



**Residential Program
Evaluation Report
Home Energy Jumpstart 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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E. Executive Summary

This report presents a summary of the findings and results from the impact evaluation of the GPY4¹ Home Energy Jumpstart Program. The Home Energy Jumpstart (HEJ) Program is an assessment and direct install program jointly implemented by Peoples Gas (PG) and North Shore Gas (NSG) and Commonwealth Edison Company (ComEd) with Franklin Energy Services operating as implementer of the program. This report focuses solely on the gas savings from the program. Savings from electric measures are documented in a separate report.

The primary objective of this residential direct install program is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation and programmable thermostats at eligible single family residences. In addition, the installation teams performed services including programming new thermostats and reprogramming existing thermostats. The secondary objective of this program is to function as the “gateway” for homeowners to participate in other residential programs. HEJ performs a brief assessment of the major retrofit opportunities (e.g., furnace, boiler, air conditioning, insulation and air sealing) and brings heightened awareness to the homeowners about available additional efficiency programs offered by Peoples Gas, North Shore Gas and ComEd.

E.1. Program Savings

Table E-1 summarizes the natural gas savings from the GPY4 PG Home Energy Jumpstart Program.

Table E-1. GPY4 Peoples Gas Home Energy Jumpstart Program Natural Gas Savings

Program/Path	Ex Ante Gross Savings ² (Therms)	Ex Ante Net Savings ³ (Therms)	Verified Gross RR ⁴	Verified Gross Savings (Therms)	NTGR ⁵	Verified Net Savings ⁶ (Therms)
Home Energy Jumpstart	396,145	376,496	1.00	397,295	0.96	381,403

Source: Navigant evaluation analysis of GPY4 program tracking data and Illinois Statewide Technical Reference Manuals.⁷

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

² 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”.

³ GPY4 Ex Ante Net = (GPY4 Ex Ante Gross * GPY3 Verified Gross RR) * GPY4 Deemed NTGR.

⁴ Verified Gross Realization Rate (RR) = Verified Gross Savings / Ex Ante Gross Savings;
Verified Gross Savings = RR * Ex Ante Gross Savings.

⁵ The net-to-gross ratio (NTGR) used for calculating verified net savings was determined via previously conducted research using participant survey responses.

⁶ Verified Net Savings = NTGR * Verified Gross Savings.

⁷ 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>

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Table E-2 summarizes the natural gas savings from the GPY4 NSG Home Energy Jumpstart Program.

Table E-2. GPY4 North Shore Gas Home Energy Jumpstart 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)
Home Energy Jumpstart	70,633	66,452	1.00	70,617	0.96	67,792

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

E.2 Program Savings by Measure

Table E-3 summarizes the natural gas savings from the GPY4 PG Home Energy Jumpstart by measure.

Table E-3. GPY4 Peoples Gas Home Energy Jumpstart Program 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)
Showerheads	128,760	122,373	1.00	128,760	0.96	123,609
Bathroom Aerators	6,330	6,016	1.00	6,330	0.96	6,077
Kitchen Aerators	28,972	27,535	1.00	28,972	0.96	27,813
Pipe Insulation	23,418	22,257	1.14	26,665	0.96	25,599
Programmable Thermostats	147,206	139,904	1.00	146,860	0.96	140,986
Reprogramming Thermostats	61,459	58,411	0.97	59,707	0.96	57,319
Total	396,145	376,496	1.00	397,295	0.96	381,403

Source: Navigant evaluation analysis of GPY4 program tracking data.

Table E-4 summarizes the natural gas savings from the GPY4 NSG Home Energy Jumpstart by measure.

Table E-4. GPY4 North Shore Gas Home Energy Jumpstart Program 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)
Showerheads	28,173	26,506	1.00	28,173	0.96	27,047
Bathroom Aerators	1,800	1,693	1.00	1,800	0.96	1,728
Kitchen Aerators	3,535	3,325	1.00	3,535	0.96	3,393
Pipe Insulation	4,200	3,951	1.06	4,465	0.96	4,286
Programmable Thermostats	19,751	18,582	1.00	19,656	0.96	18,870
Reprogramming Thermostats	13,175	12,395	0.99	12,988	0.96	12,468
Total	70,633	66,452	1.00	70,617	0.96	67,792

Source: Navigant evaluation analysis of GPY4 program tracking data.

Pipe insulation measures received realization rates higher than 100 percent because of an error in the ex ante calculations. Reprogramming of programmable thermostats received a realization rate that was less than 100 percent as a result of several projects having ex ante savings claimed for multiple reprogramming thermostats in one household. More information on both of these findings is located in Section 3.

