

Residential Prescriptive Rebate Program GPY2 Evaluation Report

Final

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

**Presented to
Peoples Gas and North Shore Gas**

February 10, 2014

Prepared by:

Katherine Wolf
Navigant Consulting, Inc.

Crystal Berry
Navigant Consulting, Inc.



www.navigant.com



Submitted to:

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

Submitted by:

Navigant Consulting, Inc.
30 S. Wacker Drive, Suite 3100
Chicago, IL 60606
Phone 312.583.5700
Fax 312.583.5701

Contact:

Randy Gunn, Managing Director
312.938.4242
Randy.Gunn@Navigant.Com

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

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

Disclaimer: This report was prepared by Navigant Consulting, Inc. ("Navigant") for Peoples Gas and North Shore Gas based upon information provided by Peoples Gas and North Shore Gas and from other sources. Use of this report by any other party for whatever purpose should not, and does not, absolve such party from using due diligence in verifying the report's contents. Neither Navigant nor any of its subsidiaries or affiliates assumes any liability or duty of care to such parties, and hereby disclaims any such liability.

Table of Contents

E.	Executive Summary	1
E.1.	Program Savings	1
E.2.	Program Savings	2
E.3.	Impact Estimate Parameters	3
E.4.	Impact Estimate Parameters For Future Use	4
E.4.	Participation Information	4
E.5.	Conclusions and Recommendations	5
1.	Introduction	7
1.1	Program Description	7
1.2	Evaluation Objectives	7
1.2.1	Impact Questions	7
1.2.2	Process Questions	7
2.	Evaluation Approach	8
2.1	Primary Data Collection	8
2.1.1	Overview of Data Collection Activities	8
2.1.2	Verified Savings Parameters	8
2.1.3	Verified Gross Program Savings Analysis Approach	10
2.1.4	Verified Net Program Savings Analysis Approach	10
2.1.5	Process Evaluation	11
3.	Gross Impact Evaluation	12
3.1	Tracking System Review	12
3.2	Gross Program Impact Parameter Estimates	12
3.3	Program Volumetric Findings	14
3.4	Development of the Verified Gross Realization Rate	16
3.5	Verified Gross Program Impact Results	18
4.	Net Impact Evaluation	21
5.	Process Evaluation	23
6.	Conclusions and Recommendations	25
7.	Appendix	27
7.1	Glossary	27
7.2	Detailed Impact Research Findings and Approaches	31
7.2.1	Gross Impact Results	31
7.2.2	Net Program Impact Results	34
7.3	Detailed Process Results	36
7.3.1	Non-Participating Trade Ally Survey Results	36
7.4	Data Collection Instruments	39

List of Figures and Tables

Figures

Figure 5-1. Reason for Not Submitting Qualified Furnaces for a Rebate.....	23
Figure 5-2. Effect of Trade Ally Incentives (n = 58).....	24
Figure 7-1. Method by Which Contractor First Became Aware of RPR Program (n = 58).....	36
Figure 7-2. Non-Participating Trade Ally Program Knowledge (n = 59).....	37
Figure 7-3. Perceived Level of Customer Home EER Knowledge (n = 57).....	38

Tables

Table E-1. GPY2 Total Program Natural Gas Savings.....	1
Table E-2. GPY2 Program Results.....	2
Table E-3. Peoples Gas GPY2 Program Results by Measure.....	2
Table E-4. North Shore Gas GPY2 Program Results by Measure.....	3
Table E-5. Impact Estimate Parameters.....	4
Table E-6. Impact Estimate Parameters for Future Use.....	4
Table E-7. GPY2 Primary Participation Detail.....	5
Table 2-1. Core Data Collection Activities.....	8
Table 2-2. Ex Ante and Verified Gross Savings Parameter Estimates.....	9
Table 3-1. Boiler Pipe Insulation Input Values to 3E Plus and Energy Savings Output Value.....	13
Table 3-2. Verified Gross Savings Parameters.....	14
Table 3-3. Peoples Gas Ex Ante and Verified Measure Count.....	15
Table 3-4. North Shore Gas Ex Ante and Verified Measure Count.....	16
Table 3-5. GPY2 Volumetric Findings Detail.....	16
Table 3-6. GPY2 Peoples Gas Ex Ante and Verified Gross Savings.....	17
Table 3-7. GPY2 North Shore Gas Ex-Ante and Verified Gross Savings.....	18
Table 3-8. Peoples Gas GPY2 Verified Gross Impact Savings Estimates by End-Up.....	19
Table 3-9. North Shore Gas GPY2 Verified Gross Impact Savings Estimates by End-Use.....	20
Table 4-1. Non-Participating Trade Ally Spillover for Boilers and Furnaces.....	21
Table 7-1. Non-Participant Trade Ally Spillover Savings.....	35
Table 7-2. Non-Participant Trade Ally Spillover.....	36

