

Single Family Direct Install Program GPY2 Evaluation Report

**Energy Efficiency Plan:
Gas Plan Year 2
(6/1/2012-5/31/2013)**

Final

**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 GPY2¹ Single Family Direct Install Program (SFDI). The SFDI program launched in March 2012 in the Peoples Gas territory and launched in June 2012 in the North Shore Gas territory. The main goal 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, beginning in GPY2, programmable thermostats, at eligible single family residences. A second objective of this program is to perform a brief assessment of major retrofit opportunities (e.g., furnace, boiler, air conditioning, insulation and air sealing) and bring heightened awareness to the homeowners about the updated Peoples Gas (PGL, in GPY1 through GPY3)² and North Shore Gas (NSG, in GPY2 and GPY3)³ Residential Prescriptive Rebate program. The program name has transitioned to the Home Energy Jumpstart Program going forward through GPY3.

E.1. Program Savings

Table E-1 summarizes the natural gas savings from the SFDI Program.

Table E-1. GPY2 Total Program Natural Gas Savings

Savings Category †	Peoples Gas Energy Savings (Therms)	North Shore Gas Energy Savings (Therms)
Ex Ante Gross Savings	273,868	24,552
Ex Ante Net Savings	235,534	21,116
Verified Gross Realization Rate	0.93 ‡	0.89 ‡
Verified Gross Savings	254,014	21,858
Net to gross ratio (NTG)	0.96‡	0.96‡
Research Findings Net Savings	243,853	20,984

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy on October 28, 2013 and November 13, 2013

‡ Based on evaluation research findings.

E.2. Program Savings by End Use Type

Table E-2 summarizes GPY2 Peoples Gas SFDI Program energy savings results by measure or equipment end-use type. Water efficiency measures and boiler pipe insulation were the largest categories of savings in the Peoples Gas program, followed by programmable thermostats and domestic hot water pipe insulation.

¹ The GPY2 program year began June 1, 2012 and ended May 31, 2013.

² Peoples Gas Program year dates are: GPY1 begins June 1, 2011 and ends May 31, 2012; GPY2 begins June 1, 2012 and ends May 31, 2013; GPY3 begins June 1, 2013 and ends May 31, 2014.

³ North Shore Gas Program year dates are parallel to Peoples Gas: GPY2 begins June 1, 2012 and ends May 31, 2013; GPY3 begins June 1, 2013 and ends May 31, 2014.

Table E-2. GPY2 People Gas Program Savings by Equipment End-Up Type

	Sample	Energy Savings (Therms)	90/10 Significance?
Water Efficiency Measures			
Ex-Ante GPY2 Gross Savings	NA†	110,222	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		110,222	
Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	58,691	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		58,691	
DHW Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	37,470	NA†
Verified Gross Realization Rate‡		40%	
Verified Gross Savings		14,916	
Boiler Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	67,485	NA†
Verified Gross Realization Rate‡		104%	
Verified Gross Savings		70,184	
Peoples Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings		273,868	
Verified Gross Realization Rate‡		93%	
Verified Gross Savings		254,014	
Free-ridership ‡	80 Total (71 PGL) (9 NSG)	0.08	Yes
Participant Spillover ‡		0.04	Yes
Net-to-Gross Ratio (NTGR) ‡		0.96	Yes
Research Findings Net Savings		243,853	

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy on October 28, 2013 and November 13, 2013.

† Results based on deemed values.

‡ Based on evaluation research findings

The GPY2 North Shore Gas SFDI Program energy savings results by measure or equipment end-use type, as shown in Table E-3 below. Water efficiency measures and programmable thermostats were the largest categories of savings in the North Shore Gas program, followed by boiler pipe insulation and domestic hot water pipe insulation.

Table E-3. GPY2 North Shore Gas Program Savings by Equipment End-Use Type

	Sample	Energy Savings (Therms)	90/10 Significance?
Water Efficiency Measures			
Ex-Ante GPY2 Gross Savings	NA†	12,459	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		12,459	
Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	6,001	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		6,001	
DHW Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	3,805	NA†
Verified Gross Realization Rate‡		27%	
Verified Gross Savings		1,019	
Boiler Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	2,288	NA†
Verified Gross Realization Rate‡		104%	
Research Findings Net Savings		2,189	
North Shore Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings	NA†	24,552	NA†
Verified Gross Realization Rate‡		89%	
Verified Gross Savings		21,858	
Free-ridership ‡	80 Total (71 PGL) (9 NSG)	0.08	Yes
Participant Spillover ‡		0.04	Yes
Net-to-Gross Ratio (NTGR) ‡		0.96	Yes
Research Findings Net Savings		20,984	

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy on October 28, 2013 and November 13, 2013.

† Results based on deemed values.

‡ Based on evaluation research findings.

E.3. Impact Estimate Parameters

In the course of estimating verified gross and net savings, the evaluation team used a variety of parameters in its calculations. Some of those parameters were deemed for this program year and others were adjusted based on evaluation research. The key parameters and data sources used in the analysis are shown in Table E-4.

Table E-4. Verified Gross and Net Savings Parameter Data Sources

Parameter	Data Source	Deemed or Evaluated?
NTGR	Evaluation research	Evaluated
Realization Rate	Evaluation research	Evaluated
Number of measures installed	Program tracking system	Evaluated
Direct Install Showerhead Savings	Illinois TRM, version 1.0, section 5.4.5.†	Deemed
Direct Install Bathroom and Kitchen Aerator Savings	Illinois TRM, version 1.0, section 5.4.4.†	Deemed
Direct Install Programmable Thermostat Savings	Illinois TRM, version 1.0, section 5.3.10.†	Deemed
Direct Install Hot Water Pipe Wrap Insulation Savings	Illinois TRM, version 1.0, section 5.4.1.†	Deemed
Boiler Pipe Wrap Insulation Savings	Evaluation Research	Evaluated

† Illinois_Statewide_TRM_Effective_060112_Final_091412_Clean

E.4 Impact Estimate Parameters For Future Use

Navigant conducted evaluation research into one measure that may assist the Illinois TRM Technical Advisory Committee annual updating process. Additional details on boiler pipe wrap savings calculations are included in Section 2.1.3.2 of this evaluation report.

It should be noted that the savings algorithm and assumptions for low flow aerators have changed in the IL TRM V2. The changes have helped to clarify confusion surrounding the previous version's assumptions. This has the result of raising the kitchen aerator savings to 4.77 therms/unit and lowering the bathroom aerator savings to 0.86 therms/unit.

The free-ridership, spillover, and NTG ratio evaluation research findings that are used for PY2's verified net savings calculations in Table E-2 and Table E-3 may be considered for future use for PY3 if there are no substantial changes to the program or market.

E.5 Participation Information

In GPY2, the Peoples Gas SFDI program distributed 58,965 verified measure units across six different measure types to 4,004 participants, an increase of approximately 800% from GPY1's total of 502 participants. In its first year, the GPY2 North Shore Gas SFDI program distributed 3,737 measure units across those same six measure types to 348 participants. Program participation totals are shown in Table E-5.

Table E-5. GPY2 Primary Participation Detail

Participation	Peoples Gas	North Shore Gas
Participants	4,004	348
Total Measure Types	6	6
Number of Verified Measure Units	58,965	3,737

Source: Utility tracking data and Navigant analysis.

E.6 Conclusions and Recommendations

The GPY2 Peoples Gas SFDI program delivered energy savings above the previous program year, which was not a full program year and North Shore Gas program delivered energy savings in its first year of operation. The programs' tracking system is accurately recording measure counts and measure savings, with some exceptions as detailed in this report, contributing to gross realization rates at or near one-hundred percent for most measures. In GPY2, the program-level Net-to-Gross Ratio (NTGR) of 0.96 was determined through evaluation research and was used to calculate the research findings net savings.

Program Savings Goals Attainment

Finding 1A. The PGL SFDI program achieved research findings net savings of 243,853 therms, which is 87% of the GPY2 goal of 280,125 net therms. The NSG program achieved research findings net savings of 20,984 therms, which is 67% of the GPY2 goal of 31,125 net therms. Compared to GPY1, the Peoples Gas program increased the number of participants by 800 percent.

Recommendation 1A. As already planned in GPY3, the implementation contractor should continue to market to potential participants and identify measure energy savings opportunities for participants.

Gross Realization Rates

Finding 2. The largest difference between ex ante gross savings estimates and verified gross savings estimates for the SFDI program was for DHW pipe insulation. DHW pipe insulation achieved a realization rate of 0.40 for Peoples Gas and 0.27 for North Shore Gas. Navigant allowed up to three feet of pipe wrap on the inlet pipe to the hot water heater and up to six feet of pipe wrap on the outlet pipe to contribute to savings, consistent with the IL TRM, because the actual length between the hot water heater and the first pipe elbow is unknown.

Recommendation 2. Navigant recommends that the IC either record the location of the first pipe elbow in Bensight or limit the savings for DHW pipe insulation savings to three feet on the inlet pipe and six feet on the outlet pipe to comply with the IL TRM.

Net-to-Gross estimates

Finding 3. The program average Net to Gross Ratio (NTGR) (using net savings/verified gross savings) was 0.96 for energy savings. The relative precision at a 90% confidence interval was $\pm 5\%$ for Peoples Gas/North Shore Gas. The program spillover was 0.04. Additionally, as part of the NTGR calculation, the evaluation team attempted to

qualitatively assess whether further spillover may be occurring due to program participants' changes in behavior to save more energy after participating in the program. Navigant found that 71% of the participant sample received education on their overall energy use by a Single Family Direct Install program representative, and 41% of those participants are reporting changes in their energy use as a result of their participation in the program. The most common changes in behavior are: adjusting the thermostat temperature, changes in the use of their air conditioning unit and their heater, taking shorter showers, adjusting the temperature of their water heater and turning off their lights.

Recommendation 3. The questions used to identify changes in behavior did not offer enough detail to quantify the spillover from these activities. In the future, spillover could be quantified through the development of additional questions about potential behavioral changes due to the influence of the program as reported by the participants.

Program Participation

Finding 4A. From telephone surveys with participants, over 70 percent learned about the program either through "word of mouth" or "bill inserts" and over 50 percent reported that they preferred learning about programs through the mail or bill inserts, indicating that the program is effectively reaching potential participants through one of their preferred methods. In addition, the participants reported a high level of satisfaction with all aspects of the program including the directly installed equipment, the summary report given to them by the SFDI representative, the SFDI installers/representatives, the SFDI program, and PGL/NSG.

Recommendation 4A. Since the telephone surveys indicated that the current outreach and marketing methods are well-received and effective, continuing to use those channels to reach potential participants in GPY3 will likely prove equally effective.

Finding 4B. From telephone surveys with participants, over 60 percent reported that their primary motivation for participating in the program was to decrease their energy bill. In addition, once the participants first became aware of the program, the majority (93 percent) reported that they decided to participate in the program "within six months," and seven percent reported "more than six months, but less than a year later" indicating that participants are motivated to participate in the program within a relatively short time of learning of the program.

Recommendation 4B. Since the telephone surveys indicated that the current marketing is leading to conversion to participation in a relatively short period of time, the current administrative and delivery process is effective and should continue into GPY3.

Program Participation in other Programs

Finding 5A. The majority of participants (61 percent) reported that the SFDI program representative did not inform them about other programs such as rebates for high efficiency heating equipment or high efficiency water heating equipment

Recommendation 5A. Since one of the goals of this program is to encourage SFDI participants to also participate in other residential programs, increasing the efforts to inform SFDI participants about other programs is warranted. Consider targeted brochures for each of the measure groups in the residential rebate program specifically describing the financial and other benefits for SFDI participants (i.e. bonus coupon plus

the residential rebate as well as decreased energy use and increased comfort) that the technicians could use as a basis for a more in-depth conversation on the SFDI participant taking the next step toward participation in the residential rebate program.

Finding 5B. Although the participants' existing HVAC, domestic hot water and building shell equipment is cataloged and assessed for condition on the program's assessment summary, there is no systematic process to convey the information to the other applicable residential programs.

Recommendation 5B. Since one of the goals of this program is to encourage SFDI participants to also participate in other residential programs, with the participants' consent, share the information on the assessment summaries with the appropriate residential programs for targeted outreach and marketing efforts.

Review Process.

Finding 6. Several aspects of the database proved problematic for the review process, specifically that the tracking database does not contain gross savings tallies but contains net savings, does not contain the pdfs of the installation forms for cross-checking purposes, and was not able to produce a data set that contained a participant's full set of information (contact information, installation date, and measures installed) in a single record per participant.

Recommendation 6. Enhancements to Bensight should be considered to make the review process more efficient and effective.

Overall, the SFDI program performed well in GPY2 and the trend is that the pace of installations is increasing and will continue to increase into GPY3. The PGL SFDI program achieved research findings net savings of 243,853 therms, which is 87% of the GPY2 goal of 280,125 net therms. The NSG program achieved research findings net savings of 20,984 therms, which is 67% of the GPY2 goal of 31,125 net therms. The category with the highest amount of savings is the water efficiency measures.

1. Introduction

1.1 Program Description

The Single Family Direct Install (SFDI) Program's primary objective is to secure energy savings through direct installation of low-cost efficiency measures, such as water efficient showerheads and faucet aerators, programmable thermostats (new for GPY2) and domestic hot water (DHW) and boiler pipe insulation, at eligible single family residences. A second objective of this program is to perform a brief assessment of major retrofit opportunities (furnace, boiler, air conditioning, insulation and air sealing) and bring heightened awareness to the homeowners about the updated Peoples Gas (PG, in GPY1 through GPY3) and North Shore Gas (NSG, in GPY2 and GPY3) Residential Prescriptive programs. Peoples Gas and North Shore Gas are natural gas distribution utilities of the Integrys Energy Group (Integrys).

Working through defined and trusted community groups, this program serves single family residential customers who live in the PGL territory beginning in March of GPY1, and in both PGL and NSG territories in GPY2. This SFDI Program is intended to balance the residential portfolio incentive budget (e.g., \$/therm saved) and increase therm savings from residential customers. In addition, the program intends to build a base of eligible customers for future program participation in other Residential programs and paths. Also, the program plans to be responsive to recent input from HVAC distributors about the need for more homeowner awareness.

Changes to the SFDI program in GPY2 include⁴⁴:

1. The Implementation Contractor (IC) added a SFDI-specific field supervisor, added a full-time SFDI program coordinator and expanded from two installation teams to three installation teams.
2. While in the participant's home, the IC representatives completed both an "installation summary" form (attached in Section 7.3.1) and an "assessment summary" form (attached in Section 7.3.1). The assessment summary form recorded information about the home's HVAC systems, domestic hot water system, building envelope and refrigerators and freezers. The IC representatives began heavily promoting GPY2 rebates while in the participants' homes after completing the installation.
3. The IC distributed "Time to Replace?" sticker which was developed for HVAC equipment and water heater and included the SFDI program logo, website, and phone number.
4. The IC initiated customer feedback postcards in both English and Spanish (with an estimated average of 4.95 out of 5 in all 5 categories).
5. A new scheduling system (through Bensight) allowed for multiple customer service representatives to see the real-time status of the schedule which replaced the old system of using multiple spreadsheets. The new scheduling system increased the speed of scheduling and greatly reduced scheduling errors.

⁴⁴ From e-mail from Jamie Peters, Franklin Energy Services, January 28, 2013.

6. The IC started a new marketing strategy of “neighborhood sweeps” by putting brochures on doorknobs on streets where the program had completed at least one job, which was effective at generating calls and appointments.
7. The IC enhanced their efforts to market through community event by signing up 600+ people (hot leads) at 25 events in first half of GPY2.
8. The program added a new measure – programmable thermostats.
9. The IC provided additional training for installers on how to promote the various directly installed measures in order to maximize the therms saved/home. These efforts increased the average net therm savings/unit from 29.5 in GPY1 to 60.9 in GPY2 for Peoples Gas and 60.3 for North Shore Gas⁵.
10. The program launched new Home Energy Jumpstart web pages on PGL and NSG websites (http://www.peoplesgasdelivery.com/home/rebates_direct.aspx) The IC transitioned the program name to the Home Energy Jumpstart Program going forward to GPY3.
11. A SFDI bill insert promotional campaign started in January 2013.
12. In partnership with the Historical Chicago Bungalow Association, SFDI-specific mailings were sent to members in six groups of 2,250 each.
13. To increase program branding, installer clothing with program logos were approved in mid-GPY2.
14. In January and February, the program started using a new SFDI/Residential Rebate brochure.

The initial program implementation period is three years, which commenced with GPY1 – the program did not begin in earnest until March 2012.⁶ The goals for GPY2 are to achieve net gas savings of 280,125 therms for Peoples Gas and 31,125 therms for North Shore Gas.⁷ Key metrics include the number of participating single family customers, measures installed and corresponding deemed energy savings, as well as documenting the age and type of existing heating and air conditioning equipment. Customer leads are documented within the implementation contractor’s (Franklin Energy Services) tracking system and serve as the basis for targeted marketing of programs in GPY2 and GPY3.

1.2 Evaluation Objectives

The primary objective of the impact evaluation is to estimate gross savings for the SFDI Program in all years and provide one estimate of the net-to-gross ratio over the three year period. Since the launch date of the Single Family Direct Install program was March 2012, additional information was gleaned from participant surveys conducted in GPY2 on a variety of aspects of the program. The results from GPY2 will be used to validate program-claimed savings and to improve their accuracy for GPY3.

The Evaluation Team identified the following key researchable questions for GPY2:

1.2.1 Impact Questions

1. What are the gross impacts from this program?

⁵ GPY2 therms saved/home values are calculated using verified net savings totals and number of participants for each utility.

⁶ Program year date ranges are as stated in Footnotes 1 and 2.

⁷ E-mail from Jamie Peters, Franklin Energy, April 18, 2013.

2. What are the net impacts from this program?
3. Did the program meet its energy saving goals?
4. Are the deemed savings values reasonable for the program participants?

1.2.2 Process Questions

The primary objective of the limited process evaluation effort in GPY1 was to help program designers, managers and implementers structure their programs to achieve cost-effective savings while maintaining high levels of customer satisfaction. Through interviews with implementation contractor staff, we learned that the program was undergoing significant further development for GPY2 including marketing materials approval, a redesigned installation summary form, and developing an operations manual.

Navigant conducted a more thorough process evaluation in GPY2 focusing on the following areas:

1. How did customers become aware of the program? What are the customers' preferred strategies to learn about programs?
2. Are the program marketing plans and program promotional materials aligned with program benefits? Do they clearly communicate program benefits?
3. Has the program effectively targeted and engaged with community organizations to promote the program to customers?
4. Has the program effectively channeled customers to other programs sponsored by Peoples Gas and North Shore Gas to implement additional efficiency measures as identified by the energy assessments? What are the main barriers to and motivation for customers to implement additional recommended measures?
5. What areas could the program improve to create a more effective program for customers and help increase the energy impacts (information provided in written reports and adequate follow-up information provided)?
6. Does the application/enrollment process present any barriers to program participation?
7. Are customers satisfied with the aspects of program implementation in which they have been involved?
8. Are there changes to the administrative and delivery process that would improve the program?
9. Are customers satisfied with participation in the program and customer service experiences? Are customer surveys completed and reviewed by the program?

2. Evaluation Approach

In GPY1, the analytical methods used for the evaluation of the SFDI Program were driven to a large extent by the data available for the program's early stage of development. In addition, we used the Illinois Technical Reference Manual (TRM)⁸ for all the measures to verify gross savings calculations (with the exception of boiler pipe insulation which applied an industry standard calculation because it is not in the TRM).

This evaluation of the SFDI Program in GPY2 reflects the first full-scale year of program operation, and telephone surveys were conducted during July and August of 2013. During GPY2, both NSG and PGL customers received directly installed energy efficiency measures.

2.1 Primary Data Collection

2.1.1 Overview of Data Collection Activities

The data collected for the evaluation of the GPY2 SFDI Program was gathered via Bensight tracking data analysis, a deemed savings review, participant telephone surveys and an engineering desk review. Table 2-1 below provides a summary of the data collection activities.

Table 2-1. Core Data Collection Activities

N	What	Who	Target Completes	Completes Achieved	When	Comments
<i>Impact Assessment</i>						
1	Engineering Desk Review	Participants	20	20	July 2013	
2	Telephone Survey	Participants	80	80	June – August 2013	Data collection supporting NTG and process analysis in the same instrument.
3	Tracking System Review	Participants	All	All	July – October 2013	"Bensight"
<i>Process Assessment</i>						
4	Telephone Survey	Participants	80	80	June – August 2013	Data collection for NTG in same instrument.
5	In Depth Interviews	Program Manager/Implementer Staff	2	2	January – April 2013	Conducted in depth interviews with IC Program Manager in Jan and April 2013

⁸ The final version of the first State of Illinois Energy Efficiency Technical Reference Manual (TRM) (Version 1.0 dated September 14, 2012, effective as of June 1, 2012) was approved on January 9, 2013 by the Illinois Commerce Commission in Docket No. 12-0528.

2.1.2 Verified Savings Parameters

Navigant estimated verified per unit savings for each program measure using impact algorithm sources found in the Illinois TRM for deemed measures, and evaluation research for non-deemed measures. Table 2-2 below presents the sources for parameters that were used in verified gross savings analysis indicating which were examined through GPY2 evaluation research and which were deemed. For the boiler pipe measure which is not included in the version of the Illinois TRM pertaining to GPY2, Navigant reviewed GPY2 ex-ante values and used the approach provided by the implementation contractor in GPY1.