E.3. Program Volumetric Detail

Table E-5 and Table E-6, below, present GPY4 program participation reported by the Program Administrator Franklin Energy Services (Franklin Energy) for the Peoples Gas and North Shore Gas programs. Detailed volumetric breakdown of the measure type and savings quantity are provided in the program-level analysis in Section 3.

Table E-5. GPY4 Peoples Gas Home Energy Jumpstart Program Primary Participation Detail

Measure Category	Participants Count ⁸	Total Installed Measures ⁹	Number of Measures/Participants ¹⁰	Installed Projects
Showerheads	5,979	9,201	1.54	7,141
Bathroom Aerators	5,707	9,129	1.60	5,943
Kitchen Aerators	4,589	5,166	1.13	4,770
Pipe Insulation	4,135	4,424	1.07	4,421
Programmable Thermostats	2,259	2,363	1.05	2,362*
Reprogramming Thermostats	959	994	1.04	994**
Program Total	7,093	31,277	4.41	7,471

Source: Navigant evaluation analysis of GPY4 program tracking data.

* Of the 2,362 total projects that had programmable thermostats installed, 59 projects had no savings.

** Of the 994 total projects that had thermostats reprogrammed, 31 projects had no savings.

Table E-6. GPY4 North Shore Gas Home Energy Jumpstart Program Primary Participation Detail

Measure Category	Participants Count	Total Installed Measures	Number of Measures/Participants	Installed Projects
Showerheads	1,031	2,008	1.95	1,337
Bathroom Aerators	1,011	2,597	2.57	1,091
Kitchen Aerators	544	631	1.16	582
Pipe Insulation	752	780	1.04	780
Programmable Thermostats	306	325	1.06	324*
Reprogramming Thermostats	197	222	1.13	222**
Program Total	1,238	6,563	5.30	1,330

Source: Navigant evaluation analysis of GPY4 program tracking data.

*Of the 324 total projects that had programmable thermostats installed, 12 projects had no savings.

**Of the 222 total projects that had thermostats reprogrammed, 12 projects had no savings.

E.4 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 evaluation.

⁸ Participants are defined based on the number of account names.

⁹ For evaluation reporting purpose, if a measure quantity is reported in the tracking system in linear feet or household, Navigant treated each row entry of such measure as one measure quantity in this table. The actual linear feet or household are reported in Section 3.2 at the program-level analysis.

¹⁰ Number of Measures/Participants is the ratio of installed measures count and participants count for specific measure.

E.5. Findings and Recommendations

The following detail provides insight into key program findings and recommendations.¹¹ The GPY4 Peoples Gas Home Energy Jumpstart (HEJ) Program had 7,093 participants that received 31,277 measures. The PG HEJ Program achieved verified net savings of 397,295 therms representing 64 percent of the target savings which is an increase of 20 percent in verified net savings in GPY4 compared to GPY3 (317,376 therms). The GPY4 North Shore Gas HEJ Program had 1,238 participants that received 6,563 measures. The NSG HEJ program achieved verified net savings of 70,617 therms representing 85 percent of the target savings and 67,792 therms for the NSG HEJ Program which is a 42 percent increase in verified net savings from GPY3 (47,781 therms). 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 “Residential Programs” and portfolio level when all GPY4 results are verified.

Verified Gross Impacts and Realization Rate

Finding 1. The GPY4 PG HEJ Program achieved verified gross energy savings of 397,295 therms resulting in a verified gross realization rate of 100 percent. The GPY4 NSG HEJ Program achieved verified gross energy savings of 70,617 therms also resulting in a verified gross realization rate of 100 percent.

Finding 2. The ex ante and verified gross savings per unit for pipe insulation measures differ. This is a result of a discrepancy in the pipe circumference assumption as shown in Section 3.3. The discrepancy results in higher verified gross savings per unit for pipe insulation measures.

Recommendation 1. Navigant recommends updating the ex ante gross savings calculations to average the circumferences of the most common pipe diameters to calculate the new circumference values instead of adding them. This will ensure that measure level savings are accurate.

Finding 3. For the PG HEJ Program, Navigant identified 28 projects with ex ante savings claimed for multiple programmable thermostats in one household, or multiple reprogramming thermostats in one household, or one programmable thermostat and one reprogramming thermostat in one household. For the NSG HEJ Program, Navigant identified four projects with ex ante savings claimed for multiple programmable thermostats in one household, or multiple reprogramming thermostats in one household, or one programmable thermostat and one reprogramming thermostat in one household. Navigant capped ex post savings at one programmable or one reprogramming thermostat for each project.

Recommendation 2. Navigant recommends claiming ex ante savings based on one thermostat per project, and not claiming savings for multiple thermostats or reprogramming thermostats.

