billing data to provide calibration checks and quality assurance for engineering calculations.

**Finding 6.** For domestic hot water (DHW) measures, the current billing analysis approach assumes the monthly DHW load based on the single lowest use month over a two year billing period.<sup>29</sup> That approach is conservative in estimating savings from DHW measures. As an alternative defensible approach, take an average of all months below a given Heating Degree Day (HDD) threshold. Further analysis can inform the most appropriate value to use for this breakpoint, but a value in the range of 100 HDD will generally capture at least 4 months per year with very little space heating load. Over a two-year billing history this approach would provide an average DHW load based on at least eight months of data, as opposed to the current approach that uses only the lowest one or two months.

**Recommendation 5.** Update methodology for determining average monthly DHW load.

#### **Program Volumetric Findings.**

**Finding 7.** The PG GPY4 program involved 344 participants (property accounts) who implemented a total of 2,325 measures from 504 projects. Standard incentive and direct-installed deemed measures contributed 81 and 4 percent, respectively, of the verified gross savings for the PG GPY4 SBP, while savings from custom projects contributed 15 percent of the GPY4 verified gross savings. The NSG GPY4 program involved 41 participants who implemented a total of 213 measures from 57 projects. Standard incentive measures

<sup>28</sup> It is also advisable to confirm the new equipment's efficiency as well, but the baseline is the more important of the two measurements.

<sup>29</sup> One project analysis file was modified to use an average of the two lowest months across two summers of billing data.

accounted for 97 percent of program savings, while direct-installed measures contributed the remaining 3 percent. In terms of measures, savings from steam traps produced the bulk of the GPY4 savings for PG and NSG (56 and 71 percent, respectively), followed by hot water measures (20 and 13 percent, respectively).

#### **Process/Net-To-Gross Findings.**

**Finding 8.** Based on GPY4 trade ally interviews, Navigant estimated FR for the PG and NSG Small Business programs to be 0.02 and 0.07, respectively. No significant SO was found for either program. The weighted average FR for both programs was 0.03.

**Recommendation 6.** Despite differences between the FR scores derived from the PG and NSG TA interviews, we recommend using the weighted-average FR estimate of 0.03 because of the considerable overlap between the two TA samples (three of the six interviewed NSG TAs also completed projects for customers in the PG service territory in GPY4).

**Finding 9:** Navigant conducted in-depth interviews with a total of twelve SBP-affiliated TAs in GPY4 during August to September 2015: six who participated in the PG SBP and six who participated in the NSG SBP. Ten of the twelve trade allies interviewed from both utilities indicated they were satisfied with the program, mostly because the program increased their business. The trade allies described a range of positive attributes of the program and Franklin Energy, but also offered suggestions for improvements. Several described past and expected future hiring as a result of the program. The trade allies agreed that customers are satisfied with the program. Two trade allies provided negative comments about the program. One Peoples Gas' trade ally said he was frustrated with the program because of the lack of consistency and standardization between the utilities. A North Shore Gas trade ally complained that the program asks for too much documentation. The broader picture of the SBP is one of a successful program that supports small businesses.

## 7 Appendix

### 7.1 Detailed Gross Impact Approach and Findings

Most of the PG and NSG GPY4 SBP measures and savings were deemed through the TRM (v3.0). The PG program completed twelve (12) custom projects. The evaluation team randomly sampled 6 out of the 12 custom projects and performed engineering files reviews and analysis of the claimed savings, including billing analysis for some projects. 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.

A profile of the custom sample selection and summary of adjustments are provided Table 7-1.

**Table 7-1. PG GPY4 SBP Custom Sample**

Project ID	Measure Description	Ex Ante Gross (Therms)	Unweighted Verified Gross (Therms)	Unweighted Gross Realization Rate	Summary of Adjustment
813597	Boiler Burner Replacement	22,217	22,217	100%	OK
833294	Infrared Unit Heaters	5,765	7,994	139%	Billing analysis
854049	Water Heaters	5,672	10,485	185%	Corrected a geometry calculation error in estimate of baseline storage volume.
824188	Boiler Replacement	4,434	13,118	296%	Billing Analysis
845840	Attic Insulation	3,478	3,478	100%	OK
879670	Infrared Heaters	2,121	2,940	139%	Billing analysis

*Source: Utility tracking data and Navigant analysis.*

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, Navigant engineers estimated ex post gross savings based on their review of documentation and engineering analysis. 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), inspection reports and photos (where available), and calculation spreadsheets.

Table 7-2 below presents the research findings for the 6 sampled custom file review projects. The mean verified gross realization rate for the custom sample was 148 percent at a relative precision of  $\pm 7$  percent at 90 percent confidence level.