Table 2-2. Verified Gross and Net Savings Parameter Data Sources

Parameter	Data Source	Deemed or Evaluated?
NTGR	Evaluation research	Evaluated
Realization Rate	Evaluation research	Evaluated
Number of measures installed	Program tracking system	Evaluated
Direct Install Showerhead Savings	Illinois TRM, version 1.0, section 5.4.5.‡	Deemed
Direct Install Bathroom and Kitchen Aerator Savings	Illinois TRM, version 1.0, section 5.4.4.‡	Deemed
Direct Install Programmable Thermostat Savings	Illinois TRM, version 1.0, section 5.3.10.‡	Deemed
Direct Install Hot Water Pipe Wrap Insulation Savings	Illinois TRM, version 1.0, section 5.4.1.‡	Deemed
Boiler Pipe Wrap Insulation Savings	Evaluation Research	Evaluated

‡ *Integritys_Master_Measure_Document 010213; Illinois_Statewide_TRM_Effective_060112_Final_091412_Clean*

2.1.3 Verified Gross Program Savings Analysis Approach

Overall program gross savings were estimated by using per unit savings values in the TRM (with the exception of boiler pipe insulation, described below) and the measure quantities in the database extract from July 26, 2013. In addition, Navigant requested and received clarification on the calculations for savings from hot water pipe wrap, which is described below.

2.1.3.1 Verified Gross Energy Savings – Single Family Direct Install Domestic Hot Water Pipe Insulation

While the algorithm and variable assumptions for the DHW pipe insulation measure are correctly applied, the IL TRM states that the algorithm provided is only valid for up to six feet of hot pipe insulation and three feet of cold pipe insulation. To further clarify, this measure should only be applied up to the first elbow of pipe. Because the distance to the first elbow is not a recorded value in Bensight, Navigant must rely on the assumption that the first pipe elbow on the inlet pipe is three

feet from the hot water heater and the first pipe elbow on the outlet pipe is six feet from the hot water heater. Therefore, all DHW pipe insulation projects have been capped at these distances.⁹

$$\Delta thermals = \left(\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}} \right) \times (L \times C) \times \Delta T \times 8,766 \right) / \eta_{DHW} / 100,000 = \mathbf{0.908 thermals/unit}$$

Where:

- R_{exist} = Pipe heat loss coefficient of uninsulated pipe (existing) [(hr-°F-ft)/Btu] = 1.0
- R_{new} = Pipe heat loss coefficient of insulated pipe (new) [(hr-°F-ft)/Btu] = Actual (1.0 + R value of insulation) = 2.8
- L = Length of pipe from water heating source covered by pipe wrap (ft) = 1
- C = Circumference of pipe (ft) (Diameter (in) * $\pi/12$) = Actual = 0.196
- ΔT = Average temperature difference between supplied water and outside air temperature (°F) = 60
- η_{DHW} = Recovery efficiency of gas hot water heater = 0.78

2.1.3.2 Verified Gross Energy Savings – Single Family Direct Install Boiler Pipe Insulation

Since this measure is not deemed in Illinois TRM used for GPY2, Navigant used the approach and calculations that were used in GPY1 for boiler pipe insulation. Although boiler pipe insulation is a deemed measure in the Illinois TRM which will be used for GPY3, Navigant determined that the best approach for GPY2 is to use GPY1's calculation.

Navigant used the industry software 3E Plus^{®10} to verify the calculations performed by the implementation contractor. The implementation contractor used the approach in the Illinois TRM to calculate the gross energy savings. As we did in GPY1, we based our estimate of actual hours of usage on an operating strategy of 24 hours a day for the eight months of typical heating (mid-September – mid-May), which is 5,840 hours per year, and no operation during the cooling season. Navigant used the input values listed in Table 2-3, which are the same as GPY1 with the exception of the GPY2 R-value of the boiler pipe insulation. The implementation contractor's estimate was based upon slightly different pipe and ambient temperatures as well as different operating hours and a correction factor of 1.0.¹¹ The evaluation team could not verify the sources for these revised inputs, and thus defaulted to the inputs used in GPY1. This revises the verified gross savings to be 2.60 therms per linear foot (from the implementation contractor's ex ante value of 2.50 therms per linear foot¹²).

⁹ E-mail from Samuel Dent, VEIC, November 6, 2013

¹⁰ <http://www.pipeinsulation.org> Accessed: October 25, 2012. "The 3E Plus[®] Insulation Thickness Computer Program is an industrial energy management tool developed by the North American Insulation Manufacturers Association (NAIMA) to simplify the task of determining how much insulation is necessary to use less energy, reduce plant emissions and improve system process efficiency."

¹¹ Implementation contractor inputs: Ambient temperature = 75 F, Pipe temperature = 150 F, Hours/year = 4963. Although the source for the correction factor of 1.0 is supported by Version 2 of the Illinois TRM (effective June 1, 2013), the TRM algorithm is more conservative in operating hours and also assumes that units are in unconditioned basements or crawl spaces. The location of program units is unknown.

¹² E-mail from Leo Schaub, Franklin Energy, November 13, 2013.

Table 2-3. SFDI Boiler Pipe Insulation Input Values to 3E Plus and Energy Savings Output Value

Parameter	Value	Units	Notes
R Value of pipe insulation	1.8		E-mail from Franklin Energy, 11/13/2013 1.5 inches of insulation with K of 0.27 or less is required by IECC 2009
Feet of pipe	1	ft	Calculations are per foot
Temp of pipe	160	Degrees F	Assuming 180F boiler water, cools down over boiler loop
Ambient temperature	70	Degrees F	Assumption, conservative value based on assumed average 65F set point
Combustion Eff.	80%		Federally mandated boiler thermal efficiency
NPS (nominal pipe size)	1.5		1.5 inches, assumed
Btu loss/hr, uninsulated	70.2		Using 3E Plus®
Btu loss/hr, insulated	22.6		Using 3E Plus®
Btu loss/hr, savings	47.5		Calculated
Hours/year	5,840	hours	Hours for heating for eight months of the year
CF	0.75		Correction factor, a portion of losses will be useful heat
Btu/therm	100,000		Standard for natural gas delivered to Illinois
Therms/year saved	2.60	therms	Calculated (Equation)

Source: Navigant Evaluation Team

2.1.4 Research Findings Net Program Savings Analysis Approach

The primary objective of the net savings analysis was to determine the program's net effect on customers' energy usage. After gross program impacts have been verified, net program impacts are derived by estimating a NTGR that quantifies the percentage of the verified gross program impacts that can be reliably attributed to the program. This includes an adjustment for free-ridership (the portion of impact that would have occurred even without the program) and spillover (the portion of impact that occurred outside of the program, but would not have occurred in the absence of the program).

NTG research methods in GPY2 included participant survey results. Evaluation research uses a self-report method where participants answer questions about their participation in the program. The participant survey instrument asks about program awareness before purchasing or implementing an energy-efficient measure and the inclination to pursue corrective actions to save energy in the absence of the program. The survey instrument also included questions about the level of satisfaction with the program and PGL/NSG.

The final NTGR for the program is calculated using the following algorithm, presented in Figure 2-1.

Figure 2-1. Net-to-Gross Ratio Algorithm

$$NTGR = 1 - \text{Free-ridership} + \text{Spillover}$$

Where:

- *Free ridership* is the energy savings that would have occurred even in the absence of program activities and sponsorship, expressed as a percent of gross impact.
- *Spillover* is the energy savings that occurred as a result of program activities and sponsorships, but was not included in the gross impact accounting, expressed as a percent of gross impact.

2.1.4.3 Free-ridership

In GPY2, Navigant calculated free-ridership for this evaluation using an algorithm approach based on survey self-report data. The analysis relied on interview results from program participants. The method looks at three elements of free-ridership for participants: Prior Planning and Timing Score, Program Influence Score and Program Likelihood Score. A more detailed description of the free-ridership algorithm is presented in Section 7.2.2.1. Overall, our algorithms for direct install programs err on the side of lower free ridership compared to other residential program such as rebate programs, because the directly install measures are often measures that are low priority for customers (i.e., faucet aerators in my bathroom and kitchen) and they are generally measures that participants do not install on their own. Navigant strives to appropriately discount the free ridership of participants with good intentions but likely poor follow-through.

2.1.4.4 Spillover

Spillover refers to additional energy efficient measures participants adopted due to program influences, but without any financial assistance from the program. Survey free-ridership questions were followed by questions designed to estimate spillover. These questions asked about recent purchases of any additional energy-efficient measures that were made without any additional financial assistance from the program. A more detailed description of the spillover calculation is presented in Section 7.2.2.2. Below are examples of the spillover questions:

1. Have you purchased and installed any additional energy efficient equipment since participating in the program?
2. What have you installed?
3. How many additional measures have you installed?
4. Was the additional measure that you purchased and installed eligible for a residential rebate?
5. Did you receive a utility rebate for these additional measures that you installed?
6. How influential was the program in encouraging you to install the additional measure?
Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential.

Additionally, the evaluation team also asked a battery of questions to qualitatively assess behavioral changes from participating in the program. Below are paraphrased versions of these questions:

1. Did the Single Family Direct Install program representative educate you on your overall energy use and how that impacts your energy costs?
2. What did you learn from the program representative about your energy use and how that impacts your energy costs?

3. Did you change any of your energy use behaviors to try and save more energy?
4. What energy use behaviors did you change to try and save more money?
5. Did you discuss energy saving behaviors with other family members?
6. What did you discuss and what behaviors, if any, are they changing?

The evaluation team used responses to these questions to assess whether spillover may be occurring due to changes in behavior but the questions do not offer enough detail to quantify the spillover from these activities. Spillover could be quantified through additional follow-up questioning on potential behavioral changes due to the influence of the program as reported by the participants.

2.1.5 Process Evaluation

Navigant process evaluation included in-depth interviews with the implementation program manager and a review of available program materials including marketing and outreach materials. In addition, the process evaluation included analyzing feedback from the 80 telephone interviews with participants. The process evaluation of the GPY2 SFDI Program assessed the effectiveness of program marketing and outreach, as well as participants' satisfaction with the program and PGL/NSG.

3. Gross Impact Evaluation

Overall, the SFDI program performed well in GPY2. The PGL SFDI program achieved verified net savings of 243,853 therms, which is 87% of the GPY2 goal of 280,125 net therms. The NSG program achieved verified net savings of 20,984 therms, which is 67% of the GPY2 goal of 31,125 net therms. Navigant calculated the ex ante gross savings estimates by using savings algorithms and assumptions provided by Franklin Energy Services. Navigant used the IL TRM algorithms and assumptions provided by Franklin, and tracking system information to calculate verified gross savings for the program. The overall GPY2 verified gross realization rate for the program was 0.93 for Peoples Gas and 0.89 for North Shore Gas.

3.1 Tracking System Review

Navigant conducted a tracking system review to determine that all information necessary was recorded. In addition, Navigant requested the operations manual for this program, however the operations manual was not completed in time for this review. During the course of the tracking system review, Navigant determined verified measure quantities for each measure type. Ex ante net savings were provided in the tracking database. Upon further request, ex ante gross savings algorithms were provided by the implementer. Navigant applied these algorithms to the verified measure quantities to determine ex ante gross savings estimates. During the course of the review, several participants appeared to receive boiler pipe insulation twice. After investigating, the IC determined that prior to using their own fleet vehicles; their installation teams used their own vehicle and did not always carry enough pipe wrap to complete boiler projects. In that event, their installers conducted a second visit to follow-up and complete the boiler pipe wrap project¹³.

Navigant conducted an engineering desk review on 20 randomly selected projects. Table 3-1 shows the results of the review.

Key findings include:

1. The measures on the installation forms matched the information for the measures in the database for all but one of the projects, resulting in a potential underrepresentation of savings since the 40' of boiler pipe wrap on the form did not appear to be represented in the database.
2. The owner information on the installation forms matched the information in the database for all but one of the projects; the form listed a different zip code and phone number than the database for the participant, potentially resulting in difficulty for following up with the participant, if need be.
3. The Project IDs on the installation forms matched the database for all but one of the projects; which upon further examination by the IC was due to a clerical error and would not have adversely impacted the program results.

¹³ E-mail from Maxwell Burke-Scoll, Franklin Energy, October 22, 2013.

Table 3-1. Summary of GPY2 Engineering Desk Review

	Project ID	Measures on installation form match database?	Owner information on installation form match database?	Project ID on form matches database?
1	119273	Yes	Yes	Yes
2	152859	Yes	Yes	Yes
3	168633	Yes	Yes	Yes
4	170406	Yes	Yes	Yes
5	181033	Yes	Yes	Yes
6	197283	Yes	Yes	Yes
7	211121	Yes	Yes	Yes
8	231228	Yes	Yes	Yes
9	233268	No, form states 40' of boiler pipe wrap; database does not contain boiler pipe wrap	Yes	Yes
10	239099	Yes	Yes	Yes
11	239365	Yes	Yes	Yes
12	239794	Yes	Yes	No - Form lists "239724" as project ID for this project "239794" however file containing installation form was loaded to database with correct project number in file name
13	241986	Yes	Yes	Yes
14	244974	Yes	Form lists different zip code and phone number than database	Yes
15	249552	Yes	Yes	Yes
16	249778	Yes	Yes	Yes
17	250111	Yes	Yes	Yes
18	258565	Yes	Yes	Yes
19	308429	Yes	Yes	Yes
20	320088	Yes	Yes	Yes

Source: Navigant analysis

Program Volumetric Findings

During the course of the tracking system review, Navigant verified measure counts for each measure type. With the exception of DHW pipe wrap, all verified counts match the ex ante measure counts. Peoples Gas installed a total of 58,965 measure units in GPY2 and North Shore Gas installed a total of 3,737 measure units in GPY2. The details of this are shown in Table 3-2 and Table 3-3 below.

Table 3-2. Peoples Gas Ex-Ante and Verified Measure Count

Measure	Unit	Ex-Ante Measure Count	Verified Measure Count
Showerheads	Unit	4,672	4,672
Kitchen Aerators	Unit	3,183	3,183
Bathroom Aerators	Unit	5,434	5,434
Programmable Thermostat	Unit	1,115	1,115
DHW Pipe Wrap	Linear Ft	41,264	17,567
Boiler Pipe Wrap	Linear Ft	26,994	26,994
GPY2 Peoples Gas Total		82,662	58,965

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract)

Table 3-3. North Shore Gas Ex-Ante and Verified Measure Count

Measure	Unit	Ex-Ante Measure Count	Verified Measure Count
Showerheads	Unit	525	525
Kitchen Aerators	Unit	240	240
Bathroom Aerators	Unit	743	743
Programmable Thermostat	Unit	114	114
DHW Pipe Wrap	Linear Ft	4,190	1,200
Boiler Pipe Wrap	Linear Ft	915	915
GPY2 North Shore Gas Total		6,727	3,737

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract).

In GPY2, the Peoples Gas SFDI program distributed 58,965 verified measure units across six different measure types to 4,004 participants. In its first year, the GPY2 North Shore Gas SFDI program distributed 3,737 measure units across those same six measure types to 348 participants.

Table 3-4 GPY2 Program Volumetric Information

Detail	Peoples Gas	North Shore Gas
Participants	4,004	348
Total Measure Types	6	6
Verified Measure Units Installed	58,965	3,737

Source: EM&V analysis

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract).

3.2 Gross Program Impact Parameter Estimates

As described in Section 2, energy and demand savings are estimated using the formulas as specified in the TRM. Details on these formulas and assumptions can be found in the Section 7 Appendix. Navigant calculated verified gross energy savings (therms) using measure savings values as identified in Table 3-5 below.

Table 3-5. Verified Gross Savings Parameters

Measure	Verified Gross Savings (Therms/Unit)	Method	Source (IL-TRM)
Showerheads	19.89	Deemed	v1.0 sections 5.4.4 and 5.4.5
Kitchen Aerators	1.78	Deemed	
Bathroom Aerators	2.14	Deemed	
Programmable Thermostat	52.64	Deemed	v1.0 section 5.3.10
DHW Pipe Wrap	0.85	Deemed	v1.0 section 5.4.1
Boiler Pipe Wrap	2.60	Non-Deemed	Implementation contractor GPY1 approach with GPY2 inputs

Source: Navigant analysis

Key findings include:

1. The programs' tracking system captures relevant data for most of the measures. Appropriate program quality assurance and quality control procedures are in place.
2. For DHW Pipe Wrap, the programs' tracking system does not capture the length of pipe to the first elbow, therefore savings must be calculated using the default values of 3 feet of input pipe wrap and 6 feet outlet pipe wrap for any pipe wrap that exceeds those lengths.

3.3 Development of the Verified Gross Realization Rate

The verified gross realization rate is the ratio of verified gross savings to ex-ante gross savings from the program tracking system. Navigant calculated verified gross energy savings (therms) using Illinois TRM methodology and algorithms and engineering analysis. Navigant applied per unit measure savings values as displayed in Table 3-5 to verified measure quantities found in the program tracking systems to calculate verified gross savings.

As shown in the tables below, GPY2 evaluation verified gross energy savings were equal to all measures' ex-ante gross energy savings reported in the program tracking system with the exception of DHW pipe wrap and boiler pipe wrap. This resulted in realization rates of 100% for all but the pipe wrap measures.¹⁴ The DHW pipe wrap measure achieved a realization rate of 0.40 for Peoples Gas

¹⁴ Realization rate = verified gross / ex-ante gross from the tracking system.

and 0.27 for North Shore Gas. As explained in the preceeding sections, this was because Navigant capped the savings at 3 feet of inlet pipe and 6 feet of outlet pipe per project. The boiler pipe wrap measure received a realization rate of 1.04 for both utilities. As discussed previously, this was because of a discrepancy in the approach used for GPY2.

Navigant used the verified per unit savings values shown in Table 3-5 and the verified measure counts in Table 3-2 to calculate verified gross savings for the Peoples Gas GPY2 program. Table 3-6 below includes ex-ante and verified gross savings for the Peoples Gas GPY2 program. The Peoples Gas GPY2 program achieved verified gross savings of 254,014 therms and a verified gross realization rate of 93 percent.

Table 3-6. GPY2 Peoples Gas Ex-Ante and Verified Gross Savings

Measure	Ex-Ante Gross Savings (therms)	Verified Gross Savings (therms)	Verified Gross Realization Rate
Showerheads	92,931	92,931	100%
Kitchen Aerators	5,672	5,672	100%
Bathroom Aerators	11,619	11,619	100%
Programmable Thermostat	37,470	15,952	100%
DHW Pipe Wrap	93,162	14,916	40%
Boiler Pipe Wrap	67,485	70,184	104%
TOTALS	273,868	254,014	93%

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and Franklin Energy Services e-mails of October 28, 2013 and November 13, 2013.

Navigant used the verified per unit savings values shown in Table 3-5 and the verified measure counts in Table 3-3 to calculate verified gross savings for the North Shore Gas GPY2 program. Table 3-7 below includes ex-ante and verified gross savings for the North Shore Gas GPY2 program. The North Shore Gas program achieved verified gross savings of 21,858 therms and a 89 percent verified gross realization rate. As indicated above, the North Shore Gas program included a higher percentage of DHW pipe wrap installed by the program, which accounted for the difference between the programs' evaluation verified gross savings and the program's ex-ante gross savings.

Table 3-7. GPY2 North Shore Gas Ex-Ante and Verified Gross Savings

Measure	Ex-Ante Gross Savings (therms)	Verified Gross Savings (therms)	Verified Gross Realization Rate
Showerheads	10,443	10,443	100%
Kitchen Aerators	428	428	100%
Bathroom Aerators	1,589	1,589	100%
Programmable Thermostat	3,805	1,090	100%
DHW Pipe Wrap	3,805	1,019	27%
Boiler Pipe Wrap	2,288	2,379	104%
TOTALS	24,552	21,858	89%

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and Franklin Energy Services e-mails, October 28, 2013 and November 13, 2013.

3.4 Verified Gross Program Impact Results

Table 3-8 below illustrates that the Peoples Gas GPY2 SFDI Program reported ex-ante gross energy savings of 273,868 therms. Evaluation adjustments described in the sections above resulted in evaluation verified gross energy savings of 254,014 therms. The overall Peoples Gas program verified gross energy savings realization rate was 93 percent.

Table 3-8. Peoples Gas GPY2 Verified Gross Impact Savings Estimates by End-Use

	Sample	Gross Energy Savings (Therms)	90/10 Significance?
Water Efficiency Measures			
Ex-Ante GPY2 Gross Savings	NA†	110,222	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		110,222	
Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	58,691	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		58,691	
DHW Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	37,470	NA†
Verified Gross Realization Rate‡		40%	
Verified Gross Savings		14,916	
Boiler Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	67,485	NA†
Verified Gross Realization Rate‡		104%	
Verified Gross Savings		70,184	
Peoples Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings	NA†	273,868	NA†
Verified Gross Realization Rate‡		93%	
Verified Gross Savings		254,014	

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy Services, October 28, 2013 and November 13, 2013.

†NA when the TRM or evaluation engineering analysis determines the gross savings.

‡ Based on evaluation research findings.