Program Tracking Database

Finding 4. For the PG HEJ Program, Navigant identified 15 projects in the tracking database with ex ante savings claimed for DHW pipe insulation at more than six feet. For the NSG HEJ Program, Navigant also identified five projects with ex ante savings claimed for DHW pipe insulation at more than six feet. Navigant capped ex post savings at the first six feet for those projects having more than six feet of pipe insulation. Franklin Energy indicated procedures are in place to catch this error.

¹¹ 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.

Finding 5. For Hot Water Boiler Pipe Insulation, Navigant identified a subtle equation error to calculate the circumference of pipe with insulation.

Recommendation 3. Navigant recommends implementers correct this subtle pipe insulation equation error.

Program Participation and Satisfaction

Finding 7. The information gathered through interviews and other communication with HEJ program management did not raise concerns. The PG and NSG programs used an outreach strategy that proved to be highly effective at generating new leads: fifteen percent of the participants enter the program through a monthly raffle for referrals. Participant reported satisfaction was 4.95 out of 5, a very high score.

1 Introduction

1.1 Program Description

This report presents a summary of the findings and results from the impact evaluation of the GPY4¹² Home Energy Jumpstart Program. The Home Energy Jumpstart (HEJ) Program is an assessment and direct install program jointly implemented by Peoples Gas and North Shore Gas and Commonwealth Edison Company (ComEd) with Franklin Energy Services implementing the program. This report focuses solely on the gas savings from the program. Savings from electric measures are included in a separate report.

The primary objective of this residential direct install program is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, pipe insulation, and programmable thermostats at eligible single family residences. In addition, the installation teams performed services including programming new thermostats and reprogramming existing thermostats. The secondary objective of this program is to function as the “gateway” for homeowners to participate in other residential programs. HEJ performs a brief assessment of the major retrofit opportunities (e.g., furnace, boiler, air conditioning, insulation, and air sealing) and brings heightened awareness to the homeowners about available additional efficiency programs offered by Peoples Gas and North Shore Gas and ComEd.

1.2 Evaluation Objectives

The Evaluation Team’s main objectives for the GPY4 Home Energy Jumpstart Program were to determine the program’s verified gross savings and verified net savings, and identify updates for the TRM. For this evaluation, Navigant conducted limited process research through telephone interviews with program managers at PG and NSG and Franklin Energy to understand the program’s performance and changes in GPY4.

¹² The GPY4 program year began June 1, 2014 and ended May 31, 2015.
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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 an engineering analysis of the program data. The full set of data collection activities is shown in the following table.

Table 2-1. Primary Data Collection Activities

What	Who	Completions Achieved	When
Program Tracking Database	Participants	Census	September – November 2015
In Depth Interviews	Program Manager/Implementer Staff	2	May 2015 & November 2015
Engineering Desk Review	Participants	15	June 2015

Source: Navigant.

Table 2-2. Additional Resources

Reference Source	Author	Application	Gross Impacts	Process
Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0	N/A	Engineering Analysis	X	N/A

2.2 Verified Savings Parameters

2.2.1 Verified Gross Savings Analysis Approach

Navigant estimated the verified per-unit savings for each program measure using impact algorithms and input assumptions as defined by the Illinois TRM for deemed measures.¹³ Table 2-3 below 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. In GPY4, all measures in the Home Energy Jumpstart Program were deemed.

¹³ Because the Illinois TRM provides multiple options for selecting input assumptions, Franklin Energy Services produces a “Master Measure Database” spreadsheet that documents their approach to compliance with the Illinois TRM. The spreadsheet is Integrys MMDB PY4 -052915, produced by Franklin Energy
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Table 2-3. GPY4 Verified Gross Savings Parameter Data Sources

Parameter	Data Source	Deemed or Evaluated?
Measure Quantity Installed	Program tracking system	Evaluated
Verified Gross Realization Rate	Program tracking data, TRM, Navigant	Evaluated
Residential hot water measure savings assumptions	Illinois TRM, version 3.0, section 5.4‡	Deemed
Residential pipe insulation savings assumptions	Illinois TRM, version 3.0, sections 5.3‡	Deemed
Programmable thermostat savings assumptions	Illinois TRM, version 3.0, section 5.3‡	Deemed

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

‡ Source: State of Illinois Technical Reference Manuals. Integrys MMDB PY4 -052915, produced by Franklin Energy;

2.2.2 Verified Net Savings Analysis Approach

Evaluation calculated verified net energy savings by multiplying the verified gross savings estimates by a net-to-gross ratio (NTGR). In GPY4, the NTGR estimate used to calculate the verified net savings was based on past evaluation research and approved through a consensus process managed through the Illinois Energy Efficiency Stakeholders Advisory Group (SAG)¹⁴. The approved, deemed NTGR for the GPY4 PG and NSG Home Energy Jumpstart program is 0.96.

2.3 Process Evaluation

Process evaluation activities in GPY4 were limited to interviews with program and implementation contractor staff to verify information about any changes that had been made to the program tracking database or to the measure savings calculations that may have impacted the GPY4 evaluation as well as to marketing and outreach for the program.