E. Executive Summary

This report presents a summary of the findings and results from the Impact and Process Evaluation of the GPY2¹ Residential Prescriptive Rebate Program (RPR). Under the RPR program cash incentives were offered to encourage Peoples Gas and North Shore Gas customers to purchase higher-efficiency water and space-heating equipment, and air-conditioning systems for ComEd customers through the complete system replacement (CSR) portion of the program. The RPR Program name has transitioned to the Home Energy Rebate Program (HER program) and has added rebates for several new measures, including attic and pipe insulation, programmable thermostats, and storage and tankless water heaters.

E.1. Program Savings

Table E-1 summarizes the natural gas savings from the RPR 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	931,200	322,873
Ex Ante Net to Gross Ratio †	0.72	0.67
Ex Ante Net Savings	670,464	216,325
Verified Gross Savings ‡	938,434	330,612
Research Findings Net to Gross Ratio ‡	0.82	0.80
Research Findings Net Savings	769,516	264,489

Source: Utility tracking data and Navigant analysis.

† Results based on deemed values. Source: Illinois Energy Efficiency Stakeholder Advisory Group web site, <http://ilsag.info/net-to-gross-framework-1.html>, Net-to-Gross Framework Peoples Gas and North Shore Gas - Consensus Document, NTG_PGL-NSG_GPY1-GPY3_and_Phase_II_Plan_07_15_13.xlsx.

‡ Based on evaluation research findings.

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

E.2. Program Savings

The following two tables summarize the program savings by utility and by measure.

Table E-2. GPY2 Program Results

Savings Category	Peoples Gas	North Shore Gas
Ex Ante Gross Savings ² (Therms)	931,200	322,873
Verified Gross Realization Rate	1.01	1.02
Verified Gross Savings (Therms)	938,434‡	330,612 ‡
Net to gross ratio (NTG)	0.82 ‡	0.80 ‡
Research Findings Net Savings (Therms)	769,516	264,489

Source: Utility tracking data and Navigant analysis.

‡ Based on evaluation research findings.

Table E-3. Peoples Gas GPY2 Program Results by Measure

Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)
Storage Water Heaters	3,596	1.00	3,596 ‡
Attic Insulation	247,621	1.00	247,621 ‡
Boiler Reset Controls	780	1.00	780 ‡
High Efficiency Boilers	18,582	0.99	18,463 ‡
High Efficiency Furnaces	595,536	1.00	595,536 ‡
Indirect Water Heaters	951	0.78	742 ‡
DHW Pipe Insulation	3,284	0.20	657 ‡
Boiler Pipe Insulation	28,159	0.92	26,027 ‡
Programmable Thermostats	17,745	1.69	30,067 ‡
Tankless Water Heaters	14,946	1.00	14,946 ‡
TOTAL	931,200	1.01	938,434

Source: Utility tracking data and Navigant analysis.

‡ Based on evaluation research findings.

² Navigant analysis of Bensight tracking system data

Table E-4. North Shore Gas GPY2 Program Results by Measure

Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)
Storage Water Heaters	1,358	1.00	1,358 ‡
Attic Insulation	27,126	1.00	27,126 ‡
Boiler Reset Controls	195	1.00	195 ‡
High Efficiency Boilers	6,831	1.00	6,831 ‡
High Efficiency Furnaces	267,296	1.00	267,296 ‡
Indirect Water Heaters	211	0.78	165 ‡
DHW Pipe Insulation	1,931	0.10	186 ‡
Boiler Pipe Insulation	1,063	0.92	983 ‡
Programmable Thermostats	13,619	1.71	23,230 ‡
Tankless Water Heaters	3,243	1.00	3,243 ‡
TOTAL	322,873	1.02	330,612

Source: Utility tracking data and Navigant analysis.

‡ Based on evaluation research findings.