The North Shore Gas GPY2 SFDI Program reported ex-ante gross energy savings of 24,552 therms. Evaluation adjustments described in the sections above resulted in evaluation verified gross energy savings of 21,858 therms. Table 3-9 below illustrates that the overall North Shore Gas program verified gross energy savings realization rate was 89 percent.

Table 3-9. North Shore Gas GPY2 Verified Gross Impact Savings Estimates by End-Use

	Sample	Gross Energy Savings (Therms)	90/10 Significance?
Water Efficiency Measures			
Ex-Ante GPY2 Gross Savings	NA†	12,459	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		12,459	
Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	6,001	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		6,001	
DHW Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	3,805	NA†
Verified Gross Realization Rate‡		27%	
Verified Gross Savings		1,019	
Boiler Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	2,288	NA†
Verified Gross Realization Rate‡		104%	
Verified Gross Savings		2,379	
North Shore Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings	NA†	24,552	NA†
Verified Gross Realization Rate‡		89%	
Verified Gross Savings		21,858	

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy Services, October 28, 2013 and November 13, 2013.

†NA when the TRM determines the gross savings.

‡ Based on evaluation research findings.

4. Net Impact Evaluation

In GPY2, Navigant calculated verified net savings of 243,853 therms for the Peoples Gas program and 20,984 therms for the North Shore Gas program. The program level NTGR estimate of 0.96 used to calculate the verified net savings was calculated by evaluation research as noted in Section 2.1.4.

Navigant calculated verified net savings of 243,853 therms for the GPY2 Peoples Gas SFDI program, as shown in Table 4-1 below. As indicated in the table below, measure savings are derived from the Illinois TRM and engineering analysis of program population-level data, so sample size and statistical significance are not applicable. The table presents savings at the measure group level including groups where the NTGR estimate is not statistically significant at the 90/10 level.

Table 4-1. Peoples Gas GPY2 Research Findings Net Impact Savings Estimates by End-Use

	Sample	Energy Savings (Therms)	90/10 Significance ?
Water Efficiency Measures			
Ex-Ante GPY2 Gross Savings	NA†	110,222	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		110,222	
Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	58,691	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		58,691	
DHW Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	37,470	NA†
Verified Gross Realization Rate‡		40%	
Verified Gross Savings		14,916	
Boiler Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	67,485	NA†
Verified Gross Realization Rate‡		104%	
Verified Gross Savings		70,184	
Peoples Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings		273,868	
Verified Gross Realization Rate‡		93%	
Verified Gross Savings		254,014	
Free-ridership ‡	80 Total (71 PGL) (9 NSG)	0.08	Yes
Participant Spillover ‡		0.04	
Net-to-Gross Ratio (NTGR) ‡		0.96	
Research Findings Net Savings		243,853	

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy Services, October 28, 2013 and November 13, 2013.

†NA when the TRM or evaluation engineering analysis determines the gross savings.

‡ Based on evaluation research findings.

* Deemed value.

Navigant calculated verified net savings for the North Shore Gas GPY2 SFDI program of 20,984 therms as shown in Table 4-2 below. As indicated in the table below, measure savings are derived from the Illinois TRM and engineering analysis of program population-level data, so sample size and statistical significance are not applicable. The table presents savings at the measure group level including groups where the NTGR estimate is not statistically significant at the 90/10 level.

Table 4-2. North Shore Gas GPY2 Research Findings Net Savings by End-Use

	Sample	Energy Savings (Therms)	90/10 Significance ?
Water Efficiency Measures			
Ex-Ante GPY2 Gross Savings	NA†	12,459	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		12,459	
Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	6,001	NA†
Verified Gross Realization Rate‡		100%	
Verified Gross Savings		6,001	
DHW Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	3,805	NA†
Verified Gross Realization Rate‡		27%	
Verified Gross Savings		1,019	
Boiler Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	2,288	NA†
Verified Gross Realization Rate‡		104%	
Verified Gross Savings		2,379	
North Shore Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings		24,552	
Verified Gross Realization Rate‡		89%	
Verified Gross Savings		21,858	
Free-ridership ‡	80 Total (71 PGL) (9 NSG)	0.08	Yes
Participant Spillover ‡		0.04	
Net-to-Gross Ratio (NTGR) ‡		0.96	
Research Findings Net Savings		20,984	

Source: Navigant analysis of GPY2 Single-family program tracking data (July 26, 2013 data extract) and e-mails from Franklin Energy Services, October 28, 2013 and November 13, 2013.

†NA when the TRM or evaluation engineering analysis determines the gross savings.

‡ Based on evaluation research findings.

5. Process Evaluation

In GPY2, Navigant assessed the effectiveness of the marketing and outreach activities, motivators to participate, the satisfaction of the participants, as well as the participants' recommendations for changes to the program. Navigant conducted interviews with the IC program manager, reviewed marketing strategies and materials, and analyzed feedback provided during participant telephone interviews.

5.1 Marketing and Outreach Activities

Navigant reviewed the marketing materials (attached in Section 7.3.3) and outreach activities and determined that they were effectively used to recruit new participants to the SFDI program.

Activities included:¹⁵

- Historic Chicago Bungalow Association, on behalf of the IC, sent a program-specific mailer to 13,000 Chicago bungalows between Nov 4, 2012 and Feb 4, 2013 phased in at 2,200 or so every few weeks. The Association also sent the mailer via e-mail to those individuals for whom they have e-mail addresses.
- PGL & NSG SFDI bill inserts – Peoples/North Shore sent the inserts to approximately 100,000 Service Class 1 (individually-metered residential) customers each month for several month by a specific set of zip codes for each month. A group inserts went out February – May 2013 (PGL) and March 2013 (NSG).
- Residential Program brochures – The IC distributed over 25,000 SFDI brochures in GPY2 directly to customers and through partner events/groups like the “Readers are Leaders” and “Circus in the Parks.” Distribution was in print and electronic.
- Leave behind – The IC provides the “Leave Behind” document to each customer and asks them to fill out the customer survey. The document is in English and Spanish.
- Thermostat education piece – The IC leaves the Thermostat education piece with each customer for whom they install a thermostat.
- The IC requested approval for adding the SFDI program logos to the installer technician uniforms as well as the having their vans wrapped with the program information.

In addition, Navigant reviewed the process of the information flow for the assessment form. While in the participant's home, the implementation contractor staff member performs an assessment of the existing HVAC, hot water heater, and building shell equipment and notes conditions and approximate ages. The assessment information is shared with the participant while the implementation contractor staff member is in the participant's home and the information is entered

¹⁵ E-mail from Jamie Peters, Franklin Energy Services, April 9, 2013.

into Bensight. However, there is not a systematic process for sharing (with the participant's consent) the equipment information with other residential programs for targeted marketing and outreach.¹⁶

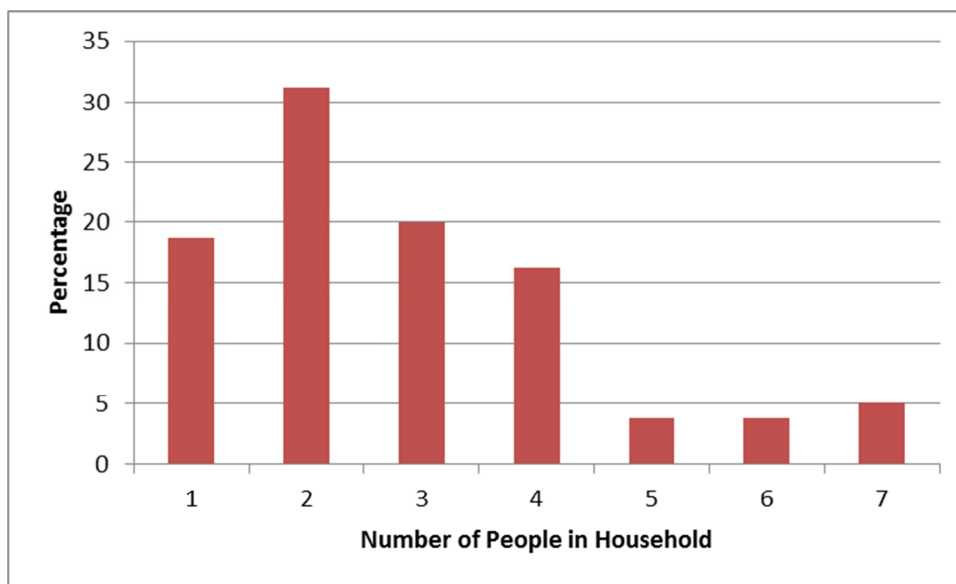
5.2 Participant Telephone Survey Feedback

To survey a representative group of participants, Navigant provided a quota to the survey house which reflected the representation of participants by Peoples Gas customers and North Shore Gas customers as well as by measure. A total of 80 telephone interviews were conducted using the representative quota. Since similar marketing and outreach strategies were used for both Peoples Gas customers and North Shore Gas customers and the installation process was identical, the process evaluation analyzed the overall participation across both utilities.

5.2.1 Participant Demographics

Most of the participants owned their homes (94 percent). Also, most of the participants (84 percent) described their home as a "single family detached". Eight percent described their home as "two-flat," three percent as "townhome", one percent each as "duplex " and "condo" and an additional four percent as "other." One area of with wider variability was the reported number of people living in the household. As shown in Figure 5-1, when responding to the question "how many people lived in your home during the past 12 months?" about a third of the participants reported a household size of two people, and about 20 percent each reported a household size of either one person or three people. Therefore, the majority of the participants, 72 percent, reported a household size of one – three people with the remainder of the households reporting four – seven members in their households.

Figure 5-1. Percentage of Participants by Household Size



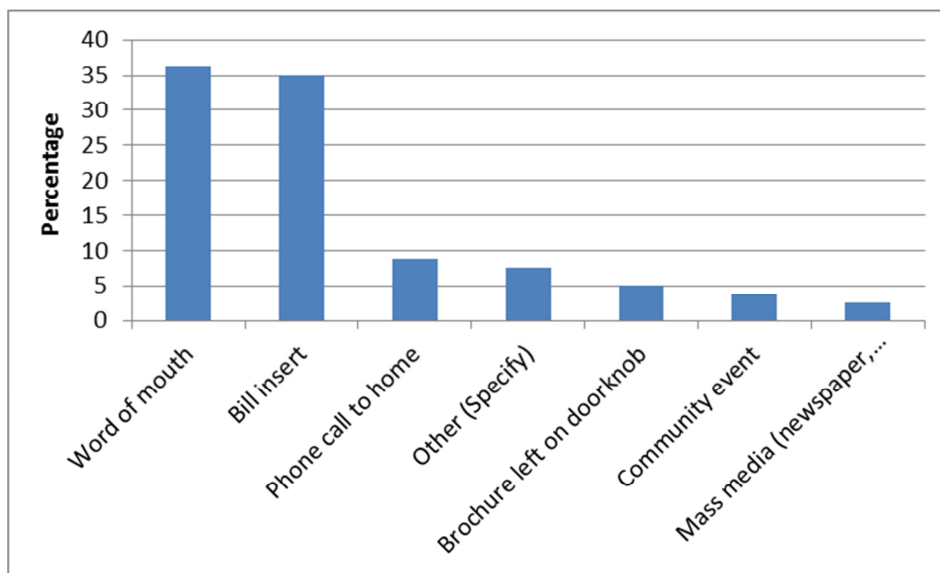
Source: Navigant analysis

¹⁶ E-mail from Max Burke-Scoll, Franklin Energy, November 19, 2013 and telephone conversation with Jim Heffron, Franklin Energy, November 19, 2013.

5.2.2 Participant Awareness

As shown in Figure 5-2, of the 80 surveyed participants, over 70 percent learned about the program either through “word of mouth” or “bill inserts” with approximately an even distribution between the two. Nine percent learned of the program through a “phone call to home.”

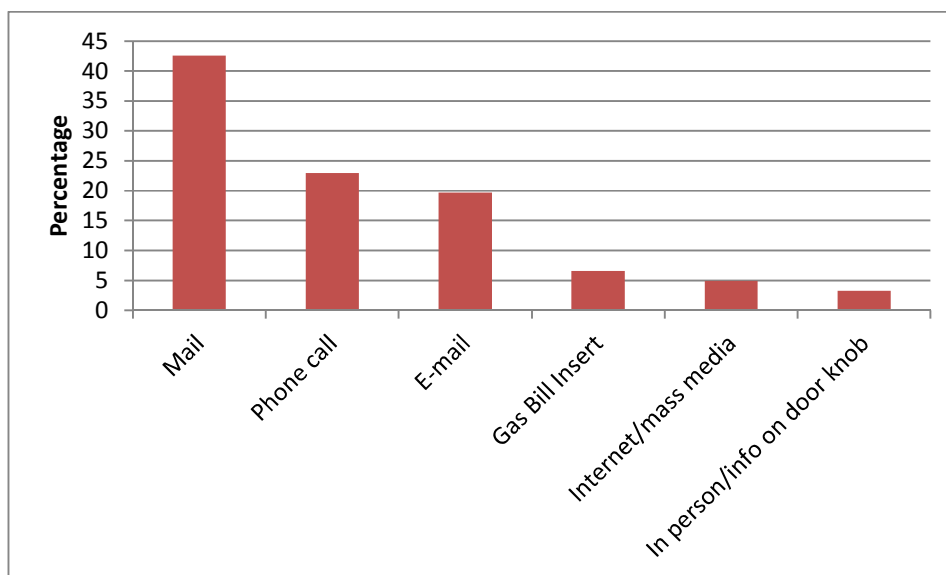
Figure 5-2. How Participants Learned About Program, by Percentage



Source: Navigant analysis

Of the 61 participants who gave a preference for how they preferred to learn about a Peoples Gas or North Shore Gas program (shown in Figure 5-3), 43 percent reported “mail” as their top preference and 23 percent reported “phone call” as their top preference. Another 20 percent reported “e-mail” as their preference and seven percent reported “gas bill insert” as their preference.

Figure 5-3. Participants’ Preference for Outreach, by Percentage

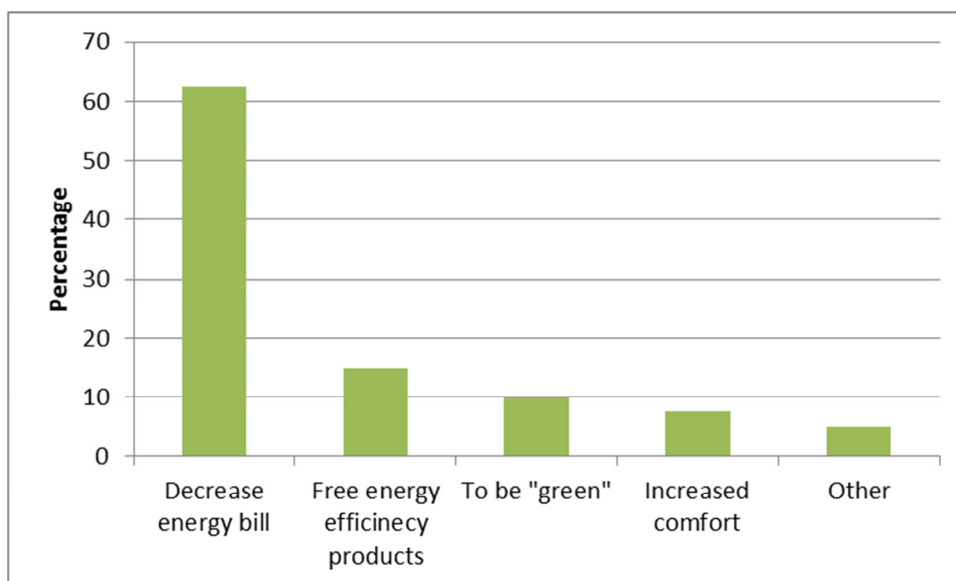


Source: Navigant analysis

5.2.3 Program Motivators and Timing

When asked “what was your primary reason for participating in the program?”, 63 percent of participants reported “decrease energy bill,” 15 percent reported “free energy efficiency products for my home”, ten percent “to be ‘green’”, six percent “increased comfort” and five percent “other,” as shown in Figure 5-4. In addition, once the participants first became aware of the program, the majority (93 percent) reported that they decided to participate in the program “within six months,” and seven percent reported “more than six months, but less than a year later” indicating that participants are motivated to participate in the program within a relatively short time of learning of the program.

Figure 5-4, Participants’ Primary Reason for Participation, by Percentage



Source: Navigant analysis

5.2.4 Individual Measure Participant Feedback

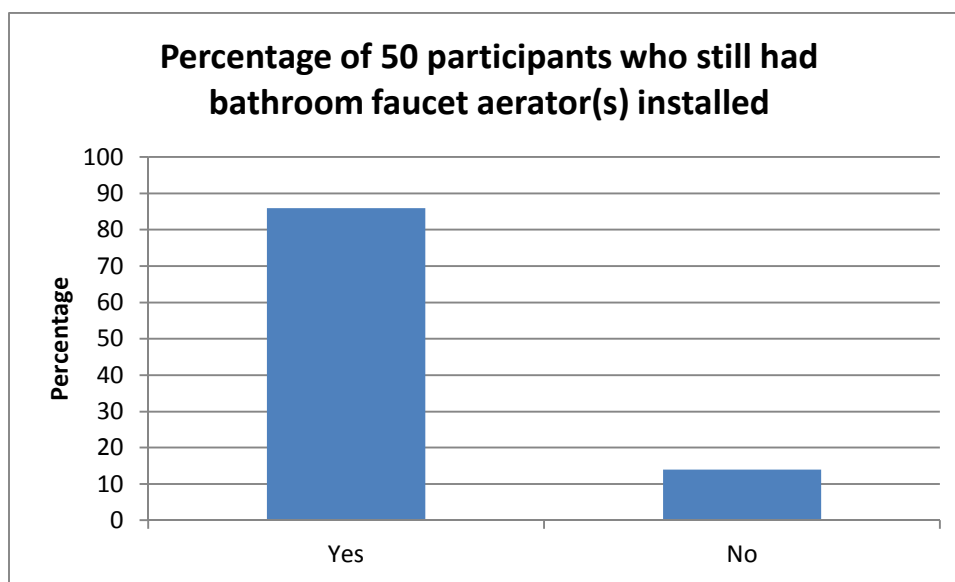
5.2.4.1 Bathroom Faucet Aerators

As shown in Figure 5-5, most of the participants who received bathroom faucet aerators still had them installed at the time of the telephone survey, indicating a high degree of persistent savings. Of the seven participants who reported removing the directly installed aerators, four of them reported replacing it with “with a new high efficiency aerator” and the other three reported “re-installed the old equipment.”

Reasons stated for removing the aerators included:

- *Didn’t like the flow of water with the efficient aerator*
- *Didn’t work properly*
- *We had the bathrooms updated so [I bought] new faucets*
- *[The aerator] was really loud*
- *[The aerators] didn’t have any screens in the faucets to catch the debris*

Figure 5-5. Percentage of Participants Who Still Had Bathroom Faucet Aerator(s) Installed



Source: Navigant analysis

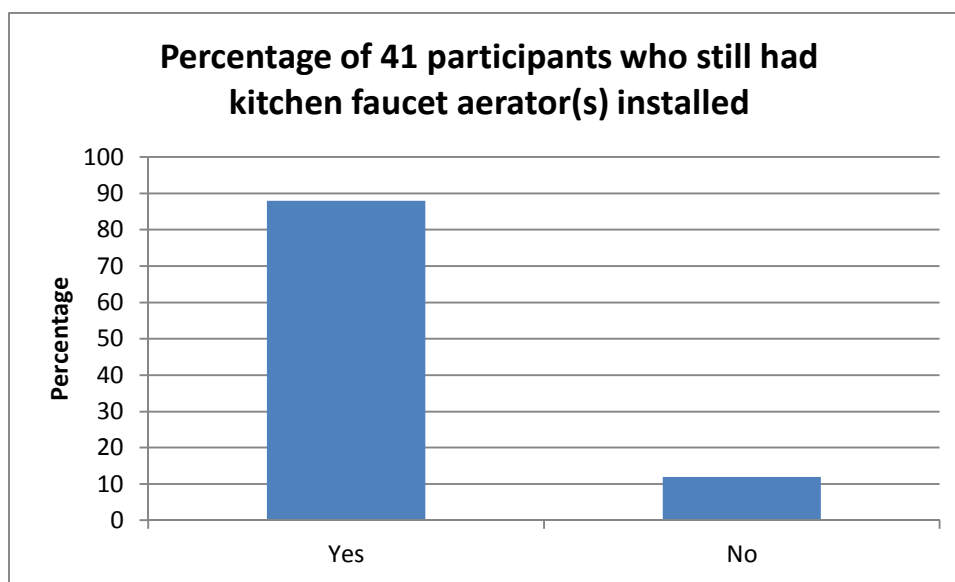
5.2.4.2 Kitchen Faucet Aerators

Similar to the bathroom faucet aerators, the majority of the 41 respondents who reported receiving kitchen faucet aerators reported that they still had the aerators installed in the original locations, as shown in Figure 5-6, indicating a high degree of persistent savings. Of the five participants who removed the aerators, three reported that they “reinstalled the old equipment” and one replaced it with a “PUR water filter.”