¹⁴ 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

3 Gross Impact Evaluation

The gross impact analysis involved a review of the tracking system and verification of measure savings. The verified savings were calculated by multiplying the quantity of measures installed by the verified measure per unit savings. The programs' verified gross realization rates were determined by the ratio of the verified savings to the ex ante gross savings.

3.1 Program Tracking Data Review

Franklin Energy provided updated tracking data report links from the previous year to enable Navigant to download the program tracking database for GPY4 impact evaluation.¹⁵ Navigant used the data extracts from the program's tracking system to verify the program's GPY4 ex ante inputs, including the measure counts and ex ante savings. In addition to the tracking database, Franklin Energy updated and provided to Navigant a spreadsheet of the measure savings (*Integrays_Master_Measure_Document*)¹⁶ that were derived either from the Illinois TRM (Ver. 3.0) for the deemed measures, or from other engineering estimates for measures not included in the Illinois TRM.

Navigant also conducted an engineering desk review on fifteen randomly selected projects. The information in the project files contained sufficient detail to assess the home's energy performance at a high level including type, age and condition of heating system, number and type of thermostats, type, size, and condition of domestic hot water system, type and depth of attic insulation, and location of ducts and whether or not duct sealing is recommended.¹⁷

3.2 Program Volumetric Findings

As shown in Table 3-1 and Table 3-2, the PG Home Energy Jumpstart Program reported 7,093 participants in GPY4 and distributed 31,277 measures. This translates to 4.41 measures per participant. The NSG Home Energy Jumpstart Program reported 1,238 participants in GPY4 and distributed 6,563 measures. This translates to 5.30 measures per participant.

¹⁵ Date for the final data extract was 7/22/2015.

¹⁶ Integrays MMDB PY4 -052915, produced by Franklin Energy.

¹⁷ File from Franklin Energy Services, June 17, 2015. "Jumpstart Survey Questions for Select 15 projects.xlsx."

Table 3-1. GPY4 Peoples Gas Home Energy Jumpstart Program Primary Participation Detail

Measure Category	Participants Count ¹⁸	Total Installed Measures ¹⁹	Number of Measures/Participants ²⁰	Installed Projects
Showerheads	5,979	9,201	1.54	7,141
Bathroom Aerators	5,707	9,129	1.60	5,943
Kitchen Aerators	4,589	5,166	1.13	4,770
Pipe Insulation	4,135	4,424	1.07	4,421
Programmable Thermostats	2,259	2,363	1.05	2,362*
Reprogramming Thermostats	959	994	1.04	994**
Program Total	7,093	31,277	4.41	7,471

Source: Navigant evaluation analysis of GPY4 program tracking data.

* Of the 2,362 total projects that had programmable thermostats, 59 projects had no savings.

**Of the 994 total projects that had reprogramming thermostats, 31 projects had no savings.

Table 3-2. GPY4 North Shore Gas Home Energy Jumpstart Program Primary Participation Detail

Measure Category	Participants Count	Total Installed Measures	Number of Measures/Participants	Installed Projects
Showerheads	1,031	2,008	1.95	1,337
Bathroom Aerators	1,011	2,597	2.57	1,091
Kitchen Aerators	544	631	1.16	582
Pipe Insulation	752	780	1.04	780
Programmable Thermostats	306	325	1.06	324*
Reprogramming Thermostats	197	222	1.13	222**
Program Total	1,238	6,563	5.30	1,330

Source: Navigant evaluation analysis of GPY4 program tracking data.

*Of the 324 total projects that had programmable thermostats, 12 projects had no savings.