E.3. Impact Estimate Parameters

In the course of estimating verified gross and research findings 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 net savings analysis are shown in Table E-5. The evaluation used gross savings parameters as defined by the Illinois Technical Reference Manual (IL TRM)³ or evaluation research, as described in Table 2-2.

³ 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.

Table E-5. Impact Estimate Parameters

Parameter	Data Source	Deemed or Evaluated?
GPY2 Ex Ante NTGR	GPY1 Evaluation Research Findings NTGR, Illinois Stakeholder Advisory Group Process†	Deemed
GPY2 Participant Free-ridership and Spillover	GPY1 Evaluation Research	Deemed
GPY2 Non-Participant Spillover	GPY2 Evaluation Research	Evaluated
GPY2 Research Findings NTGR	GPY1 and GPY2 Evaluation Research	Evaluated
GPY2 Realization Rate (RR)	Evaluation Research	Evaluated

† Results based on deemed values. Source: Illinois Energy Efficiency Stakeholder Advisory Group web site, <http://ilsag.info/net-to-gross-framework-1.html>, Net-to-Gross Framework Peoples Gas and North Shore Gas - Consensus Document, NTG_PGL-NSG_GPY1-GPY3_and_Phase_II_Plan_07_15_13.xlsx.

E.4. Impact Estimate Parameters For Future Use

In the course of our GPY2 research, the evaluation team did research on parameters used in impact calculations including those in the Illinois TRM. Some of those parameters are eligible for deeming for future program years or for inclusion in future versions of the TRM. The evaluation team's parameters recommended for future use are shown in the following table.

Table E-6. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source
Non-Participant Trade Ally Spillover for Furnaces and Boilers	0.15	Evaluation research

Source: Evaluation research.

E.4. Participation Information

The Peoples Gas RPR program had 5,099 participants in GPY2 and distributed 14 measure types across 5,961 projects. The North Shore Gas RPR program had 1,774 participants in GPY2 and distributed 13 measure types across 2,231 projects as shown in the table below.

Table E-7. GPY2 Primary Participation Detail

Participation	Peoples Gas	North Shore Gas
Participants	5,099	1,774
Total Measure Types	14	13
Number of Projects	5,961	2,231

Source: Utility tracking data and Navigant analysis.

E.5. Conclusions and Recommendations

Program Savings Goals Attainment

Finding 1. The PGL RPR Program achieved research findings net savings of 769,516 therms, which is 94 percent of the GPY2 goal of 820,000 net therms. The NSG RPR Program achieved research findings net savings of 264,489 therms, which is 78 percent of the GPY2 goal of 340,000 net therms.

Recommendation 1. To expand participation in GPY3, the implementation contractor should consider the process findings from evaluation research conducted in GPY2 on dropout and non-participating trade allies.

Gross Realization Rates

Finding 2. The lowest realization rates for the RPR Program were for domestic hot water (DHW) pipe insulation where Navigant capped the savings at 3 feet of cold pipe and 6 feet of hot pipe, as specified by the Illinois TRM, because the location of the first elbow was unknown.

Recommendation. Navigant recommends that the Implementation Contractor (IC) either record the location of the first pipe elbow in Bensight or cap the DHW pipe insulation rebate and savings at 6 feet hot water pipe to comply with the Illinois TRM.

Net-to-Gross Rate

Finding 3. The NTGR for Peoples Gas is calculated at 0.82, and for North Shore Gas is calculated at 0.80, based on GPY2 evaluation research to estimate spillover from non-participating trade allies. Evaluation did not research free-ridership in GPY2.

Recommendation. Navigant recommends that the NTGR for GPY2 be calculated using participant free-ridership and spillover based on GPY1 evaluation research, and non-participant spillover based on GPY2 evaluation research. The Illinois Stakeholder Advisory Group may review the GPY2 NTGR updated with spillover research for retrospective application in GPY2 and deeming in GPY3.

Savings Estimates.

Finding 4. The boiler pipe insulation measure savings estimates were lowered slightly by Navigant because the hours of use assumption was adjusted. This was done to account for the typical boiler that does not operate during the cooling season.

Recommendation. Navigant recommends that the hours of use assumption be adjusted to account for a boiler not operating during the cooling season.

Finding 5. The energy savings estimate for indirect water heaters was adjusted by Navigant to include the boiler efficiency.