Reasons stated for removing the kitchen aerators included:

- *Didn't like the flow of water with the efficient aerator*
- *Didn't work properly*
- *[I] had to replace the faucet*
- *[The aerator] would stop up and it had no screens to keep debris from coming out of faucet*

Figure 5-6. Percentage of Participants Who Still Had Kitchen Faucet Aerator(s) Installed



Source: Navigant analysis

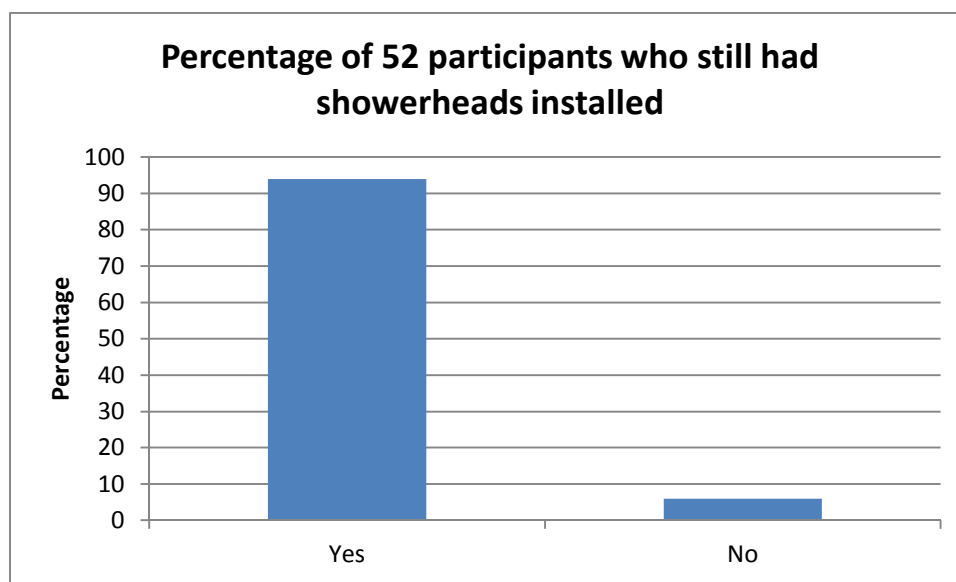
5.2.4.3 Water Efficient Showerheads

Similar to the bathroom and kitchen aerators, the majority of the 52 respondents who reported receiving water efficient showerheads reported that they still had the showerheads installed in the original locations, indicating a high degree of persistent savings. For the three participants who removed the showerheads two reported they replaced it with “a new high efficiency showerhead” and one “re-installed the old equipment.”

Reasons stated for removing the showerheads included:

- Didn't like the flow of water with the efficient showerhead
- Didn't work properly

Figure 5-7. Percent of Participants Who Still Had Showerheads Installed



Source: Navigant analysis

5.2.4.4 Programmable Thermostats

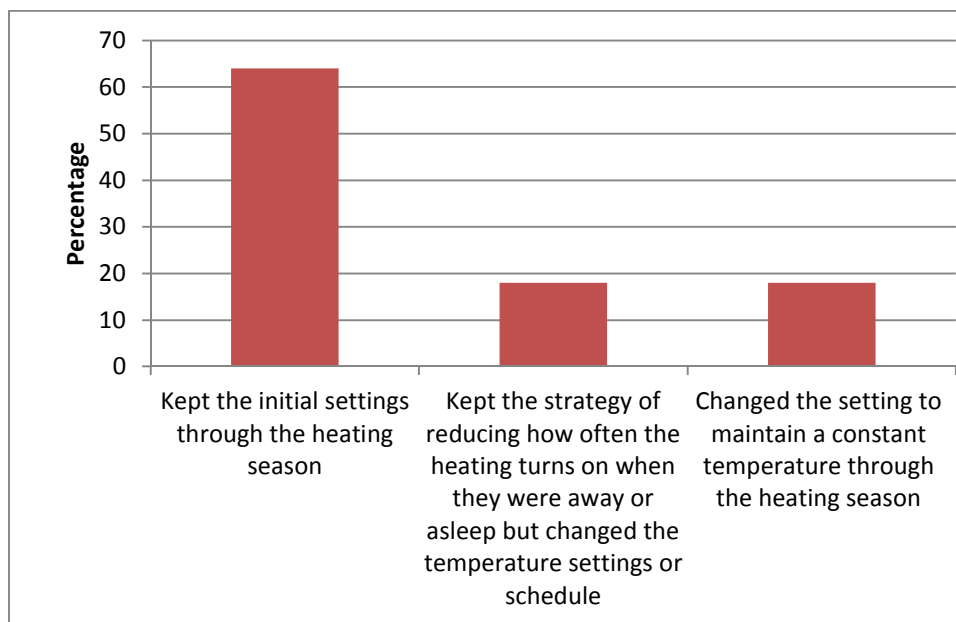
This was the first year that programmable thermostats were part of the SFDI program and the participants responded favorably to most of the questions about the programmable thermostats. As shown in Figure 5-8, the majority of the participants kept the settings that the SFDI technician programmed during installation. Also, as shown in Figure 5-9 the majority of the participants expected to program the thermostat to “lower the temperature during the daytime hours” during the winter. Overall the majority of participants reported that they were using the programmable thermostats as intended by the SFDI program.

All 18 participants reported:

- They were “very satisfied” or “satisfied” with their programmable thermostat
- Technician left information behind that shows how to operate the programmable thermostat
- Programmable thermostat was “easy to operate and understand”

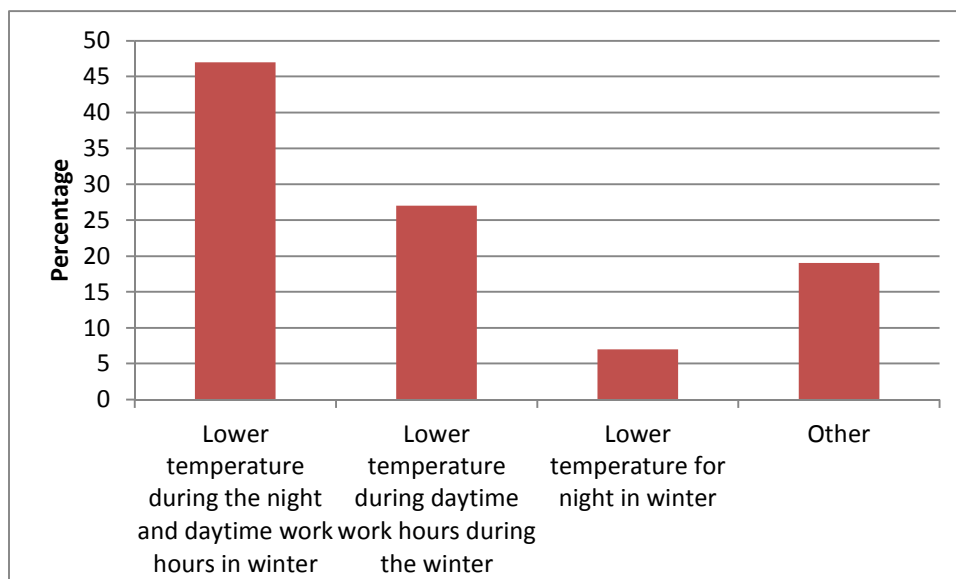
In addition, 17 of 18 participants reported that “the field technician showed how to initially program the programmable thermostat. Fifteen of 18 participants reported that the technician also “showed them how to re-program the thermostat to meet their needs.”

Figure 5-8. How Participants Reported Using Their Thermostat Post-Installation – By Percentage



Source: Navigant analysis

Figure 5-9. How Participants Expected to Program Their Thermostat for the Winter – By Percentage



Source: Navigant analysis

5.2.4.5 Domestic Hot Water Pipe Insulation

Of the 32 respondents who reported receiving pipe wrap on their hot water pipes, 31 reported that the pipe wrap was still present, (and one responded that they “didn’t know”), indicating a high degree of persistent savings.

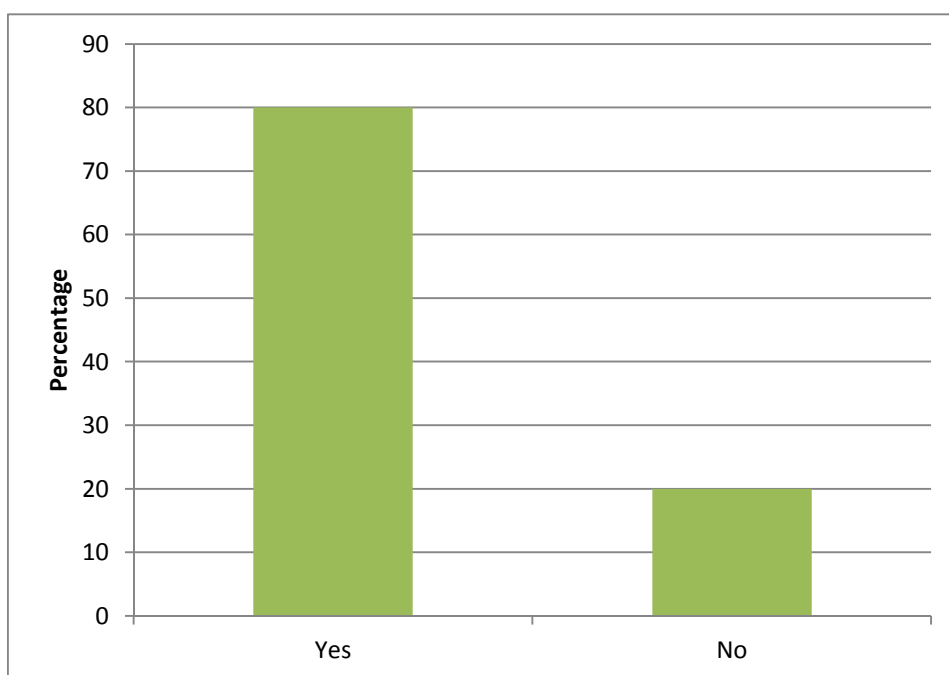
5.2.4.6 Boiler Pipe Insulation

Of the 20 respondents who reported receiving pipe wrap on their boiler pipes, all 20 reported that the pipe wrap was still present, indicating a high degree of persistent savings.

5.2.5 Participants’ Interactions with SFDI Representative and Behavior Changes

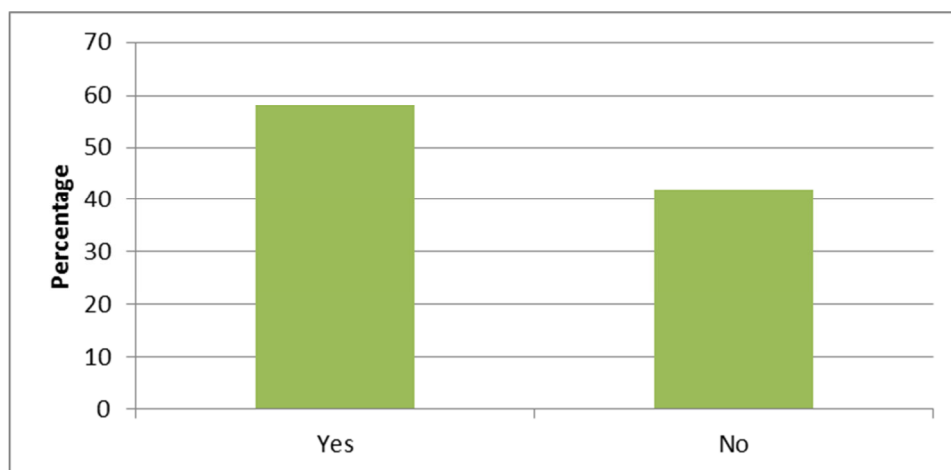
One of the stated goals of the SFDI program is to encourage participants to also participate in other PGL/NSG residential energy efficiency programs. The majority of the participants (80 percent), shown in Figure 5-10, reported that the SFDI program representative educated them on their overall energy use and how that impacted their energy costs. In addition, the majority of participants (58 percent) reported that they changed their energy use behavior to try and save more energy, shown in Figure 5-11.

Figure 5-10. Participants Receiving Energy Efficiency Education from Program Representative – By Percentage



Source: Navigant analysis

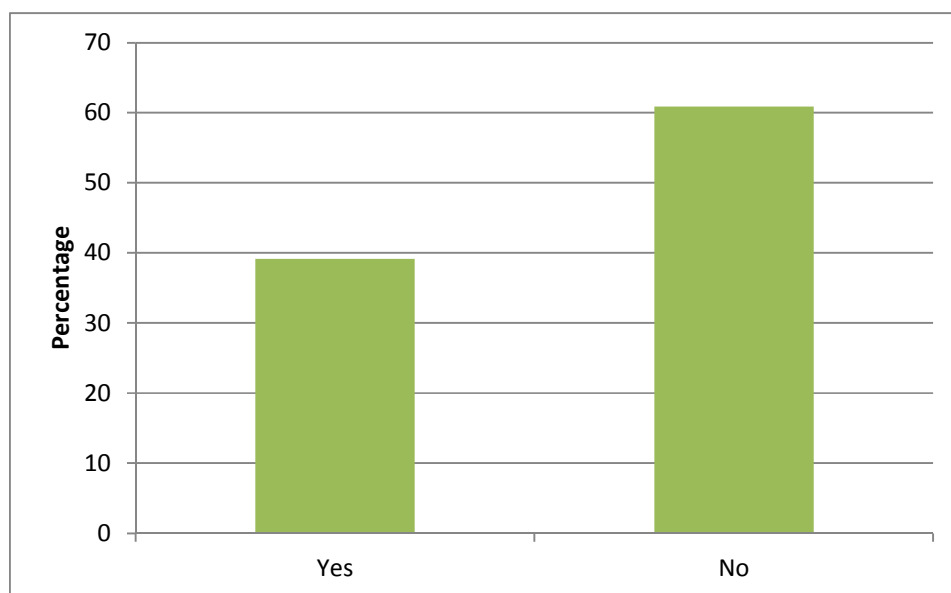
Figure 5-11. Participants Reporting Changing their Behavior to Save More Energy – by Percentage



Source: Navigant analysis

However, the majority of participants (61 percent) reported that the SFDI program representative did NOT inform them about other programs such as rebates for high efficiency heating equipment or high efficiency water heating equipment, shown in Figure 5-12. Since one of the goals of this program is to encourage SFDI participants to also participate in other residential programs, increasing the efforts to inform SFDI participants about other programs is warranted.

Figure 5-12. Participants Indicating being Informed about Other Programs- By Percentage



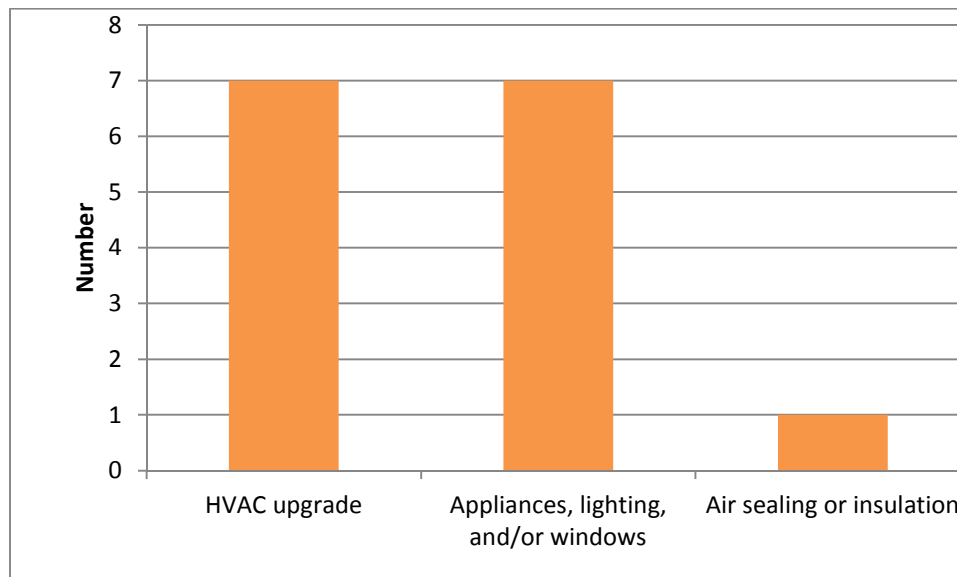
Source: Navigant analysis

5.2.6 Participants' Purchases of Additional Energy Efficient Equipment

The majority of the participants (84 percent) reported that they have not purchased and installed any additional energy efficient equipment since participating in the program. Figure 5-13 shows the measures of additional energy efficient equipment purchased and installed by participants. Four

participants reported that the additional equipment they purchased was eligible for a residential rebate, although only one reported receiving a rebate.

Figure 5-13. Additional Energy Efficient Measures Purchased and Installed by Participants



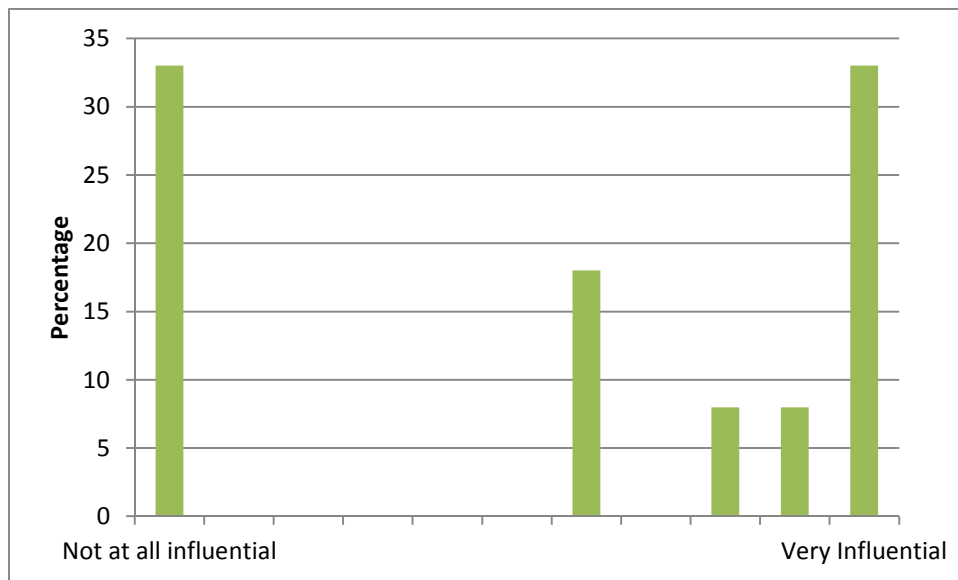
Source: Navigant analysis

Of the four respondents who answered the question “what were any of these the reason or reasons you decided not to participate in the residential rebate program and receive a rebate when you purchased and installed the equipment?” two responded “I didn’t have enough information about the rebate program”, one responded “I didn’t know anything about an incentive or anything” and one responded “the [rebate] program was over.” This indicates that most of the respondents who answered this question indicated that they didn’t have sufficient information about the residential rebate programs to participate, warranting additional information be provided to SFDI participants at the time of installation for the other residential programs.

As shown in Figure 5-14 the amount of influence that the program had on encouraging participants to install additional equipment varied greatly, with an equal percentage reporting that the program was “very influential” and “not at all influential.” Additional feedback offered by the participants regarding their responses included:

- *I felt that I would see a drastic difference in my bill.*
- *It made me more conscious about energy efficiency.*
- *The technician explained that I could save energy if I bought a new energy efficient one.*
- *The representative explained that my water heater consumes more energy and I would save more energy with an energy efficient water heater.*

Figure 5-14. Levels of Program Influence on Installing Additional Equipment – By Percentage



Source: Navigant analysis

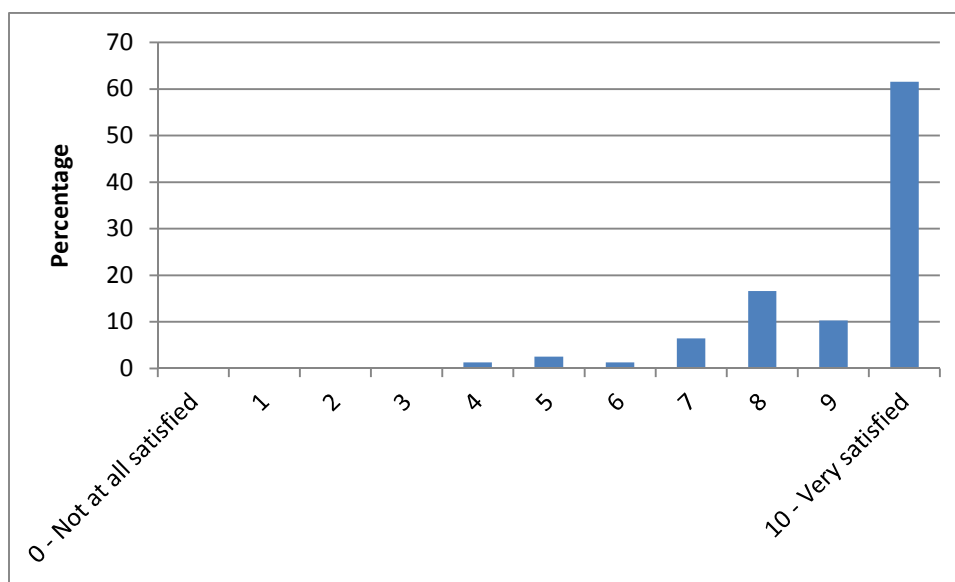
5.2.7 Participant satisfaction

Overall, the participants reported a high level of satisfaction with all aspects of the program including the directly installed equipment, the summary report given to them by the SFDI representative, the SFDI installers/representatives, the SFDI program, and PGL/NSG.