**Of the 222 total projects that had reprogramming thermostats, 12 projects had no savings.

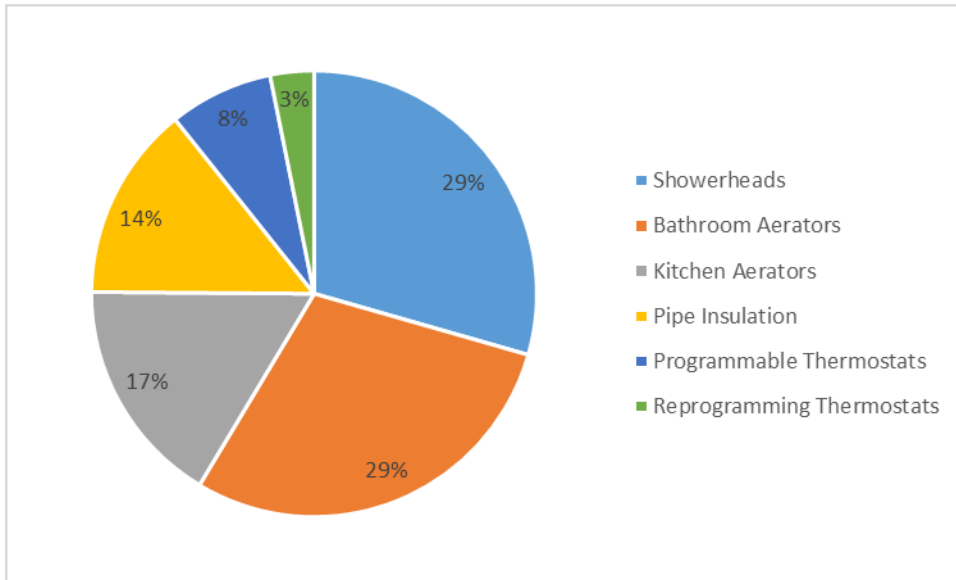
Figure 3-1 and Figure 3-2 disaggregate the measure mix by type. For the PG HEJ Program, showerheads and aerators represented 75 percent of the installations. Pipe insulation accounted for 14 percent of the installations and thermostats accounted for 11 percent of the installations. For the NSG HEJ program, showerheads and aerators represented 80 percent of the installations. Pipe insulation accounted for 12 percent of the installations and thermostats accounted for 8 percent of the installations.

¹⁸ Participants are defined based on the number of account names.

¹⁹ For evaluation reporting purpose, if a measure quantity is reported in the tracking system in linear feet or household, Navigant treated each row entry of such measure as one measure quantity in this table. The actual linear feet or household are reported in Section 3.2 at the program-level analysis.

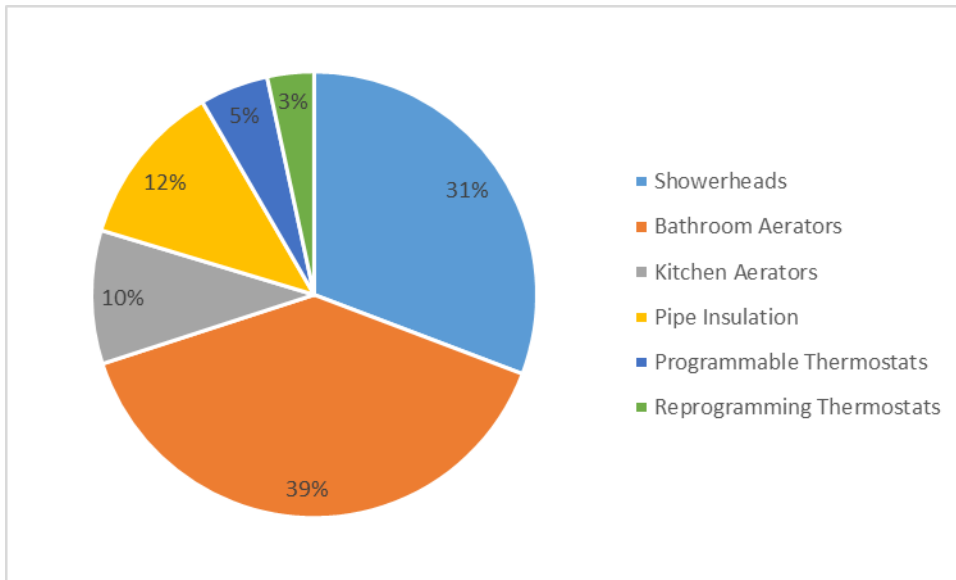
²⁰ Number of Measures/Participants is the ratio of installed measures count and participants count for specific measure.

Figure 3-1. Peoples Gas: HEJ Number of Measures Installed by Type



Source: Navigant evaluation analysis.

Figure 3-2. North Shore Gas: HEJ Number of Measures Installed by Type



Source: Navigant evaluation analysis.

Table 3-3 and below provide additional information regarding participation measures.

Table 3-3. Peoples Gas GPY4 Home Energy Jumpstart Program Measure Count

Measure	Unit	Install Type	Ex Ante Measure Count	Verified Measure Count
Showerheads	Each	Direct Install	9,201	9,201
Bathroom Aerators	Each	Direct Install	9,129	9,129
Kitchen Aerators	Each	Direct Install	5,166	5,166
Pipe Insulation	Linear Foot	Direct Install	32,739	32,739
Programmable Thermostats	Household	Direct Install	2,259	2,259
Reprogramming Thermostats	Household	Direct Install	959	959

Source: Navigant evaluation analysis of program tracking data.

Table 3-4. North Shore Gas GPY4 Home Energy Jumpstart Program Measure Count

Measure	Unit	Install Type	Ex Ante Measure Count	Verified Measure Count
Showerheads	Each	Direct Install	2,008	2,008
Bathroom Aerators	Each	Direct Install	2,597	2,597
Kitchen Aerators	Each	Direct Install	631	631
Pipe Insulation	Linear Foot	Direct Install	5,011	5,011
Programmable Thermostats	Household	Direct Install	306	306
Reprogramming Thermostats	Household	Direct Install	197	197

Source: Navigant evaluation analysis of program tracking data.