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

Program	Sampling Strata	Sample Size (n)	Population (N)	Sample Ex Ante Gross Savings (Therms)	Population Ex Ante Gross Savings (Therms)	Weighted Sample-Based Research Findings Gross Realization Rate	Weighted Population Research Findings Gross Savings (Therms)
PG SBP	Large	2	2	27,983	27,983	1.08	30,212
	Small	4	10	15,705	25,651	1.91	49,035
	<b>Total</b>	<b>6</b>	<b>12</b>	<b>43,688</b>	<b>53,634</b>	<b>1.48</b>	<b>79,247</b>
Overall Confidence Interval and Relative Precision (90/10) on RR						7%	

Source: Utility tracking data and Navigant analysis.

The stratified and weighted verified gross realization rates for the sample were applied to the population ex ante to calculate the overall custom projects verified gross savings of 79,247 therms.

## 7.2 Detailed Net-to-Gross Approach and Findings

Navigant asked each interviewed trade ally a series of questions designed to elicit information on the influence of the SBP on participant customer decision-making in order to calculate free-ridership (FR). Interviewees were also asked questions about participant spillover (SO). These were combined to calculate individual FR and SO scores for each interviewee. Weights reflecting each interviewed TA's aggregate GPY4 SBP gross ex ante savings were used to develop average FR and SO estimates for each program, as well as overall combined scores. These values are shown in Table 7-3.

**Table 7-3. PG and NSG Free Ridership and Net-to-Gross Ratios**

Utility	Free-Ridership	Spillover	Net-to-Gross Ratio
Peoples Gas	0.02	0.00	0.98
North Shore Gas	0.07	0.00	0.93
Weighted Average	0.03	0.00	0.97

Source: Navigant calculations, in-depth TA interviews.

No quantitative evidence was found of participant SO in either sample, although one interviewed TA indicated that some of his customers installed domestic hot water measures without applying for an incentive through the Small Business program.

The FR score for PG is lower than that for NSG, however, the two TA interview samples were not mutually exclusive: three of the six interviewed NSG TAs also completed SBP projects for customers in the PG service territory in GPY4. It is therefore possible that the responses of the overlap group may reflect their views about customers in both utilities' programs. For this reason, we believe that using the weighted average of the two FR scores for both programs is preferable to applying the two component scores separately.

The free-ridership (FR) scores, shown in Table 7-4, were derived from the trade ally (TA) interviews conducted in August and September 2015. The GPY4 TA Interview Guide is provided as Appendix 7.3 for more details regarding the individual FR questions. These included three separate program influence components as well as an overall program influence score. The algorithm used to combine these individual scores into a single FR value for each interviewed TA are as follows:

- Program Components Score = Maximum(FR1, FR2a, FR3)
- Program Influence Score = 1 – FR4
- Free-Ridership = 1 – Average(Program Components Score/10, Program Influence Score)

The weights shown in Table 7-4 are based on each TA's GPY4 SBP combined ex ante gross therm savings. To obtain the combined average FR score for both utilities' programs, the final verified gross therm savings were used as weights. Therefore, weighted NTGR for the trade allies in our study is 97 percent.

**Table 7-4. GPY4 Trade Ally Net-to-Gross Detailed Calculations**

Utility	Trade Ally	Free-Ridership Component Scores						Free-Ridership		
		FR1	FR2a	FR3	Program Components Score	FR4	Program Influence Score	Unweighted Free-Ridership	Weights	Weighted Free-Ridership
PG	1	10.00	6.00	10.00	10.00	0.00	1.00	0.00	0.027	0.00
	2	10.00	5.00	10.00	10.00	0.00	1.00	0.00	0.640	0.00
	3	2.00	4.00	7.00	7.00	0.00	1.00	0.15	0.006	0.00
	4	6.00	0.00	5.00	6.00	0.00	1.00	0.20	0.002	0.00
	5	9.50	2.00	8.50	9.50	0.09	0.91	0.07	0.320	0.02
	6	7.50	8.00	9.00	9.00	0.00	1.00	0.05	0.005	0.00
PG Weighted Average Free-Ridership:										0.02
NSG	7	5.00	10.00	5.00	10.00	0.00	1.00	0.00	0.463	0.00
	8	8.00	8.00	9.00	9.00	0.25	0.75	0.18	0.111	0.02
	9	8.00	8.00	8.00	8.00	0.50	0.50	0.35	0.003	0.00
	10	2.00	2.00	3.00	3.00	0.00	1.00	0.35	0.138	0.05
	11	9.00	8.50	8.50	9.00	0.30	0.70	0.20	0.019	0.00
	12	10.00	8.00	10.00	10.00	0.00	1.00	0.00	0.266	0.00
NSG Weighted Average Free-Ridership:										0.07
<b>Combined PG-NSG Weighted Average Free-Ridership:</b>										<b>0.03</b>

Source: Navigant analysis of trade ally interview responses.

### *7.3 Interview Guide*

#### **Participating Trade Ally Interview Guide**



PG and NSG GPY4  
Small Bus Program T