5.2.7.1 Satisfaction with Directly Installed Equipment

The majority of respondents (89 percent), as shown in Figure 5-15, responded in the three highest ratings (out of 11) by rating their overall satisfaction with the direct install equipment, indicating a high degree of satisfaction.

Figure 5-15. Participants' Ratings of Their Overall Satisfaction with Equipment – by Percentage



Source: Navigant analysis

5.2.7.2 Satisfaction with the Summary Report about the directly installed activities in their home

The majority of respondents (92 percent) responded in the three highest ratings (out of 11) by rating their overall satisfaction with the summary report about the directly installed activities in their home, indicating a high degree of satisfaction. In addition, the remaining eight percent distributed in the next tier indicating an overall participant response of “satisfied.”

5.2.7.3 Satisfaction with the field team who installed the equipment

The majority of respondents (87 percent) responded in the three highest ratings (out of 11) by rating their overall satisfaction with the field team who installed the equipment, indicating a high degree of satisfaction. Also ten percent rated “satisfied” in the next tier below the top tier and the remaining three percent rated in the bottom three ratings of “very dissatisfied” as outliers. Overall, this indicated a high degree of satisfaction with the field teams who install equipment, but also some small amount of dissatisfaction.

Additional feedback included:

- *[The field team] didn't know how to answer questions. I asked about spray foam in the attic and they didn't know anything about it. Also they left debris and put a hole in my wall when they installed the thermostat.*
- *I felt that they were in a hurry to leave and they did not take their time to do the things that they were supposed to do such as pipe wrapping under the sink.*

5.2.7.4 Overall satisfaction with the Single Family Direct Install Program

The majority of respondents (91 percent) responded in the top three ratings (out of 11) by rating their overall satisfaction with the SFDI program, indicating a high degree of satisfaction. Also the remaining nine percent rated “satisfied” in the next tier below the top tier. Overall, this indicated a high degree of satisfaction with the SFDI program.

5.2.7.5 Overall satisfaction with Peoples Gas or North Shore Gas

The majority of respondents (78 percent) responded in the top three ratings (out of 11) by rating their overall satisfaction with the PGL or NSG, indicating a high degree of satisfaction. Also 19 percent rated “satisfied” in the next tier below the top tier and three percent responded that they were “very dissatisfied.” Overall, this indicated a high degree of satisfaction with PGL/NSG with a small amount of dissatisfaction.

Additional feedback included:

- *[The utility] didn’t give the rebates that are needed in a timely manner. People need to be informed of the different programs on a regular basis.*
- *I haven’t seen any decrease in the bill. It only seems to have gotten higher.*

5.2.8 Problems Encountered?

All 80 participants reported that “they did not experience any problems with the technicians.” About 88 percent of the 80 participants reported “no problems with the equipment” and 12 percent reported that they “experienced a problem with the equipment installed.” Of those 10 participants, eight stated that they “did not report the problem” and two did report the problem. The two participants who reported the problem stated that they both “called the phone number on program information” and one also reported the problem to the “on-site technician from the program.” For both participants “the issue was resolved to their satisfaction.”

5.2.9 Customer survey

Of the participants who were aware of the customer survey, the majority (72 percent) reported “completing and mailing the survey.” Those who did not complete and mail the survey offered this feedback:

- *They did not know about [the survey]*
- *[The technician] did not leave a [survey]*
- *[The technician] must have given [the survey] to my wife*

However, 30 of the 80 participants reported that they did not know about the survey.

5.2.10 Value of Program on Property Value?

Of the 52 participants who responded, 40 percent were in the top three ratings reporting that the program was “highly valuable in increasing property value”, 31 percent were in the middle tier, and 29 percent were in the lowest three ratings of “not valuable at all at increasing property value.” 28 participants reported that they had “no answer” or “didn’t know” about this question.

5.2.11 Value of Program on Decreasing Home Utility Expenses?

Overall the majority of the participants reported that the program was valuable in decreasing home utility expenses. Of the 60 participants who responded, 62 percent were in the top three ratings reporting that the program was “highly valuable in decreasing home utility expenses”, 25 percent were in the middle tier, and 13 percent were in the lowest three ratings of “the program was not valuable at all at decreasing home utility expenses. About 20 participants reported that they had “no answer” or “didn’t know” about the question.

5.2.12 Value of Program on Decreasing Maintenance Expenses?

Overall the majority of the participants reported that the program was valuable in decreasing maintenance expenses. Of the 62 participants who responded, 61 percent were in the top three ratings reporting that the program was “highly valuable in decreasing maintenance expenses”, 29 percent were in the middle tier, and 10 percent were in the lowest three ratings of “not valuable at all at decreasing maintenance expenses.” Also, of the 80 participants, 18 reported that they had “no answer” or “didn’t know” about the question “how valuable was the program in decreasing maintenance expenses?”

5.2.13 Value of Program on Increasing Home’s Comfort?

Overall the majority of the participants reported that the program was valuable in increasing their home’s comfort. Of the 69 participants who responded, 74 percent were in the top three ratings reporting that the program was “highly valuable in increasing my home’s comfort”, 20 percent were in the middle tier, and 6 percent were in the lowest three ratings of “not valuable at all at increasing my home’s comfort.” Of the 80 participants, 11 reported that they had “no answer” or “didn’t know” about the question “how valuable was the program in increasing my home’s comfort?”

5.2.14 Participant responses regarding the value of the program in other ways

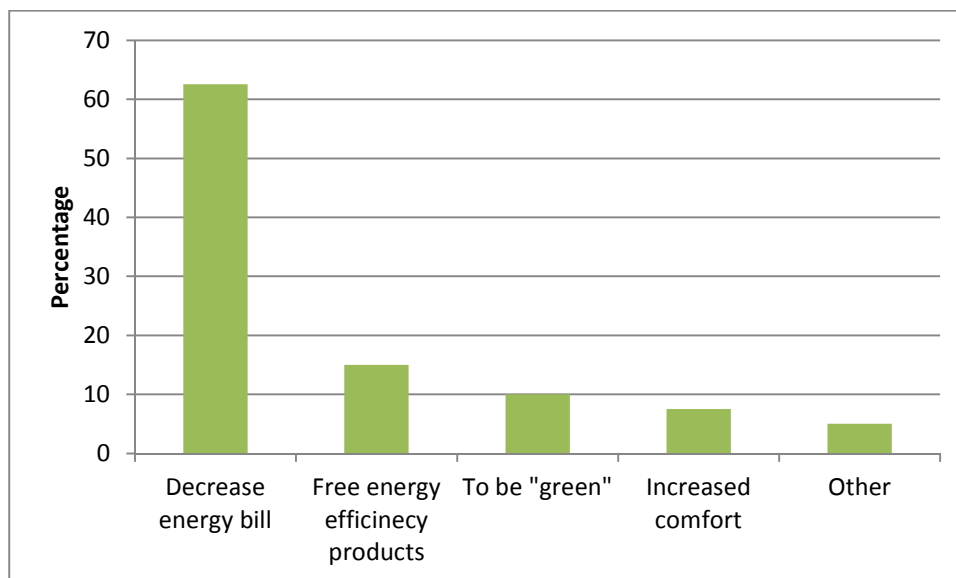
Of the 73 participants who responded, 31 percent reported “yes, the program has been value in another way in my home.” Feedback offered included:

- *[I have] become aware of how to be energy efficient in my home.*
- *I’m in love with the programmable thermostat.*
- *I can see a difference in the bill and water usage, especially in my kitchen because that was my biggest point of usage.*
- *The new showerhead made the water run through it better – it’s a clean stream – you know how showerheads get clogged up with calcium.*
- *It was convenient for the guys to come in and make sure that the equipment works properly and to make sure I have an efficient furnace.*
- *The showerheads aren’t leaking; nothing is dripping so that is good.*
- *Since I had the equipment installed, my house is warmer and it’s very, very comfortable in my house.*
- *It added comfort to my home. I don’t have to raise the thermostat any higher. If it goes below 15 or 20 below zero outside, I don’t have to adjust it, because it kicks on by itself.*
- *It made my house more comfortable.*
- *The fact that we didn’t have to call anyone for service or maintenance since the thermostat has been installed.*

5.2.15 Participant Recommendations

Figure 5-16 shows the 64 participant responses (by percentage) when asked “what additional equipment would you like to see included in the program?” The most frequently requested measure (by 35 percent of the respondents) was air sealing and insulation. LED lighting and HVAC upgrades were requested by 10 percent of the respondents.

Figure 5-16. Participant Feedback on Additional Equipment Offered by Program – By Percentage



Source: Navigant analysis

5.2.16 Barriers to Referring Others to the Program

The majority of the respondents (89 percent) reported “no barriers to referring other people to the program.”

Additional feedback included:

- *I already told my Bible study class about it.*
- *I have told 10 other people about [the program] and given out the information that the technician left.*
- *[I] gave pamphlets to everyone I knew – my hairdresser, my neighbor, and people at church.*

However one participant offered:

- *I think they need to make sure that Peoples Gas [customer service representatives are] familiar with the program. And they are all not. And the senior citizens don't know if the program is real and don't know if they can trust it. Maybe [Peoples Gas] could advertise [the Single Family Direct Install Program] and share information [about the program] with AARP and say that Peoples Gas is affiliated with this program. When I called Peoples Gas, it took five people to tell me [the Single Family Direct Install Program] is [a bone fide program]. And [the Peoples Gas customer service representatives] didn't sound excited. So [Peoples Gas] needs to educate people in customer service on this [program].*

6. Conclusions and Recommendations

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

Overall, the SFDI program performed well in GPY2 and the trend is that the pace of installations is increasing and will continue to increase into GPY3. The PGL SFDI program achieved research findings net savings of 243,853 therms, which is 87% of the GPY2 goal of 280,125 net therms. The NSG program achieved research findings net savings of 20,984 therms, which is 67% of the GPY2 goal of 31,125 net therms. The category with the highest amount of savings is the water efficiency measures.

Program Savings Goals Attainment

Finding 1A. The PGL SFDI program achieved research findings net savings of 243,853 therms, which is 87% of the GPY2 goal of 280,125 net therms. The NSG program achieved research findings net savings of 20,984 therms, which is 67% of the GPY2 goal of 31,125 net therms. Compared to GPY1, the Peoples Gas program increased the number of participants by 800 percent.

Recommendation 1A. As already planned in GPY3, the implementation contractor should continue to market to potential participants and identify measure energy savings opportunities for participants.

Finding 1B. As part of the engineering desk review, the measures on the installation forms matched the information for the measures in the database for all but one of the projects, resulting in a potential underrepresentation of savings since the 40' of boiler pipe wrap on the form did not appear to be represented in the database.

Recommendation 1B. Establish a cross-check mechanism for the measures and quantities appearing on the installation forms and the database.

Gross Realization Rates

Finding 2. The largest difference between ex ante gross savings estimates and verified gross savings estimates for the SFDI program was for DHW pipe insulation. DHW pipe insulation achieved a realization rate of 0.40 for Peoples Gas and 0.27 for North Shore Gas. Navigant allowed up to three feet of pipe wrap on the inlet pipe to the hot water heater and up to six feet of pipe wrap on the outlet pipe to contribute to savings, consistent with the IL TRM, because the actual length between the hot water heater and the first pipe elbow is unknown.

Recommendation 2. Navigant recommends that the IC either record the location of the first pipe elbow in Bensight or limit the savings for DHW pipe insulation savings to three feet on the inlet pipe and six feet on the outlet pipe to comply with the IL TRM.

Net-to-Gross estimates

Finding 3. The program average Net to Gross Ratio (NTGR) (using net savings/verified gross savings) was 0.96 for energy savings. The relative precision at a 90% confidence interval was $\pm 5\%$ for Peoples Gas/North Shore Gas. The program spillover was 0.04. Additionally, as part of the NTGR calculation, the evaluation team attempted to qualitatively assess whether further spillover may be occurring due to program

participants changes in behavior to save more energy after participating in the program. Navigant found that 71% of the participant sample received education on their overall energy use by a Single Family Direct Install program representative, and 41% of those participants are reporting changes in their energy use as a result of their participation in the program. The most common changes in behavior are: adjusting the thermostat temperature, changes in the use of their air conditioning unit and their heater, taking shorter showers, adjusting the temperature of their water heater and turning off their lights.

Recommendation 3. The questions used to identify changes in behavior did not offer enough detail to quantify the spillover from these activities. Spillover could be quantified through the development of additional questions on potential behavioral changes due to the influence of the program as reported by the participants.

Program Participation

Finding 4A. From telephone surveys with participants, over 70 percent learned about the program either through “word of mouth” or “bill inserts” and over 50 percent reported that they preferred learning about programs through the mail or bill inserts, indicating that the program is effectively reaching potential participants through one of their preferred methods. In addition, the participants reported a high level of satisfaction with all aspects of the program including the directly installed equipment, the summary report given to them by the SFDI representative, the SFDI installers/representatives, the SFDI program, and PGL/NSG.

Recommendation 4A. Since the telephone surveys indicated that the current outreach and marketing methods are well-received and effective, continuing to use those channels to reach potential participants in GPY3 will likely prove equally effective.

Finding 4B. From telephone surveys with participants, over 60 percent reported that their primary motivation for participating in the program was to decrease their energy bill. In addition, once the participants first became aware of the program, the majority (93 percent) reported that they decided to participate in the program “within six months,” and seven percent reported “more than six months, but less than a year later” indicating that participants are motivated to participate in the program within a relatively short time of learning of the program.

Recommendation 4B. Since the telephone surveys indicated that the current marketing is leading to conversion to participation in a relatively short period of time, the current administrative and delivery process is effective and should continue into GPY3.

Program Participation in other Programs

Finding 5A. The majority of participants (61 percent) reported that the SFDI program representative did not inform them about other programs such as rebates for high efficiency heating equipment or high efficiency water heating equipment

Recommendation 5A. Since one of the goals of this program is to encourage SFDI participants to also participate in other residential programs, increasing the efforts to inform SFDI participants about other programs is warranted. Consider targeted brochures for each of the measure groups in the residential rebate program specifically describing the financial and other benefits for SFDI participants (i.e. bonus coupon plus the residential rebate as well as decreased energy use and increased comfort) that the

technicians could use as a basis for a more in-depth conversation on the SFDI participant taking the next step toward participation in the residential rebate program.

Finding 5B. Although the participants' existing HVAC, domestic hot water and building shell equipment is cataloged and assessed for condition on the program's assessment summary, there is no systematic process to convey the information to the other applicable residential programs.

Recommendation 5B. Since one of the goals of this program is to encourage SFDI participants to also participate in other residential programs, with the participants' consent, share the information on the assessment summaries with the appropriate residential programs for targeted outreach and marketing efforts.

Review Process.

Finding 6. Several aspects of the database proved problematic for the review process, specifically that the tracking database does not contain gross savings tallies but contains net savings, does not contain the pdfs of the installation forms for cross-checking purposes, and was not able to produce a data set that contained a participant's full set of information (contact information, installation date, and measures installed) in a single record per participant.

Recommendation 6. Enhancements to Bensight should be considered to make the review process more efficient and effective.

Marketing and Outreach

Finding 7. Although most participants reported that they did not purchase and install additional energy efficiency measures, several did purchase and install additional energy efficiency equipment that were eligible for rebates. However, these participants reported that they didn't know enough about the residential rebate programs to participate or they couldn't participate because the "program was over." Navigant included these participants in our spillover calculations, when they met the criteria for spillover.

Recommendation 7. Ensure that PGL and NSG SFDI participants are fully briefed on opportunities with residential programs.

Savings Estimates.

Finding 8. For boiler pipe insulation savings calculations, the Illinois TRM pertaining to GPY2 does not contain an approach to calculating savings, and Navigant could not verify the inputs used by the implementation contractor in GPY2 used in the Illinois TRM pertaining to GPY3. Therefore, Navigant used the same approach as was used in GPY1 with GPY2 inputs, except for the hours of boiler use. Navigant's suggested hours of use account for typical boiler usage and do not include hours that occur during the cooling season.

Recommendation 8. Navigant recommends that the suggested hours of use be adopted for boiler pipe insulation savings calculations.

Implementation

Finding 9. The SFDI program has evolved and matured and has gone through several program managers. Although the IC's plans included developing an operations manual for the SFDI program, one was not completed in GPY2.

Recommendation 9. Complete an operations manual for the SFDI program to increase consistency and assist with the transfer of institutional knowledge (such as the R-value of pipe insulation) from program manager to program manager.

7. Appendix

7.1 Glossary

High Level Concepts

Program Year

- EPY1, GPY2, etc. Electric Program Year where EPY1 is June 1, 2008 to May 31, 2009, GPY2 is June 1, 2009 to May 31, 2010, etc.
- GPY1, GPY2, etc. Gas Program Year where GPY1 is June 1, 2011 to May 31, 2012, GPY2 is June 1, 2012 to May 31, 2013.

There are two main tracks for reporting impact evaluation results, called Verified Savings and Impact Evaluation Research Findings.

Verified Savings composed of

- Verified Gross Energy Savings
- Verified Gross Demand Savings
- Verified Net Energy Savings
- Verified Net Demand Savings

These are savings using deemed savings parameters when available and after evaluation adjustments to those parameters that are subject to retrospective adjustment for the purposes of measuring savings that will be compared to the utility's goals. Parameters that are subject to retrospective adjustment will vary by program but typically will include the quantity of measures installed. In GPY2 PGL and NSG's deemed parameters were defined in its filing with the ICC. The Gas utilities agreed to use the parameters defined in the TRM, which came into official force for GPY2/EPY5.

Application: When a program has deemed parameters then the Verified Savings are to be placed in the body of the report. When it does not (e.g., Business Custom, Retro-commissioning), the evaluated impact results will be the Impact Evaluation Research Findings.

Impact Evaluation Research Findings composed of

- Research Findings Gross Energy Savings
- Research Findings Gross Demand Savings
- Research Findings Net Energy Savings
- Research Findings Net Demand Savings

These are savings reflecting evaluation adjustments to any of the savings parameters (when supported by research) regardless of whether the parameter is deemed for the verified savings analysis. Parameters that are adjusted will vary by program and depend on the specifics of the research that was performed during the evaluation effort.

Application: When a program has deemed parameters then the Impact Evaluation Research Findings are to be placed in an appendix. That Appendix (or group of appendices) should be

labeled Impact Evaluation Research Findings and designated as “ER” for short. When a program does not have deemed parameters (e.g., Business Custom, Retro-commissioning), the Research Findings are to be in the body of the report as the only impact findings. (However, impact findings may be summarized in the body of the report and more detailed findings put in an appendix to make the body of the report more concise.)

Program-Level Savings Estimates Terms

N	Term Category	Term to Be Used in Reports‡	Application†	Definition	Otherwise Known As (terms formerly used for this concept)§
1	Gross Savings	Ex-ante gross savings	Verification and Research	Savings as recorded by the program tracking system, unadjusted by realization rates, free-ridership, or spillover.	Tracking system gross
2	Gross Savings	Verified gross savings	Verification	Gross program savings after applying adjustments based on evaluation findings for only those items subject to verification review for the Verification Savings analysis	Ex post gross, Evaluation adjusted gross
3	Gross Savings	Verified gross realization rate	Verification	Verified gross / tracking system gross	Realization rate
4	Gross Savings	Research Findings gross savings	Research	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
5	Gross Savings	Research Findings gross realization rate	Research	Research findings gross / ex-ante gross	Realization rate
6	Gross Savings	Evaluation-Adjusted gross savings	Non-Deemed	Gross program savings after applying adjustments based on all evaluation findings	Evaluation-adjusted ex post gross savings
7	Gross Savings	Gross realization rate	Non-Deemed	Evaluation-Adjusted gross / ex-ante gross	Realization rate
1	Net Savings	Net-to-Gross Ratio (NTGR)	Verification and Research	1 – Free-ridership + Spillover	NTG, Attribution
2	Net Savings	Verified net savings	Verification	Verified gross savings times NTGR	Ex post net
3	Net Savings	Research Findings net savings	Research	Research findings gross savings times NTGR	Ex post net
4	Net Savings	Evaluation Net Savings	Non-Deemed	Evaluation-Adjusted gross savings times NTGR	Ex post net
5	Net Savings	Ex-ante net savings	Verification and Research	Savings as recorded by the program tracking system, after adjusting for realization rates, free-ridership, or spillover and any other factors the program may choose to use.	Program-reported net savings

‡ “Energy” and “Demand” may be inserted in the phrase to differentiate between energy (kWh, Therms) and demand (kW) savings.

† **Verification** = Verified Savings; **Research** = Impact Evaluation Research Findings; **Non-Deemed** = impact findings for programs without deemed parameters. We anticipate that any one report will either have the first two terms or the third term, but never all three.

§ Terms in this column are not mutually exclusive and thus can cause confusion. As a result, they should not be used in the reports (unless they appear in the “Terms to be Used in Reports” column).

Individual Values and Subscript Nomenclature

The calculations that compose the larger categories defined above are typically composed of individual parameter values and savings calculation results. Definitions for use in those components, particularly within tables, are as follows:

Deemed Value – a value that has been assumed to be representative of the average condition of an input parameter and documented in the Illinois TRM or PGL and NSG’s approved deemed values. Values that are based upon a deemed measure shall use the superscript “D” (e.g., delta watts^D, HOU-Residential).