3.3 Gross Program Impact Parameter Estimates

Navigant calculated verified gross savings from the GPY4 HEJ Program using algorithms and parameters defined in the Illinois TRM v3.0. Navigant used the Illinois TRM v3.0 for all direct install measures. Table 3-5 presents the key parameters and the references used in the verified gross savings calculations.

Table 3-5. GPY4 Home Energy Jumpstart Program Ex Ante and Verified Gross Savings Parameters

Measure	Ex Ante Gross Savings (Therms/Unit)	Verified Gross Savings (Therms/Unit)	Method	Data Source
Bathroom Aerators	0.69	0.69	Deemed	Sections 5.4.4 TRM V3.0
Kitchen Aerators	5.61 (PG) or 5.60 (NSG)	5.61 (PG) or 5.60 (NSG)	Deemed	
Showerheads	14.0	14.0	Deemed	Sections 5.4.5 TRM V3.0
Programmable/Reprogramming Thermostats-2 Wire	94.38	94.38	Deemed	Sections 5.3.11 TRM V3.0
Programmable/Reprogramming Thermostats	62.29	62.29		
DHW Pipe Insulation	0.99	0.99	Deemed	Sections 5.4.1 TRM V3.0
HW Boiler Pipe Insulation	0.08	0.42	Deemed	Sections 5.3.2 TRM V3.0

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>.

Key findings include:

- For the PG HEJ Program, Navigant identified 15 projects in the tracking database with ex ante savings claimed for DHW pipe insulation at more than six feet. For the NSG HEJ Program, Navigant also identified five projects with ex ante savings claimed for DHW pipe insulation at more than six feet. Navigant capped ex post savings at the first six feet for those projects having more than six feet of pipe insulation.
- For the PG HEJ Program, Navigant identified one project (#915719) in the tracking database with ex ante savings claimed for two 2-wire reprogramming thermostats. For the NSG HEJ Program, Navigant also identified one project (#655109) with ex ante savings claimed for two 2-wire programmable thermostats and one project (#835781) with ex ante savings claimed for two reprogramming thermostats. For the PG HEJ Program, Navigant identified 27 projects in the tracking database with ex ante savings claimed for multiple programmable thermostats in one household, or multiple reprogramming thermostats in one household, or one programmable thermostat and one reprogramming thermostat in one household. For the NSG HEJ Program, Navigant also identified two projects with ex ante savings claimed for one programmable thermostat and one reprogramming thermostat in one household. Navigant capped ex post savings at one programmable thermostat or one reprogramming thermostat per household.
- For Hot Water Boiler Pipe Insulation, Navigant identified a subtle equation error to calculate the circumference of pipe with insulation, as follows:

$$C_{new} = \left((0.5 \text{ in} + 2 \text{ in}) + \frac{(0.75 \text{ in} + 2 \text{ in})}{2} \right) \times \pi \times \frac{1 \text{ ft}}{12 \text{ in}} = 1.014 \text{ ft}$$

Using a pipe insulation thickness of 0.5 inches (1.0 inch added for total diameter) for hot water boiler pipe insulation, and averaging the two most common pipe diameters (0.5 inches and 0.75 inches), C_{new} can be calculated with the following equation and values:

$$C_{new} = \left(\frac{((0.5 \text{ in} + 1 \text{ in}) + (0.75 \text{ in} + 1 \text{ in}))}{2} \right) \times \pi \times \frac{1 \text{ ft}}{12 \text{ in}} = 0.425 \text{ ft}$$

Using the above equation, the evaluation team adjusted the savings per unit foot of HW pipe from 0.08 therms to 0.42 therms.

3.4 Verified Gross Program Impact Results

As shown in Table 3-6, the GPY4 PG Home Energy Jumpstart Program reported ex ante gross energy savings of 396,145 therms. Evaluation adjustments resulted in verified gross energy savings of 397,295 therms, reflecting the program’s gross realization rate of 100 percent.

Table 3-6. GPY4 Peoples Gas Home Energy Jumpstart Program Impact Results

Measure Category	Quantity Unit	Verified Measure Quantity	Ex Ante Gross Savings (therms)	Verified Gross Realization Rate	Verified Gross Savings (therms)
Showerheads	Each	9,201	128,760	1.00	128,760
Bathroom Aerators	Each	9,129	6,330	1.00	6,330
Kitchen Aerators	Each	5,166	28,972	1.00	28,972
Pipe Insulation	Linear Feet	32,739	23,418	1.14	26,665
Programmable Thermostats	Household	2,259	147,206	1.00	146,860
Reprogramming Thermostats	Household	959	61,459	0.97	59,707
Total			396,145	1.00	397,295

Sources: Program tracking data and Navigant evaluation analysis.

As shown in Table 3-7, the GPY4 NSG Home Energy Jumpstart Program reported ex ante gross energy savings of 70,633 therms. Evaluation adjustments resulted in verified gross energy savings of 70,617 therms, reflecting the program’s gross realization rate of 100 percent.

Table 3-7. GPY4 North Shore Gas Home Energy Jumpstart Program Impact Results

Measure Category	Unit	Verified Measure Quantity	Ex Ante Gross Savings (therms)	Verified Gross Realization Rate	Verified Gross Savings (therms)
Showerheads	Each	2,008	28,173	1.00	28,173
Bathroom Aerators	Each	2,597	1,800	1.00	1,800
Kitchen Aerators	Each	631	3,535	1.00	3,535
Pipe Insulation	Linear Feet	5,011	4,200	1.06	4,465
Programmable Thermostats	Household	306	19,751	1.00	19,656
Reprogramming Thermostats	Household	197	13,175	0.99	12,988
Total			70,633	1.00	70,617

Source: Program tracking data and Navigant evaluation analysis.

Key findings include:

1. As noted in Section 3.3 above, the pipe insulation measures received realization rates higher than one as a result of the per unit savings adjustments.
2. As noted in Section 3.3 above, the thermostat measures received realization rates lower than one as a result of attributing savings of more than one programmable thermostat per household for some homes.

4 Net Impact Evaluation

The verified net energy savings were calculated by multiplying the verified gross savings estimates by the net-to-gross ratio. As noted in Section 2, the NTGR used to calculate the net verified savings for the GPY4 Home Energy Jumpstart Program was deemed for GPY4.

Table 4-1 summarizes the natural gas savings from the GPY4 Peoples Gas Home Energy Jumpstart Program by measure.

Table 4-1. GPY4 Peoples Gas Home Energy Jumpstart Program 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)
Showerheads	128,760	122,373	1.00	128,760	0.96	123,609
Bathroom Aerators	6,330	6,016	1.00	6,330	0.96	6,077
Kitchen Aerators	28,972	27,535	1.00	28,972	0.96	27,813
Pipe Insulation	23,418	22,257	1.14	26,665	0.96	25,599
Programmable Thermostats	147,206	139,904	1.00	146,860	0.96	140,986
Reprogramming Thermostats	61,459	58,411	0.97	59,707	0.96	57,319
Total	396,145	376,496	1.00	397,295	0.96	381,403

Source: Evaluation analysis of GPY4 program tracking data.

Table 4-2 summarizes the natural gas savings from the GPY4 North Shore Gas Home Energy Jumpstart Program by measure.

Table 4-2. GPY4 North Shore Gas Home Energy Jumpstart Program 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)
Showerheads	28,173	26,506	1.00	28,173	0.96	27,047
Bathroom Aerators	1,800	1,693	1.00	1,800	0.96	1,728
Kitchen Aerators	3,535	3,325	1.00	3,535	0.96	3,393
Pipe Insulation	4,200	3,951	1.06	4,465	0.96	4,286
Programmable Thermostats	19,751	18,582	1.00	19,656	0.96	18,870
Reprogramming Thermostats	13,175	12,395	0.99	12,988	0.96	12,468
Total	70,633	66,452	1.00	70,617	0.96	67,792

Source: Evaluation analysis of GPY4 program tracking data.

5 Process Evaluation

The GPY4 Home Energy Jumpstart process evaluation activities for the programs were limited to interviews with program management from PG and NSG and Franklin Energy to understand the changes to the program in GPY4. The information gathered through interviews and other communication did not raise concerns.

The PG and NSG programs used an outreach strategy that proved to be highly effective at generating new leads: offering participants a chance to win a monthly raffle prize by referring friends and family to the program. Fifteen percent of the participants enter the program through the raffle.²¹

The reports provided to homeowners included recommendations on additional energy efficiency improvements.²²

Regarding participant satisfaction, the HEJ Program used a leave-behind postcard requesting that customers fill it out and send it in. Overall the participant satisfaction was high and almost 2,000 participants sent in completed postcards. Participants in the PG and NSG HEJ Programs gave the program elements an average satisfaction rating of 4.95 out of 5.²³

²¹ Interview with Franklin Energy Services Program Manager, May 21, 2015.

²² Email attachment from Franklin Energy Services Program Manager, May 22, 2015 “Final Marketing Customer Report.pdf” – Appendix A.

²³ Email attachment from Franklin Energy Services Program Manager, November 20, 2015, “Customer Satisfaction Cards PY4 HEJ.xls.”