Non-Deemed Value – a value that has not been assumed to be representative of the average condition of an input parameter and has not been documented in the Illinois TRM or PGL and NSG’s approved deemed values. Values that are based upon a non-deemed, researched measure or value shall use the superscript “E” for “evaluated” (e.g., delta watts^E, HOU-Residential^E).

Default Value – when an input to a prescriptive saving algorithm may take on a range of values, an average value may be provided as well. This value is considered the default input to the algorithm, and should be used when the other alternatives listed for the measure are not applicable. This is designated with the superscript “DV” as in X^{DV} (meaning “Default Value”).

Adjusted Value – when a deemed value is available and the utility uses some other value and the evaluation subsequently adjusts this value. This is designated with the superscript “AV” as in X^{AV}

Glossary Incorporated From the TRM

Below is the full Glossary section from the TRM Policy Document as of October 31, 2012¹⁷.

Evaluation: Evaluation is an applied inquiry process for collecting and synthesizing evidence that culminates in conclusions about the state of affairs, accomplishments, value, merit, worth, significance, or quality of a program, product, person, policy, proposal, or plan. Impact evaluation in the energy efficiency arena is an investigation process to determine energy or demand impacts achieved through the program activities, encompassing, but not limited to: *savings verification, measure level research, and program level research*. Additionally, evaluation may occur outside of the bounds of this TRM structure to assess the design and implementation of the program.

Synonym: **Evaluation, Measurement and Verification (EM&V)**

¹⁷ IL-TRM_Policy_Document_10-31-12_Final.docx

Measure Level Research: An evaluation process that takes a deeper look into measure level savings achieved through program activities driven by the goal of providing Illinois-specific research to facilitate updating measure specific TRM input values or algorithms. The focus of this process will primarily be driven by measures with high savings within Program Administrator portfolios, measures with high uncertainty in TRM input values or algorithms (typically informed by previous savings verification activities or program level research), or measures where the TRM is lacking Illinois-specific, current or relevant data.

Program Level Research: An evaluation process that takes an alternate look into achieved program level savings across multiple measures. This type of research may or may not be specific enough to inform future TRM updates because it is done at the program level rather than measure level. An example of such research would be a program billing analysis.

Savings Verification: An evaluation process that independently verifies program savings achieved through prescriptive measures. This process verifies that the TRM was applied correctly and consistently by the program being investigated, that the measure level inputs to the algorithm were correct, and that the quantity of measures claimed through the program are correct and in place and operating. The results of savings verification may be expressed as a program savings realization rate (verified ex post savings / ex ante savings). Savings verification may also result in recommendations for further evaluation research and/or field (metering) studies to increase the accuracy of the TRM savings estimate going forward.

Measure Type: Measures are categorized into two subcategories: custom and prescriptive.

Custom: Custom measures are not covered by the TRM and a Program Administrator's savings estimates are subject to retrospective evaluation risk (retroactive adjustments to savings based on evaluation findings). Custom measures refer to undefined measures that are site specific and not offered through energy efficiency programs in a prescriptive way with standardized rebates. Custom measures are often processed through a Program Administrator's business custom energy efficiency program. Because any efficiency technology can apply, savings calculations are generally dependent on site-specific conditions.

Prescriptive: The TRM is intended to define all prescriptive measures. Prescriptive measures refer to measures offered through a standard offering within programs. The TRM establishes energy savings algorithm and inputs that are defined within the TRM and may not be changed by the Program Administrator, except as indicated within the TRM. Two main subcategories of prescriptive measures included in the TRM:

Fully Deemed: Measures whose savings are expressed on a per unit basis in the TRM and are not subject to change or choice by the Program Administrator.

Partially Deemed: Measures whose energy savings algorithms are deemed in the TRM, with input values that may be selected to some degree by the Program Administrator, typically based on a customer-specific input.

In addition, a third category is allowed as a deviation from the prescriptive TRM in certain circumstances, as indicated in Section 3.2:

Customized basis: Measures where a prescriptive algorithm exists in the TRM but a Program Administrator chooses to use a customized basis in lieu of the partially or fully deemed inputs. These measures reflect more customized, site-specific calculations (e.g., through a simulation model) to estimate savings, consistent with Section 3.2.

7.2 Detailed Impact Research Findings and Approaches

7.2.1 Gross Impact Results

Gross impact results are described in the body of the report with no further description added in this section.

7.2.2 Net Program Impact Results

The program average NTG ratio (using net savings/verified gross savings) was 0.96 for energy savings. The relative precision at a 90% confidence interval was $\pm 5\%$ for Peoples Gas/North Shore Gas. The program spillover was 0.04.

NTG research methods in GPY2 included participant survey results. Research uses a self-report method where participants answer questions about the program.

7.2.2.1 Free-ridership

Free ridership cannot be measured directly due to the lack of empirical data regarding the counterfactual situation (i.e., what would have occurred in the hypothetical, “no program” alternate reality). Thus, free-ridership is assessed as a probability score for each measure. The evaluation relies on self-reported data collected during participant telephone surveys to assign free-ridership probability scores to each measure. The evaluation team asked the following questions to each program participant:

- FR1. At the time that the participant first heard about this program, had they already been thinking about purchasing the measure?
- FR4. Did the participant have specific plans to install the measure before learning about the program?^[1]
- FR5/6. Did the program influence the participant to install the measures sooner than they otherwise would have? How much later would the participant had installed the measure without the program incentive?
- FR7. How likely was the participant to install the measure if they had not installed it through the program? (0-10 scale probability)
- FR8. How important was the program in the decision to install the measure? (0-10 scale)

^[1] Questions FR2 and FR3 do not factor directly into the free-ridership scoring, but are used to improve the accuracy of the response to question FR4 by asking the respondent to recall specific steps they may have taken toward implementing the measure prior to learning about the program.

The free-ridership data were assembled into a probability score in a step-by-step fashion, applying the following algorithm:

1. If the customer had not considered the measure prior to participating in the program then the probability of free-ridership is estimated to be zero (based on FR1 above).
2. Similarly, if the customer did not have specific plans to install the program measure prior to participation, and the self-reported probability of installing the measure was less than or equal to 3 (on a 0-10 scale) then the probability of free-ridership is estimated to be zero (based on FR4 and FR7).
3. If the customer had plans to install the measures in the absence of the program, but indicated that the program accelerated installation by at least two years, then the probability of free-ridership is estimated to be zero (based on FR6).

If none of the above three criteria holds, then the responses to questions FR7 and FR8 are used to calculate the probability of free-ridership. The corresponding formula for calculating free-ridership is shown below:

Figure 7-1. Self-Report Free-ridership Algorithm

$$\text{Free ridership} = [\text{Average (Likelihood, 10 - Importance)}]/10$$

A measure count weight is applied in calculating the overall result for free-ridership.^[2]

7.2.2.2 Spillover

Spillover refers to additional energy efficient measures participants adopted due to program influences, but without any financial assistance from the program. Survey free-ridership questions were followed by questions designed to estimate spillover. These questions asked about recent purchases of any additional energy-efficient measures that were made without any additional financial assistance from the program. Below are examples of the spillover questions:

1. Have you purchased and installed any additional energy efficient equipment since participating in the program?
2. What have you installed?
3. How many additional measures have you installed?
4. Was the additional measure that you purchased and installed eligible for a residential rebate?
5. Did you receive a utility rebate for these additional measures that you installed?
6. How influential was the program in encouraging you to install the additional measure? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential.

^[2] Each measure-level participant free-ridership score is assigned a weight in accordance with the number of showerheads, programmable thermostats, kitchen faucet aerators, bathroom aerators, boiler pipe wrap, or domestic hot water pipe installed in the home.

The evaluation team determined that four of the 80 participants surveyed reported installing additional energy-efficient measures that were not incented by the program. Out of these four participants, three participants installed gas savings measures. Also, the evaluation team determined that an additional six energy-efficient measures (two showerheads and four bathroom aerators) were installed by participants as a result of participating in the program. These participants reported removing the originally installed program equipment and replacing it with an energy-efficient efficient unit. To calculate spillover, Navigant used the TRM to identify the deemed savings for the additional measures participants installed, then multiplied the deemed savings by the quantity of energy efficient measures participants installed. These reported savings were then multiplied by the amount of influence the program had on the decision to install the additional measures (Program Influence score for spillover)^[3]. The program spillover percentage was determined by dividing the total savings reported in the sample from the additional energy-efficient measures discussed above by the total sample savings. All spillover estimates were calculated by Navigant using customer self-reported data and no follow-up interviews were conducted.

Additionally, the evaluation team asked a battery of questions to qualitatively assess behavioral changes from participating in the program. Below are paraphrased versions of these questions:

1. Did the Single Family Direct Install program representative educate you on your overall energy use and how that impacts your energy costs?
2. What did you learn from the program representative about your energy use and how that impacts your energy costs?
3. Did you change any of your energy use behaviors to try and save more energy?
4. What energy use behaviors did you change to try and save more money?
5. Did you discuss energy saving behaviors with other family members?
6. What did you discuss and what behaviors, if any, are they changing?

The evaluation team used responses to these questions to assess whether additional spillover may be occurring due to changes in behavior but the questions do not offer enough detail to quantify the spillover from these activities. Navigant found that 71% of the participant sample received education on their overall energy use by a Single Family Direct Install program representative, 41% of those participants are reporting changes in their energy use as a result of their participation in the program. The most common changes in behavior are: adjusting the thermostat temperature, changes in the use of their air conditioning unit and their heater, taking shorter showers, adjusting the temperature of their water heater and turning off their lights. In the future, spillover could be quantified through additional follow-up questioning on potential behavioral changes due to the influence of the program as reported by the participants.

^[3] The evaluation team took into account only the measures where program participants indicated the program had a significant influence in their decision to implement the additional measure, measures rated 7 or higher on a scale of 0 to 10 where 0 means not at all influential and 10 means very influential.

7.3 Detailed Process Results

7.3.1 Single-Family Direct Install Program Summary Installation Form



331586_SummaryForm.pdf

7.3.2 Single-Family Direct Install Program Assessment Summary Form



331586_AssessmentForm.pdf

7.3.3 Marketing and Outreach Materials

7.3.3.3 *Print Mailer to Members of the Historic Chicago Bungalow Association*



Direct Install Print Mailer - HCBA FINAL.

7.3.3.4 *Bill Insert for North Shore Gas Customers*



Insert 087_Mar2013 Direct Install NSG.pdf

7.3.3.5 *Bill Insert for People's Gas Customers*



Insert 086_Feb2013 Direct Install PGL.pdf

7.3.3.6 *People's Gas and North Shore Gas Combined Single-Family Direct Install and Residential Rebate Programs Brochure*



PGNSG_SFDI_Brochure_JanUpdate_0121_

7.3.3.7 *People's Gas Single-Family Direct Install "Leave Behind Survey"*



PG_SFDI_LeaveBehindSurvey_FINAL_v05

7.3.3.8 *People's Gas Single-Family Direct Install "Leave Behind Survey" – In Spanish*



PG_SFDI_LeaveBehindSurvey_REPRINT_

7.3.3.9



PG_TstatHangTag_FINAL_V04_0726.pdf

7.4 Data Collection Instrument – Participant Survey

Peoples Gas and North Shore Gas SINGLE-FAMILY DIRECT INSTALL PROGRAM GPY2 PARTICIPANT SURVEY INSTRUMENT

Purpose of this Survey Guide (not to be read to Participants)

The purpose of this survey guide is to collect information from participating customers in the Single-Family Direct Install Program. Questions in this survey guide are designed to provide interviewers with prepared questions to ask participants about their experience with the program. The table below outlines the sections, topics and questions of the interview guide to cross-reference them with the goals and objectives of the Single-Family Direct Install Program.

Survey Guide: Topics and Corresponding Questions

Section	Topics	Questions
Introduction and Screening Questions	Introduction to Survey and Is the home serviced by North Shore Gas or Peoples Gas?	INT 1 – 4, S1-S2
Sources of Program Awareness	How did the homeowner learn about the program? What were the primary motivations for participating?	SR1-SR5
Bathroom Faucet Aerator Measure Verification	Verification of Bathroom Faucet Aerator installation. Satisfaction of homeowner with Bathroom Faucet Aerator	BAMV1-BAMV5
Kitchen Faucet Aerator Measure Verification	Verification of Kitchen Faucet Aerator installation. Satisfaction of homeowner with Kitchen Faucet Aerator	KAMV1-KAMV4
Water Efficient Showerhead Measure Verification	Verification of Water Efficient Showerhead installation. Satisfaction of homeowner with Water Efficient Showerhead	SMV1- SMV4
Programmable Thermostat Measure Verification	Verification of Programmable Thermostat installation. Satisfaction of homeowner with Programmable Thermostat	PMV1 – PMV9a
Hot Water Pipe Wrap Measure Verification	Verification of Hot Water Pipe Wrap installation. Satisfaction of homeowner with Hot Water Pipe Wrap	WMVHW1 – WMVHW2
Boiler Pipe Wrap Measure Verification	Verification of Boiler Pipe Wrap installation. Satisfaction of homeowner with Boiler Pipe Wrap	WMVB1 – WMVB2
Net-to-Gross Battery for Water Efficient Showerheads	How significant was participating in the program on the homeowner's choice to install the Water Efficient Showerheads?	WMV1 – WMV10, WMVCC1
Net-to-Gross Battery for Boiler Pipe Wrap	How significant was participating in the program on the homeowner's choice to install Boiler Pipe Wrap?	WHVB1 – WHVB10, WHVBCC1
Net-to-Gross Battery for Programmable Thermostats	How significant was participating in the program on the homeowner's choice to install the Programmable Thermostats?	PMV1 – PMV10, PMVC1
Net-to-Gross Battery for Hot Water Pipe Wrap	How significant was participating in the program on the homeowner's choice to install Hot Water Pipe Wrap?	WHVHW1 – WHVHW10, WHVHWCC1
Net-to-Gross Battery for Bathroom Faucet Aerators	How significant was participating in the program on the homeowner's choice to install the Bathroom Faucet Aerators?	WBV1 – WBV10, WBVCC1
Net-to-Gross Battery for Kitchen Faucet Aerators	How significant was participating in the program on the homeowner's choice to install the Kitchen Faucet Aerators?	WKV1 – WKV10, WKVCC1
Participant Spillover	Did the homeowner implement other energy efficiency equipment after participating in the Single Family Direct Install Program? Did this equipment receive a rebate? How significant was	SO1-SO13

Section	Topics	Questions
	participating in the Single Family Direct Program in the homeowner's choice to implement other equipment or practices?	
Customer Satisfaction	How satisfied was the customer with the direct installation portions of the Single-Family Direct Install program? How satisfied was the customer with sponsoring utility? Did the customer make referrals to the program? What are potential barriers to additional participation? Does customer wish to share any additional information about the program?	CS9-CS24
Demographics	Does participant own or rent? Number of people in household.	D1 – D4

INTRODUCTION AND SCREEN

[NOTE TO INTERVIEWER: Cross-reference names from program tracking database to ensure you indicate the proper utilities.]

INT1. Hello, this is **[INTERVIEWER'S NAME]** calling from the Blackstone Group on behalf of **[UTILITY]**. ***This is not a sales call.*** We are contacting people who have participated in the Single-Family Direct Install Program when a technician came to your home and installed new energy efficient equipment.

[IF NEEDED]: This program provided free installation of energy efficiency equipment such as faucet aerators, low flow showerheads, programmable thermostats, and pipe wrap for boilers and hot water heaters.

INT2. The purpose of this call is to ask you about your experience with the Single-Family Direct Install Program as it pertains to your home. We are conducting an independent study to evaluate the Single-Family Direct Install Program and would like to include your opinions. Your answers will be included with answers from other program participants and used to help understand why customers participated and to get customers feedback on the process. *We would be grateful for your participation in our research.*

Are you the person who is most familiar with your participation in this program?

1. YES **[SKIP TO S1]**
2. NO
3. REQUESTS MORE INFORMATION **[SKIP TO INT4]**
4. DON'T KNOW
5. REFUSED

INT3. Is there someone who may be more knowledgeable about the equipment installation that I could speak with?

1. YES AND AVAILABLE **[GO BACK TO INT1]**
2. YES AND BUSY **[SCHEDULE CALLBACK]**
3. YES AND BUSY **[SCHEDULE GENERAL CALLBACK]**
4. NO **[TERMINATE – REFUSAL]**
5. DON'T KNOW/REFUSED **[TERMINATE]**

INT4. [UTILITY] sponsors the Single-Family Direct Install Program. The Illinois Commerce Commission (ICC) requires utilities to write a report each year on customer satisfaction with the program. [UTILITY] hired our company to prepare a report for the Single Family Direct Install Program. By signing the installation form, you agreed to participate in surveys like this one.

1. SATISFIED WITH INFORMATION
2. WANTS TO VERIFY STUDY [SCHEDULE CALLBACK]
3. REFUSED [TERMINATE]

(IF NEEDED: It will take about 15 - 20 minutes.)

SCREENING QUESTIONS

S1. The program records indicate that [UTILITY] provides natural gas service to your home, is this correct?
(RECORD UTILITY ANSWER AND FOLLOW SKIP LOGIC ACCORDINGLY)

1. NORTH SHORE GAS
2. PEOPLES GAS
97. ANOTHER UTILITY (SPECIFY)
98. DON'T KNOW
99. REFUSED

[IF UTILITY SAMPLE VARIABLE AND ANSWER IN S1 DO NOT MATCH, PLEASE CATEGORIZE THE RESPONDENT IN THE QUOTAS AS BASED ON THE ANSWER TO S1. IF S1=1, THEN TAG AS QUOTA=NSG. IF S1=2 THEN TAG AS QUOTA=PG. IF S1=3, 4, or 5 THEN THANK AND TERMINATE.]

S2. The program records show that during the visit to your home, a field technician installed the following equipment. Please confirm that this is correct. Did you receive...? (READ LIST) [1=YES, 2=NO, 7=NA, 8=DON'T KNOW, 9=REFUSED]

- a. [IF BAERA=1] Bathroom faucet aerators
- b. [IF KAERA=1] Kitchen faucet aerators
- c. [IF SHOW=1] Low flow showerheads
- d. [IF PTHER=1] Programmable thermostats
- e. [IF HWWRAP=1] Pipe wrap for your water heater pipes
- f. [IF PWRAP=1] Pipe wrap for your boiler pipes

SOURCES OF PROGRAM AWARENESS/REASONS FOR PARTICIPATING

SR1. How did you become aware of the Single-Family Direct Install Program? (READ LIST) [RANDOMIZE, MULTIPUNCH]

1. Mass media (newspaper, internet, TV/Radio)
2. Bill insert
3. Phone call to home
4. Word of mouth – from friend, family member, or neighbor
5. Community event
6. Brochure left on doorknob
97. OTHER (SPECIFY)
98. DON'T KNOW
99. REFUSED

SR2 Are there other ways you would prefer to be notified of these programs in the future?

97. [Open ended, record response]
98. DON'T KNOW
99. REFUSED

SR3. What was your **primary** reason for participating in the program? (READ LIST) [RANDOMIZE, SINGLE PUNCH]

1. Free energy efficiency products for my home
2. Increased comfort
3. Decrease energy bill
4. To be “green”
97. OTHER (SPECIFY)
98. DON'T KNOW
99. REFUSED

SR4. Once you first became aware of the program, about how many months later did you decide to participate in the program?

1. Within six months
2. More than six months, but less than a year later

- 3. More than a year, but less than two years later
- 98. DON'T KNOW
- 99. REFUSED

SR5. Our records indicate that you were present when the energy efficient products were installed at your home, is this correct?

- 1. YES
- 2. NO
- 8. DON'T KNOW
- 9. REFUSED

DISP1. Now I would like to ask you about the equipment you received through the program.

BAMV. BATHROOM FAUCET AERATOR MEASURE VERIFICATION

[ASK BAMV MODULE IF BAERA=1 ELSE SKIP TO LOGIC BEFORE KAMV MODULE]

BAMV1. Our records indicate that **[BAERA_QTY]** bathroom faucet aerator(s) were installed by a technician with the Single-Family Direct Install Program during a visit to your home. Is this correct?

- 1. YES, QUANTITY IS CORRECT
- 2. NO, QUANTITY IS INCORRECT (SPECIFY QUANTITY)
- 8. DON'T KNOW **[SKIP TO KAMV1]**
- 9. REFUSED **[SKIP TO KAMV1]**

BAMV2. Omitted

BAMV3. Is (are) the bathroom faucet aerator(s) still installed in the original location(s)?

- 1. YES **[SKIP TO KAMV1]**
- 2. NO
- 3. SOME ARE AND SOME ARE NOT
- 8. DON'T KNOW **[SKIP TO KAMV1]**
- 9. REFUSED **[SKIP TO KAMV1]**

BAMV4. Why [was/were] the bathroom faucet aerator(s) moved from [their/its] original locations?
(MULTIPLE RESPONSE UP TO 5 RESPONSES)

- 01. EQUIPMENT FAILED
- 02. DIDN'T WORK PROPERLY
- 03. DIDN'T LIKE THE FLOW OF WATER WITH THE EFFICIENT AERATOR
- 04. DIDN'T LIKE THE APPEARANCE OF THE AERATOR
- 97. OTHER (SPECIFY)
- 98. DON'T KNOW
- 99. REFUSED

BAMV5. What did you replace the bathroom faucet aerator(s) with? **(SELECT ALL THAT APPLY. READ LIST)**

- 01. With a new high efficiency aerator
- 02. With a less efficient aerator
- 03. Re-installed old equipment
- 04. DID NOT REPLACE **[EXCLUSIVE]**
- 97. OTHER (SPECIFY)
- 98. DON'T KNOW
- 99. REFUSED

KAMV. KITCHEN FAUCET AERATOR MEASURE VERIFICATION

[ASK KAMV MODULE IF KAERA=1, ELSE SKIP TO LOGIC BEFORE SMV MODULE]

KAMV1. Our records indicate that **[KAERA_QTY]** kitchen faucet aerator(s) were installed by a technician with the Single-Family Direct Install Program during a visit to your home. Is this correct?

1. YES, QUANTITY IS CORRECT
2. NO, QUANTITY IS INCORRECT (SPECIFY QUANTITY)
8. DON'T KNOW **[SKIP TO SMV1]**
9. REFUSED **[SKIP TO SMV1]**

KAMV2. Is (are) the kitchen faucet aerator(s) still installed in the original location(s)?

1. YES **[SKIP TO SMV1]**
2. NO
3. SOME ARE AND SOME ARE NOT
8. DON'T KNOW **[SKIP TO SMV1]**
9. REFUSED **[SKIP TO SMV1]**

KAMV3. Why [was/were] the kitchen faucet aerator(s) removed? **(MULTIPLE RESPONSE UP TO 5 RESPONSES. DO NOT READ LIST.)** **[WORDING CHANGE BASED ON KAER_QTY]**

01. EQUIPMENT FAILED
02. DIDN'T WORK PROPERLY
03. DIDN'T LIKE THE FLOW OF WATER WITH THE EFFICIENT AERATOR
04. DIDN'T LIKE THE APPEARANCE OF THE AERATOR
05. WAS NOT INSTALLED CORRECTLY
97. OTHER (SPECIFY)
98. DON'T KNOW
99. REFUSED

KAMV4. What did you replace the kitchen faucet aerator(s) with? **(MULTIPLE RESPONSE)**

- 01. With a new high efficiency aerator
- 02. With a less efficient aerator
- 03. Re-installed old equipment
- 97. OTHER (SPECIFY)
- 98. DON'T KNOW
- 99. REFUSED

SMV. WATER EFFICIENT SHOWERHEAD MEASURE VERIFICATION

[ASK SMV MODULE IF SHOW=1, ELSE SKIP TO LOGIC BEFORE PMV MODULE]

SMV1. Our records indicate that **[SHOW_QTY]** water efficient showerhead(s) were installed by the Single-Family Direct Install Program during a technician's visit to your home. Is this correct? **(NOTE TO INTERVIEWER: THIS INCLUDES BOTH WATER EFFICIENT SHOWERHEADS AND HANDHELD SHOWERHEADS)**

1. YES, QUANTITY IS CORRECT
2. NO, QUANTITY IS INCORRECT (SPECIFY QUANTITY)
8. DON'T KNOW **[SKIP TO PMV1]**
9. REFUSED **[SKIP TO PMV1]**

SMV2. Is (are) the showerhead(s) still installed in the original location(s)?

1. YES **[SKIP TO PMV1]**
2. NO
3. SOME ARE AND SOME ARE NOT
8. DON'T KNOW **[SKIP TO PMV1]**
9. REFUSED **[SKIP TO PMV1]**

SMV3. Why were the showerhead(s) moved from their original location? **(MULTIPLE RESPONSE UP TO 7 RESPONSES)**

01. EQUIPMENT FAILED
02. DIDN'T WORK PROPERLY
03. DIDN'T LIKE THE FLOW OF WATER WITH THE EFFICIENT SHOWERHEAD
04. DIDN'T LIKE THE APPEARANCE OF THE SHOWERHEAD
05. IT WAS NOT INSTALLED CORRECTLY
97. OTHER (SPECIFY)
98. DON'T KNOW
99. REFUSED

SMV4. What did you replace the showerhead(s) you removed with? **(MULTIPLE RESPONSE)**

- 01. With a new high efficiency showerhead
- 02. With a new less efficient showerhead
- 03. Re-installed old equipment
- 97. OTHER (SPECIFY)
- 98. DON'T KNOW
- 99. REFUSED

PMV. PROGRAMMABLE THERMOSTAT VERIFICATION

If PTher = 1 Ask PMV1-PMV9. Else skip to logic before WMVHW module

PMV1. Our records indicate that [PRT_QTY] programmable thermostats(s) were installed by a technician with the Single-Family Direct Install Program during a visit to your home. Is this correct?

1. YES, QUANTITY IS CORRECT
2. NO, QUANTITY IS INCORRECT (SPECIFY QUANTITY)
8. DON'T KNOW
9. REFUSED

PMV2. Did the field technician show you how to initially program the programmable thermostat?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

PMV3. Did the field technician show you how to re-program the thermostat to meet your needs?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

PMV4. Did the field technician leave information behind that shows how to operate the programmable thermostat?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

PMV5. After the initial set-up and programming, did you keep those settings where your heat adjusts the temperature in your home during hours when you were away or asleep or did you change these settings?

1. Kept the initial settings throughout the heating season [\[SKIP TO PMV7\]](#)
2. Kept the strategy of reducing how often the heating turns on when you were away or asleep but changed the temperature settings or schedule
3. Changed the settings to maintain a constant temperature throughout the heating season
8. DON'T KNOW [\[SKIP TO PMV7\]](#)
9. REFUSED [\[SKIP TO PMV7\]](#)

PMV6. Which best describes when you changed the settings after installing the programmable thermostat? \

1. Immediately changed the settings after installation
2. A few days after installation
3. A week or two later
4. A month or more later
8. DON'T KNOW
9. REFUSED

PMV7. Is the programmable thermostat easy to operate and understand?

1. YES [\[SKIP TO PMV8\]](#)
2. NO
8. DON'T KNOW [\[SKIP TO PMV8\]](#)
9. REFUSED [\[SKIP TO PMV8\]](#)

PMV7A. What about the programmable thermostat is not easy to operate and understand?

1. [\[OPEN ENDED – RECORD RESPONSE\]](#)

8. DON'T KNOW

9. REFUSED

PMV8. Please describe how you expect to program your thermostat for your heating system in the winter. **[PROBE TO DETERMINE WHICH RESPONSE BELOW IS MOST ACCURATE, CHOOSE ONLY ONE]**

1. Lower temperature during the night and daytime work hours in winter

2. Lower temperature during daytime work hours in winter

3. Lower temperature for night in winter

4. Lower temperature for vacations only

97. OTHER (SPECIFY)

98. DON'T KNOW 99. REFUSED

PMV9. On a scale of 1 to 5, where 1 is very dissatisfied and 5 is very satisfied, how would you rate your satisfaction with your new programmable thermostat(s)? **(1=VERY DISSATISFIED; 5=VERY SATISFIED) [1 THROUGH 5, 11=DK, 12=REF]**

[IF PMV9 = 1 or 2, ASK PMV9a. ELSE SKIP TO LOGIC BEFORE WMVWH1]

PMV9a. Why did you rate it that way? **[MULTIPUNCH]**

1. DID NOT WORK FOR MY PERSONAL COMFORT

2. THERMOSTAT NOT WORKING LIKE I EXPECTED

3. DIFFICULT TO READ SETTINGS

4. DIFFICULT TO OPERATE

5. DIFFICULT TO OVER RIDE IF I AM UNCOMFORTABLE

6. OPEN END, RECORD VERBATIM

7. DON'T KNOW **[EXCLUSIVE]**

8. REFUSED **[EXCLUSIVE]**

WMVHW. HOT WATER PIPE WRAP VERIFICATION

IF HWWRAP=1, ASK WMVHW1. ELSE SKIP TO LOGIC BEFORE WMVB1

WMVHW1. Our records indicate that during the Single-Family Direct Install Program technician's visit to your home, your hot water pipes were wrapped for better insulation. Is this correct?

1. YES, CORRECT
2. NO, INCORRECT [\[SKIP TO LOGIC BEFORE WMVB1\]](#)
8. DON'T KNOW [\[SKIP TO LOGIC BEFORE WMVB1\]](#)
9. REFUSED [\[SKIP TO LOGIC BEFORE WMVB1\]](#)

WMVHW2. Is the pipe wrap still present on your hot water pipes?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WMVB. BOILER PIPE WRAP VERIFICATION

IF PWRAP=1, ASK WMVB1. ELSE SKIP TO NET-TO-GROSS MODULE

WMVB1. Our records indicate that during the Single-Family Direct Install Program technician's visit to your home, your boiler water pipes were wrapped for better insulation. By boiler, we mean your radiator heating system. Is this correct?

1. YES, CORRECT
2. NO, INCORRECT [\[SKIP TO NET-TO-GROSS MODULE\]](#)
8. DON'T KNOW [\[SKIP TO NET-TO-GROSS MODULE\]](#)
9. REFUSED [\[SKIP TO NET-TO-GROSS MODULE\]](#)

WMVB2. Is the boiler pipe wrap still present on your boiler water pipes?

1. YES
2. NO
8. DON'T KNOW

9. REFUSED

NET-TO-GROSS BATTERY OF QUESTIONS

[DO NOT READ TO PARTICIPANT] Approach: For this direct install program, the rank order of total program savings for the measures are (1) low flow shower heads, (2) boiler pipe wrap, (3) programmable thermostat, (4) hot water pipe wrap, (5) low flow bath aerators, and (6) low flow kitchen aerators. If the participant has received one measure, the net-to-gross (NTG) battery of questions will be asked for that one measure. If the participant has received two different measures, the NTG battery of questions will be asked for those two measures. If the participant has received three or more different measures, the top two ranking measures' NTG battery of questions will be asked.

WATER EFFICIENT SHOWERHEADS

[ASK IF SHOW=1]

WMV1. At the time that you first heard about this program, had you already been thinking about purchasing (a) Water Efficient Showerhead(s) for your home?

1. YES
2. NO **[SKIP TO SECOND MEASURE FOR NTG BATTERY OR IF NOT APPLICABLE SKIP TO PARTICIPANT SPILLOVER SECTION]**
8. DON'T KNOW
9. REFUSED

WMV2. Had you already began researching or collecting information about Water Efficient Showerhead(s) to aid in your purchase decision?

1. YES
2. NO **[SKIP TO WMV4]**
8. DON'T KNOW **[SKIP TO WMV4]**
9. REFUSED **[SKIP TO WMV4]**

WMV3. Had you already selected which Water Efficient Showerhead(s) you were planning to purchase?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WMV4. Just to be sure I understand, did you have any specific plans to purchase and install the same or a similar Water Efficient Showerhead(s) in your home before learning about the program?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WMV5. Why hadn't you installed the Water Efficient Showerhead(s) before learning about the program?
(OPEN ENDED RESPONSE)

1. **RECORD RESPONSE VERBATIM**
8. DON'T KNOW
9. REFUSED

WMV6. Did the program influence you to have the Water Efficient Showerhead(s) installed **earlier** than you otherwise would have?

1. YES
2. NO **[SKIP TO WMV8]**
8. DON'T KNOW **[SKIP TO WMV8]**
9. REFUSED **[SKIP TO WMV8]**

WMV7. How much later would you have installed the Water Efficient Showerhead(s) if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
5. NEVER

88. DON'T KNOW

99. REFUSED

WMV8. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same or similar Water Efficient Showerhead(s) in your home if you had not received it through the program? **[0-10, DK, REF]**

[IF WMV8 <3 AND WMV4 = No/DK/REF, SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION] [SHOW WMV10 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read a statement about the Water Efficient Showerhead(s) you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement.

WMV9 Omitted.

WMV10. There may have been several reasons for my installation of a Water Efficient Showerhead(s), but the program was a key factor in my decision to have the Water Efficient Showerhead(s) installed. **[0-10, DK, REF]**

[ASK WMVCC1 IF QUALIFY BASED ON TWO TERMS BELOW. ELSE SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION]

Consistency Check & Resolution

[WMVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., ONE OF THE QUESTIONS IS AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE THE OTHER QUESTION IS AT THE OTHER END OF THE SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WMVCC1 ARE:

- **WMV8 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **WMV10 (PROGRAM WAS A KEY FACTOR IN MY DECISION TO INSTALL ITEM)**

{IF WMV8= 8,9,10 AND WMV10= 8, 9, 10 , ASK WMVCC1. INCONSISTENCY1= 'you were likely to install the Water Efficient Showerhead(s) without the program but that differs from your response that the program was a key factor in your decision to have the Water Efficient Showerhead(s) installed'}

{IF WMV8= 0,1,2 AND WMV10= 0, 1, 2 , ASK WMVCC1. INCONSISTENCY1=' you were not likely to install the Water Efficient Showerhead(s) without the program but that differs from your response that that the program was not a key factor in your decision to have the Water Efficient Showerhead(s) installed }}

WMVCC1. Let me make sure I understand you. Earlier, you said **[INCONSISTENCY1]**. Please tell me in your own words what influence, if any, the program had on your decision to install the Water Efficient Showerhead(s) at the time you did? **[OPEN END, DK, REF]**

BOILER PIPE WRAP

[ASK IF PWRAP=1]

WHVB1. At the time that you first heard about this program, had you already been thinking about purchasing boiler pipe wrap for your home?

1. YES
2. NO **[SKIP TO SECOND MEASURE FOR NTG BATTERY OR IF NOT APPLICABLE SKIP TO PARTICIPANT SPILLOVER SECTION]**
8. DON'T KNOW
9. REFUSED

WHVB2. Had you already began researching or collecting information about boiler pipe wrap to aid in your purchase decision?

1. YES
2. NO **[SKIP TO WHVB4]**
8. DON'T KNOW **[SKIP TO WHVB4]**
9. REFUSED **[SKIP TO WHVB4]**

WHVB3. Had you already selected the boiler pipe wrap you were planning to purchase?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WHVB4. Just to be sure I understand, did you have any specific plans to purchase and install the same or a similar boiler pipe wrap in your home before learning about the program?

1. YES
2. NO
8. DON'T KNOW 9. REFUSED

WHVB5. Why hadn't you installed the boiler pipe wrap before learning about the program? **(Open-ended response)**

1. [RECORD VERBATIM]
8. DON'T KNOW
9. REFUSED

WHVB6. Did the program influence you to have the boiler pipe wrap installed **earlier** than you otherwise would have?

1. YES
2. NO **[SKIP TO WHVB8]**
8. DON'T KNOW **[SKIP TO WHVB8]**
9. REFUSED **[SKIP TO WHVB8]**

WMVB7. Since you had not installed the boiler pipe wrap yet even though you may have intended to, how much later would you have installed the boiler pipe wrap if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later

- 5. NEVER
- 98. DON'T KNOW
- 99. REFUSED

WHVB8. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same or similar boiler pipe wrap in your home if you had not received it through the program? **[0-10, DK, REF]**

[IF WHVB8 <3 AND WHVB4 = No/DK/REF, SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION] [SHOW WHVB10 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read a statement about the boiler pipe wrap you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement.

WHVB9 Omitted.

WHVB10. There may have been several reasons for my installation of boiler pipe wrap but the program was a key factor in my decision to have the boiler pipe wrap installed. **[0-10, DK, REF]**

[ASK WHVBCC1 IF QUALIFY BASED ON TWO TERMS BELOW. ELSE SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION]

Consistency Check & Resolution

[WHVBCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., IF ONE OF THE QUESTIONS IS AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE THE OTHER QUESTION IS AT THE OTHER END OF THE SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WMVCC1 ARE:

- **WHVB8 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **WHVB10 (PROGRAM WAS A KEY FACTOR IN MY DECISION TO INSTALL ITEM)**

{IF WHVB8= 8,9,10 AND WHVB10= 8, 9, 10 ASK WHVBCC1. INCONSISTENCY1= 'you were likely to install the boiler pipe wrap without the program but that differs from your response that the program was a key factor in your decision to install the boiler pipe wrap'}

{IF WHVB8= 0,1,2 AND WHVB10= 0,1,2, ASK WHVBCC1. INCONSISTENCY1=' you were not likely to install the boiler pipe wrap without the program but that differs from your response that the program was not a key factor in your decision to install the boiler pipe wrap'}}

WHVBCC1. Let me make sure I understand you. Earlier, you said **[INCONSISTENCY1]**. Please tell me in your own words what influence, if any, the program had on your decision to install the boiler pipe wrap at the time you did? **[OPEN END, DK, REF]**

PROGRAMMABLE THERMOSTATS

[ASK IF PTHER=1]

PMV1. At the time that you first heard about this program, had you already been thinking about purchasing (a) programmable thermostat(s) for your home?

1. YES
2. NO [SKIP TO SECOND MEASURE FOR NTG BATTERY OR IF NOT APPLICABLE SKIP TO PARTICIPANT SPILLOVER SECTION] TO PARTICIPANT SPILLOVER SECTION]
8. DON'T KNOW
9. REFUSED

PMV2. Had you already begun researching or collecting information about programmable thermostats to aid in your purchase decision?

1. YES
2. NO [SKIP TO PMV4]
8. DON'T KNOW [SKIP TO PMV4]
9. REFUSED [SKIP TO PMV4]

PMV3. Had you already selected which programmable thermostat(s) you were planning to purchase?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

PMV4. Just to be sure I understand, did you have any specific plans to purchase and install the same or a similar programmable thermostat in your home before learning about the program?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

PMV5. Why hadn't you purchased and installed the programmable thermostat before learning about the program? (Open-ended response)

1. [RECORD VERBATIM]
8. DON'T KNOW
9. REFUSED

PMV6. Did the program influence you to have the programmable thermostat installed **earlier** than you otherwise would have?

1. YES
2. NO [SKIP TO PMV8]
8. DON'T KNOW [SKIP TO PMV8]
9. REFUSED [SKIP TO PMV8]

PMV7. How much later would you have installed the thermostat, if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
5. NEVER
88. DON'T KNOW
99. REFUSED

PMV8. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same or a similar programmable thermostat in your home if you had not received it through the program? **[0-10, DK, REF]**

[IF PMV8 <3 AND PMV4 = No/DK/REF, SKIP TO PARTICIPANT SPILLOVER SECTION] [SHOW PMV10 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read a statement about the programmable thermostat you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement.

PMV9 Omitted.

PMV10. There may have been several reasons for my installation of a programmable thermostat, but the program was a key factor in my decision to have the programmable thermostat installed. **[0-10, DK, REF]**

[ASK PMVC1 IF QUALIFY BASED ON TWO TERMS BELOW. ELSE SKIP TO PARTICIPANT SPILLOVER SECTION]

Consistency Check & Resolution

[PMVC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., IF ONE OF THE QUESTIONS IS AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE THE OTHER QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER PMVCC1 ARE:

- **PMV8 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **PMV10 (PROGRAM WAS A KEY FACTOR IN MY DECISION TO INSTALL ITEM)**

{IF PMV8= 0,1,2 AND PMV10= 0,1,2, ASK PMVCC1. INCONSISTENCY1='you would likely not have installed the programmable thermostat without the program but that differs from when you said the program was not a key factor }

{IF PMV8= 8,9,10 AND PMV10= 8,9,10 ASK PMVCC1. INCONSISTENCY1= 'you would likely have installed the programmable thermostat without the program but that differs from your response that the program was a key factor}

PMVCC1. Let me make sure I understand you. Earlier, you said **[INCONSISTENCY1]**. Please tell me in your own words what influence, if any, the program had on your decision to install the programmable thermostat at the time you did? **[OPEN END, DK, REF]**

DOMESTIC HOT WATER PIPE WRAP

[ASK IF HWWRAP=1]

WHVHW1. At the time that you first heard about this program, had you already been thinking about purchasing hot water pipe wrap for your home?

1. YES
2. NO [SKIP TO SECOND MEASURE FOR NTG BATTERY OR IF NOT APPLICABLE SKIP TO PARTICIPANT SPILLOVER SECTION]
8. DON'T KNOW
9. REFUSED

WHVHW2. Had you already began researching or collecting information about hot water pipe wrap to aid in your purchase decision?

1. YES
2. NO [SKIP TO WHVHW4]
8. DON'T KNOW [SKIP TO WHVHW4]
9. REFUSED [SKIP TO WHVHW4]

WHVHW3. Had you already selected the hot water pipe wrap you were planning to purchase?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WHVHW4. Just to be sure I understand, did you have any specific plans to purchase and install the same or a similar hot water pipe wrap in your home before learning about the program?

1. YES
2. NO 8. DON'T KNOW
9. REFUSED

WHVHW5. Why hadn't you installed the hot water pipe wrap before learning about the program? (Open-ended response)

1. [RECORD RESPONSE VERBATIM]
8. DON'T KNOW
9. REFUSED

WHVHW6. Did the program influence you to have the hot water pipe wrap installed **earlier** than you otherwise would have?