6 Findings and Recommendations

The following provides insight into key program findings and recommendations.²⁴ The GPY4 Peoples Gas Home Energy Jumpstart (HEJ) Program had 7,093 participants that received 31,277 measures. The PG HEJ Program achieved verified net savings of 397,295 therms representing 64 percent of the target savings which is an increase of 20 percent in verified net savings in GPY4 compared to GPY3 (317,376 therms). The GPY4 North Shore Gas HEJ Program had 1,238 participants that received 6,563 measures. The NSG HEJ program achieved verified net savings of 70,617 therms representing 85 percent of the target savings and 67,792 therms for the NSG HEJ Program which is a 42 percent increase in verified net savings from GPY3 (47,781 therms). 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 “Residential Programs” and portfolio level when all GPY4 results are verified.

Verified Gross Impacts and Realization Rate

Finding 1. The GPY4 PG HEJ Program achieved verified gross energy savings of 397,295 therms resulting in a verified gross realization rate of 100 percent. The GPY4 NSG HEJ Program achieved verified gross energy savings of 70,617 therms resulting in a verified gross realization rate of 100 percent.

Finding 2. The ex ante and verified gross savings per unit for pipe insulation measures differ. This is a result of a discrepancy in the pipe circumference assumption as shown in Section 3.3. The discrepancy results in higher verified gross savings per unit for pipe insulation measures.

Recommendation 1 Navigant recommends updating the ex ante gross savings calculations to average the circumferences of the most common pipe diameters to calculate the new circumference values instead of adding them. This will ensure that measure level savings are accurate.

Finding 3. For the PG HEJ Program, Navigant identified one project (#915719) in the tracking database with ex ante savings claimed for two 2-wire reprogramming thermostats. Also, Navigant identified 27 projects in the tracking database with ex ante savings claimed for multiple programmable thermostats in one household, or multiple reprogramming thermostats in one household, or one programmable thermostat and one reprogramming thermostat in one household. For the NSG HEJ Program, Navigant identified one project (#655109) with ex ante savings claimed for two 2-wire programmable thermostats and one project (#835781) with ex ante savings claimed for two reprogramming thermostats. Navigant also identified two projects with ex ante savings claimed for one programmable thermostat and one reprogramming thermostat in one household. Navigant capped ex post savings at one programmable or one reprogramming thermostat for each project.

²⁴ 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.

Recommendation 2. Navigant recommends claiming ex ante savings based on one thermostat per project, and not claiming savings for multiple thermostats or reprogramming thermostats.

Program Tracking Database

Finding 4. For the PG HEJ Program, Navigant identified 15 projects in the tracking database with ex ante savings claimed for DHW pipe insulation at more than six feet. For the NSG HEJ Program, Navigant also identified five projects with ex ante savings claimed for DHW pipe insulation at more than six feet. Navigant capped ex post savings at the first six feet for those projects having more than six feet of pipe insulation. Franklin Energy indicated procedures are in place to catch this error.

Finding 5. For Hot Water Boiler Pipe Insulation, Navigant identified a subtle equation error to calculate the circumference of pipe with insulation, as follows:

$$C_{new} = \left((0.5 \text{ in} + 2 \text{ in}) + \frac{(0.75 \text{ in} + 2 \text{ in})}{2} \right) \times \pi \times \frac{1 \text{ ft}}{12 \text{ in}} = 1.014 \text{ ft}$$

Using a pipe insulation thickness of 0.5 inches (1.0 inch added for total diameter) for hot water boiler pipe insulation, and averaging the two most common pipe diameters (0.5 inches and 0.75 inches), C_{new} can be calculated with the following equation and values:

$$C_{new} = \left(\frac{((0.5 \text{ in} + 1 \text{ in}) + (0.75 \text{ in} + 1 \text{ in}))}{2} \right) \times \pi \times \frac{1 \text{ ft}}{12 \text{ in}} = 0.425 \text{ ft}$$

Using the above equation, the evaluation team adjusted the savings per unit foot of HW pipe from 0.076 therms to 0.417 therms.

Recommendation 3. Navigant recommends implementers correct this subtle equation error.

Program Participation and Satisfaction

Finding 6. The PG HEJ Program had 7,093 participants in GPY4 and installed 31,277 measures. The NSG HEJ Program had 1,238 participants in GPY7 and installed 6,563 measures.

Finding 7. The process information gathered through interviews and other communication with HEJ program management did not raise concerns. The PG and NSG programs used an outreach strategy that proved to be highly effective at generating new leads: fifteen percent of the participants enter the program through a monthly raffle for referrals. Participant reported satisfaction was 4.95 out of 5, a very high score.

7 Appendix

Below is a sample Home Energy Assessment Report for the Home Energy Jumpstart Program.



Final Marketing
Customer Report.pdf