1. YES
2. NO [SKIP TO WHVHW8]
8. DON'T KNOW [SKIP TO WHVHW8]
9. REFUSED [SKIP TO WHVHW8]

WHVHW7. How much later would you have installed the hot water pipe wrap if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
88. DON'T KNOW
99. REFUSED

WHVHW8. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same hot water pipe wrap in your home if you had not received it through the program? [0-10, DK, REF]

[IF WHVHW8 <3 AND WHVHW4 = No/DK/REF, SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION] [SHOW WHVHW10 AND WHVHW11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read a statement about the hot water pipe wrap you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement.

WHVHW9 Omitted.

WHVHW10. There may have been several reasons for my installation of hot water pipe wrap but the program was a key factor in my decision to have the boiler pipe wrap installed. [0-10, DK, REF]

[ASK WHVHWCC1 IF QUALIFY BASED ON TWO TERMS BELOW. ELSE SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION]

Consistency Check & Resolution

[WHVHWCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., IF ONE OF THE QUESTIONS IS AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE THE OTHER QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WHVHWCC1 ARE:

- WHVHW8 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)
- WHVHW10 (PROGRAM WAS A KEY FACTOR IN MY DECISION TO INSTALL ITEM)

{IF WHVHW8= 0,1,2 AND WHVHW10= 0,1,2. INCONSISTENCY1='you would likely not have installed the hot water pipe wrap without the program but that differs from when you said the program was not a key factor'}

{IF WHVHW8= 8,9,10 AND WHVHW10= 8,9,10, ASK WHVHWCC1. INCONSISTENCY1= 'you would likely have installed the hot water pipe wrap without the program but that differs from your response that the program was a key factor'}

WHVHWCC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY1]. Please tell me in your own words what influence, if any, the program had on your decision to install the hot water pipe wrap at the time you did? [OPEN END, DK, REF]

BATHROOM FAUCET AERATORS

[ASK IF BAERA=1]

WBV1. At the time that you first heard about this program, had you already been thinking about purchasing efficient bathroom faucet aerator (s) for your home?

1. YES
2. NO **[SKIP TO SECOND MEASURE FOR NTG BATTERY OR IF NOT APPLICABLE SKIP TO PARTICIPANT SPILLOVER SECTION]**
8. DON'T KNOW
9. REFUSED

WBV2. Had you already began researching or collecting information about bathroom faucet aerator (s) to aid in your purchase decision?

1. YES
2. NO **[SKIP TO WBV4]**
8. DON'T KNOW **[SKIP TO WBV4]**
9. (REFUSED) **[SKIP TO WBV4]**

WBV3. Had you already selected which bathroom faucet aerator (s) you were planning to purchase?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WBV4. Just to be sure I understand, did you have any specific plans to purchase and install the same or a similar bathroom faucet aerator (s) in your home before learning about the program?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WBV5. Why hadn't you installed the bathroom faucet aerator (s) before learning about the program? (Open-ended response)

1. **[RECORD VERBATIM]**
8. DON'T KNOW
9. REFUSED

WBV6. Did the program influence you to have the bathroom faucet aerator (s) installed **earlier** than you otherwise would have?

1. YES
2. NO **[SKIP TO WBV8]**
8. DON'T KNOW **[SKIP TO WBV8]**
9. REFUSED **[SKIP TO WBV8]**

WBV7. How much later would you have installed the bathroom faucet aerator (s) if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
5. NEVER

88. DON'T KNOW

99. REFUSED

WBV8. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same bathroom faucet aerator (s) in your home if you had not received it through the program? **[0-10, DK, REF]**

[IF WBV8 <3 AND WBV7 = No/DK/REF, SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION] [SHOW WBV10 AND WBV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read a statement about the bathroom faucet aerator (s) you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement?

WBV9 Omitted.

WBV10. There may have been several reasons for my installation of bathroom faucet aerator (s), but the program was a key factor in my decision to have the bathroom faucet aerator (s) installed. **[0-10, DK, REF]**

[ASK WBVCC1 IF QUALIFY BASED ON TWO TERMS BELOW. ELSE SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPILLOVER SECTION]

Consistency Check & Resolution

[WBVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., IF ONE OF THE QUESTIONS IS AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE THE OTHER QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WBVCC1 ARE:

- **WBV8 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)**
- **WBV10 (PROGRAM WAS A KEY FACTOR IN MY DECISION TO INSTALL ITEM)**

{IF WBV8= 0,1,2 AND WBV10= 0,1,2, ASK WBVCC1. INCONSISTENCY1='you would likely not have installed the bathroom faucet aerator (s) without the program but that differs from when you said the program was not a key factor'}

{IF WBV8= 8,9,10 AND WBV10= 8,9,10 ASK WBVCC1. INCONSISTENCY1= 'you would likely have installed the bathroom faucet aerator (s) without the program but that differs from your response that the program was a key factor'}

WBVCC1. Let me make sure I understand you. Earlier, you said **[INCONSISTENCY1]**. Please tell me in your own words what influence, if any, the program had on your decision to install the bathroom faucet aerator (s) at the time you did? **[OPEN END, DK, REF]**

KITCHEN FAUCET AERATORS

[ASK IF KAERA=1]

WKV1. At the time that you first heard about this program, had you already been thinking about purchasing efficient kitchen faucet aerators for your home?

1. YES
2. NO **[SKIP TO PARTICIPANT SPILLOVER SECTION]**
8. DON'T KNOW
9. REFUSED

WKV2. Had you already began researching or collecting information about kitchen faucet aerators to aid in your purchase decision?

1. YES
2. NO [SKIP TO WKV4]
8. DON'T KNOW [SKIP TO WKV4]
9. REFUSED [SKIP TO WKV4]

WKV3. Had you already selected which kitchen faucet aerator you were planning to purchase?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WKV4. Just to be sure I understand, did you have any specific plans to purchase and install the same or a similar kitchen faucet aerator in your home before learning about the program?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

WKV5. Why hadn't you installed the kitchen faucet aerator before learning about the program? **(Open-ended response)**

1. [RECORD VERBATIM]
8. DON'T KNOW
9. REFUSED

WKV6. Did the program influence you to have the kitchen faucet aerator installed **earlier** than you otherwise would have?

1. YES
2. NO [SKIP TO WBK8]
8. DON'T KNOW [SKIP TO WKV8]
9. REFUSED [SKIP TO WKV8]

WKV7. How much later would you have installed the kitchen faucet aerator if you hadn't participated in the program?

1. Within six months
2. More than six months, but less than a year later
3. More than a year, but less than two years later
4. More than two years later
5. NEVER
88. DON'T KNOW
99. REFUSED

WKV8. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the same kitchen faucet aerator in your home if you had not received it through the program? [0-10, DK, REF]

[IF WKV8 <3 AND WKV7 = No/DK/REF, SKIP TO SECOND MEASURE (IF APPLICABLE) ELSE SKIP TO PARTICIPANT SPOILOVER SECTION] [SHOW WKV10 AND WKV11 ON SAME SCREEN WITH THE BELOW TEXT]

I'm going to read a statement about the kitchen faucet aerator you received. On a scale of 0 to 10, where 0 is strongly disagree and 10 is strongly agree, how much do you agree with this statement?

WKV9 Omitted.

WKV10. There may have been several reasons for my installation of a kitchen faucet aerator, but the program was a key factor in my decision to have the kitchen faucet aerator installed. [0-10, DK, REF]

[ASK WKVCC1 IF QUALIFY BASED ON TWO TERMS BELOW. ELSE SKIP TO PARTICIPANT SPILLOVER SECTION]

Consistency Check & Resolution

[WKVCC1 WILL BE ASKED ONLY FOR THOSE RESPONDENTS WHO HAVE A CLEAR INCONSISTENCY BETWEEN RESPONSES (I.E., IF ONE OF THE QUESTIONS IS AT ONE END OF THE SPECTRUM FOR FREE RIDERSHIP WHILE THE OTHER QUESTION IS AT THE OTHER SPECTRUM.) THE QUESTION RESPONSES THAT WILL BE USED TO TRIGGER WKVCC1 ARE:

- WKV8 (HOW LIKELY IS IT THAT YOU WOULD HAVE INSTALLED THE SAME ITEM)
- WKV10 (PROGRAM WAS A KEY FACTOR IN MY DECISION TO INSTALL ITEM)

{IF WKV8= 0,1,2 AND WKV10= 0,1,2, ASK WKVCC1. INCONSISTENCY1='you would likely not have installed the kitchen faucet aerator without the program but that differs from when you said the program was not a key factor'}

{IF WKV8= 8,9,10 AND WKV10= 8,9,10 , ASK WKVCC1. INCONSISTENCY1= 'you would likely have installed the kitchen faucet aerator without the program but that differs from your response that the program was a key factor'}

WKVCC1. Let me make sure I understand you. Earlier, you said [INCONSISTENCY1]. Please tell me in your own words what influence, if any, the program had on your decision to install the kitchen faucet aerator at the time you did? [OPEN END, DK, REF]

PARTICIPANT SPILLOVER

SPILLOVER ESTIMATION QUESTIONS

SO1. Did the Single Family Direct Install program representative educate you on your overall energy use and how that impacts your energy costs?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

[ASK IF SO1=1] SO1A. What did you learn from the program representative about your energy use and how that impacts your energy costs?

[OPEN-ENDED - RECORD VERBATIM]

8. DON'T KNOW
9. REFUSED

SO2. Did you change any of your energy use behaviors to try and save more energy?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

[IF SO2=1] SO2A What energy use behaviors did you change to try and save more money? **[OPEN-ENDED - RECORD VERBATIM]**

8. DON'T KNOW
9. REFUSED

SO3. Did you discuss energy saving behaviors with other family members?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

[IF SO3=1] SO3A.

What did you discuss and what behaviors, if any, are they changing? **[OPEN-ENDED - RECORD VERBATIM]**

SO4. Did the Single-Family Direct Install program representative inform you about other programs such as rebates for high efficiency heating equipment or high efficiency water heating equipment that you have access to?

1. YES
2. NO
8. DON'T KNOW
9. REFUSED

SO5. Have you purchased and installed any additional energy efficient equipment since participating in the program?

1. Yes
2. No **(SKIP TO CSINT)**
98. DON'T KNOW **(SKIP TO CSINT)**

99. REFUSED (SKIP TO CSINT)

SO6. What additional energy efficient equipment have you installed after participating in the program? [READ LIST. SELECT ALL THAT APPLY.] [PROGRAMMING NOTE:

- 1 HVAC UPGRADE (1st Mention Specify)
- 2 HVAC UPGRADE (All other mentions Specify)
- 3 NON-WINDOW UPGRADES TO SHELL (E.G. AIR SEALING & INSULATION) (1ST Mention Specify)
- 4 NON-WINDOW UPGRADES TO SHELL (All other mentions Specify)
- 5 APPLIANCES, LIGHTING, WINDOWS (1ST Mention Specify)
- 6 APPLIANCES, LIGHTING, WINDOWS (All other mentions Specify)

<MEASURE FROM SO6> PIPES IN (1st Mention Specify) from SO6 = 1, 3 or 5 in SUBSEQUENT QUESTIONS (e.g. SO7-SO13). ONLY ONE RESPONSE WILL BE PIPED IN. THE PRIORITY FOR THE PIPED IN MEASURE IS CODE 1 THEN 3 THEN 5.

ON THE LEFT HAND OF THE SCREEN OF SO6, FOR THE INTERVIEWER'S REFERENCE, PLEASE SHOW THESE THREE LISTS:

POSSIBLE MEASURES THAT FALL UNDER HVAC

Central Air conditioning

HVAC Tune Up (Central Air Conditioning or Air Source Heat Pump)

Heat pumps

Furnaces and boilers

Hot water heaters

POSSIBLE MEASURES THAT FALL UNDER AIR SEALING OR INSULATION

Air Sealing

Basement Sidewall Insulation

Floor Insulation Above Crawlspace

Wall and Ceiling/Attic Insulation

POSSIBLE MEASURES THAT FALL UNDER APPLIANCES, LIGHTING, WINDOWS

ENERGY STAR AIR PURIFIER/CLEANER

ENERGY STAR DEHUMIDIFIER

CFLS (ASSUMPTION IS 5)

ENERGY STAR Refrigerator

SMART STRIP

ENERGY STAR Freezer

ENERGY STAR and Non ENERGY STAR CLOTHES DRYER

ENERGY STAR Dishwasher

ENERGY STAR Room Air Conditioner

[READ FROM LIST IF NEEDED] For example: gaskets behind outlets and switches? Air sealing and additional insulation? A new, more efficient water heater? A new, more efficient heating system? A new, more efficient air conditioning system? Energy efficient lighting? Pulling shades during hot summer days to keep the rooms cooler? A new, more efficient washer? A new, more efficient dryer? A new, more efficient dishwasher?

98. DON'T KNOW (SKIP TO CSINT)

99. REFUSED (SKIP TO CSINT)

SO7. How many/much additional <MEASURE from SO6> have you installed?

OPEN ENDED – RECORD VERBATIM

98. Don't know (SKIP TO SO12)

99. Refused (SKIP TO SO12)

SO8. Was the <MEASURE from SO6> that you purchased and installed eligible for a residential rebate?

1. YES

2. NO

98. DON'T KNOW (SKIP TO S012)

99. REFUSED (SKIP TO SO12)

SO9. Did you receive a utility rebate for these additional <MEASURE from SO6> that you installed?

1. YES

2. NO (SKIP TO SO11)

98. DON'T KNOW (SKIP TO SO12)

99. REFUSED (SKIP TO SO12)

SO10. When you participated in the residential rebate program, did you experience any of these difficulties when you purchased and installed <MEASURE from SO6>? (CHECK ALL THAT APPLY AND RECORD VERBATIM IF NEEDED)

1. The paperwork was burdensome (SKIP TO SO12)

2. The program was complicated (SKIP TO SO12)

3. Cost of equipment was high (SKIP TO SO12)

4. I didn't have enough information about the rebate program (SKIP TO SO12)

5. The incentive wasn't high enough (SKIP TO SO12)

97. Other (RECORD VERBATIM) (SKIP TO SO12)

98. DON'T KNOW (SKIP TO SO12)

99. REFUSED (SKIP TO SO12)

SO11. Were any of these the reason or reasons you decided not to participate in the residential rebate program and receive a rebate when you purchased and installed <MEASURE from SO6>? (CHECK ALL THAT APPLY AND RECORD VERBATIM IF NEEDED)

1. The paperwork was too burdensome

2. The program was too complicated

3. Cost of equipment was too high

4. I didn't have enough information about the rebate program

5. The incentive wasn't high enough

97. Other (SPECIFY)

98. DON'T KNOW

99. REFUSED

SO12. How influential was the program in encouraging you to install the additional **[MEASURE from SO6]**? Please rate this on a 0-10 scale, where 0 means not at all influential and 10 means very influential.

[NUMERIC OPEN END from 0 to 10]

98. DON'T KNOW **(SKIP TO CSINT)**

99. REFUSED **(SKIP TO CSINT)**

SO13. You gave the program a score of **<NUMERIC FROM SO12>**. Can you please explain how the program influenced your decision to install the additional **[MEASURE from SO6]**?

[OPEN-ENDED - RECORD VERBATIM]

98. DON'T KNOW

99. REFUSED

OVERALL CUSTOMER SATISFACTION

CSINT. I'll now ask you to rate your experience with the on-site visit and the program in general on a scale from 0 to 10, where 10 is a high rating and 0 is a low rating. For example, if I ask about your level of satisfaction, 0 would mean "very dissatisfied" and 10 would mean "very satisfied." If you are unsure about the meaning of the scale for any of the questions, just let me know.

CS1 – CS8a. **[OMITTED]**

CS9. On a scale of 0 to 10, how would you rate your overall satisfaction with... (PROMPT IF NECESSARY: Remember 0 means "very dissatisfied" and 10 means "very satisfied") **[SHOW ON SEPARATE PAGES RANDOMIZED WITH QUESTION TEXT AND PROMPT ON EACH PAGE][SCALE 0-10, DK, REF] [RANDOMIZE]**

- a. ...the direct install equipment
- b. ...the summary report about the direct install activities in your home
- c. ...the field team that installed the direct install equipment in your home
- d. ...the Single-Family Direct Install Program
- e.Your utility - Peoples Gas OR North Shore Gas **[IF CS9a-e<3, ASK CS10a-e DIRECTLY AFTER IT IS RATED LOW]**

CS10a-e. Why did you rate it that way?

00. OPEN END

98. DON'T KNOW

CS11. Did you experience any problems with the technicians that visited your home?

- 1. YES, EXPERIENCED A PROBLEM WITH THE TECHNICIANS
- 2. DID NOT EXPERIENCE ANY PROBLEMS WITH THE TECHNICIANS [\[SKIP TO CS15\]](#)
- 8. DON'T KNOW [\[SKIP TO CS15\]](#)
- 9. REFUSED [\[SKIP TO CS15\]](#)

CS12. Did you report the problem?

- 1. YES
- 2. NO [\[SKIP TO CS15\]](#)
- 8. DON'T KNOW [\[SKIP TO CS15\]](#)
- 9. REFUSED [\[SKIP TO CS15\]](#)

CS13. To whom did you report the problem? [\[MULTIPUNCH\]](#)

- 2. CALLED PHONE NUMBER ON PROGRAM INFORMATION
- 3. ON-SITE TECHNICIAN FROM THE PROGRAM
- 97. OTHER (SPECIFY)
- 98. DON'T KNOW
- 99. REFUSED

CS14. Was the issue resolved to your satisfaction?

- 1. YES
- 2. NO
- 8. DON'T KNOW
- 9. REFUSED

CS15. Did you experience any problems with the equipment installed?

- 1. YES, EXPERIENCED A PROBLEM WITH THE EQUIPMENT INSTALLED
- 2. DID NOT EXPERIENCE ANY PROBLEMS WITH THE EQUIPMENT INSTALLED
- 8. DON'T KNOW [\[SKIP TO CS19\]](#)
- 9. REFUSED [\[SKIP TO CS19\]](#)

CS16. Did you report the problem?

- 1. YES
- 2. NO [\[SKIP TO CS19\]](#)
- 8. DON'T KNOW [\[SKIP TO CS19\]](#)
- 9. REFUSED [\[SKIP TO CS19\]](#)

CS17. To whom did you report the problem? [\[MULTIPUNCH\]](#)

- 1. CALLED PHONE NUMBER ON PROGRAM INFORMATION
- 2. ON-SITE TECHNICIAN FROM THE PROGRAM
- 97. OTHER, SPECIFY
- 98. DON'T KNOW
- 99. REFUSED

CS18. Was the issue resolved to your satisfaction?

- 1. YES
- 2. NO
- 8. DON'T KNOW
- 9. REFUSED

CS19. Did you complete and mail the customer survey that the technician left with you?

- 1. YES [\[SKIP TO CS20\]](#)
- 2. NO
- 8. DON'T KNOW [\[SKIP TO CS20\]](#)
- 9. REFUSED [\[SKIP TO CS20\]](#)

CS19a. Why not? [\[MULTIPUNCH\]](#)

- 1. TAKES TOO MUCH TIME
- 2. CAN'T FIND IT
- 97. OTHER (SPECIFY)

98. DON'T KNOW

99. REFUSED

CS20. On a scale from 0-10, with 0 being not at all valuable, and 10 being very valuable, how valuable has the Single-Family Direct Install Program been in ...? [GRID] [RANDOMIZE] [SCALE 0-10, DK, REF]

- a. Increasing property values?
- b. Decreasing home utility expenses?
- c. Decreasing maintenance expenses?
- d. Increasing your home's comfort?

CS21. Has the Single-Family Direct Install Program been valuable in any other way in your home?

0. YES [SPECIFY]

1. NO

88. DON'T KNOW

99. REFUSED

CS22. What additional equipment, if any, would you like to see included in the Single-Family Direct Install Program?

- 1. LED lighting
- 2. CFL lighting
- 3. Air sealing and insulation
- 4. HVAC UPGRADES
- 97. OTHER, SPECIFY
- 6. NO ADDITIONAL EQUIPMENT
- 88. DON'T KNOW
- 99. REFUSED

CS23. What barriers, if any, are there to referring other people to the Single-Family Direct Install Program?
[Select all that apply] [RANDOMIZE 1-4] [MULTIPUNCH]

- 1. I don't know any other people who would benefit
- 2. I don't have time to refer the program to my friends and neighbors
- 3. There is no incentive for me to refer the program
- 4. I'm not convinced that the program saves me money
- 97. OTHER (SPECIFY)
- 8. DON'T KNOW
- 7. REFUSED

CS24. We like to share good stories about the success of the program with others. Do you have any specific stories that you wish to share with us?

- 1. YES (SPECIFY)
- 2. NO
- 8. DON'T KNOW
- 9. REFUSED

Demographics

I have just a few questions left for background purposes.

D1. Including yourself, how many people lived in your home during the past 12 months?

[RECORD NUMBER, DK, REF]

D2. Do you own or rent your home?

1. OWN

2. RENT

97. OTHER (SPECIFY)

8. DON'T KNOW

9. REFUSED

D3. How would you describe your home?

1. Single family detached home

2. Duplex

3. Townhome

4. Condo

5. Two-flat

97. OTHER (SPECIFY)

8. DON'T KNOW

9. REFUSED

D4. Do you have anything else that you would like to add? [OPEN-END]

END. [CLOSING COMMENTS.] Those are all the questions I have. On behalf of the Single-Family Direct Install Program, thank you very much for your time.