Recommendation. Navigant recommends adopting the energy savings estimation approach detailed in the Appendix for indirect water heaters.

Trade Ally and Other Participation.

Finding 6. Forty percent of “drop-out” trade allies (those who participated in GPY1, but were not identified on any GPY2 applications) reported that the program had influenced them to sell program qualified boilers and furnaces since they last participated, without applying for rebates. This resulted in a non-participating spillover rate of 15% on those measures. When asked why they did not submit these measures to the program, the most commonly cited reason was that the trade allies were relying on their customers to apply for the program. The program tracking records indicated that customers did not submit applications identifying the drop out trade allies.

Recommendation. Navigant recommends that efforts be taken to reach out to trade allies who “drop out” of the program from year-to-year, to ensure they have the necessary training and information about the program to assist their customers in the rebate process.

Finding 7. When the trade allies were asked how changing the incentive structure (from the customer receiving the rebate to the trade ally receiving the rebate) would affect their behavior, a large majority of the non-participating trade allies (62%) stated it would make them more likely to participate. Additionally, half of the trade allies responded that they would lower the price of the high efficiency furnaces for all customers by the full amount of the incentive. An additional forty percent stated that they would use the incentive as a sales tool, decreasing the cost of high efficiency furnaces only as necessary to sell more units.

Recommendation. The non-participating trade ally reaction to the possibility of changing the incentive structure was positive and could increase participation. However, there is the possibility the utilities will lose some of the “goodwill” that comes from providing rebates to customers, since the customers are likely to be less aware that high-efficiency units are being incented by the utility.

1. Introduction

1.1 Program Description

Under the Residential Prescriptive Rebate (RPR) program, cash incentives and education were offered to encourage upgrading of water- and space-heating equipment among residential customers of Peoples Gas and North Shore Gas, and air conditioning systems for ComEd customers through the complete system replacement (CSR) portion of the program. The RPR program was designed to conserve natural gas and electricity, and lower participants' monthly energy bills. Both rental and owner-occupied dwellings are eligible for rebates for furnaces, boilers, water heaters, and air conditioning systems. Customers must be active residential customers of Peoples Gas or North Shore Gas in order to receive rebates for gas saving measures, or Peoples Gas or North Shore Gas, and ComEd to receive rebates for high efficiency furnaces and air conditioning systems under the CSR portion of the program. The premises must be used for residential purposes in existing buildings.

The RPR program promises customers a quick turn-around rebate to invest in long-term savings through better technology. Rebates are offered for the installation of high-efficiency furnaces, boilers and controls, attic insulation, programmable thermostats, pipe insulation, water heaters, and air conditioning systems. The dollar amount of the rebate depends on the size and efficiency of the replacement measures. The GPY2 RPR program ran from June 1, 2012 through May 31, 2013. The RPR Program name has transitioned to the Home Energy Rebate Program going forward through GPY3.

1.2 Evaluation Objectives

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

1.2.1 Impact Questions

1. What is the rate of non-participating and "drop-out" trade ally spillover?
2. What are the program's net and gross savings?
3. Are the TRM algorithms applied appropriately and the tracking system calculating savings correctly?

1.2.2 Process Questions

1. What are the reasons that trade allies may have participated in GPY1 but not chosen to continue participating in GPY2, and how can PGL and NSG increase trade ally retention?

2. Evaluation Approach

Navigant conducted a verified gross impact evaluation in GPY2 through an engineering review of per unit savings parameters and the program tracking system and data. Navigant interviewed utility program staff, consultants, and implementation contractors to verify information about the program and review the tracking system. The NTG ratio was determined using evaluation research on free-ridership, participant spillover, and participating trade ally spillover from GPY1⁴. For GPY2, a non-participating trade ally spillover rate was calculated and included in the program NTG calculation. Navigant applied the GPY2 NTGR to obtain the research findings net savings.

2.1 Primary Data Collection

2.1.1 Overview of Data Collection Activities

The core data collection activity was reviewing the programs' tracking system to verify that all fields are appropriately populated, as shown in Table 2-1.

Table 2-1. Core Data Collection Activities

N	What	Who	Target Completes	Completes Achieved	When	Comments
<i>Impact Assessment</i>						
1	Measure Savings Review	Program Tracking System	Census	Census	July – September 2013	Source of information for verified gross analysis
2	Engineering Analysis	Participants	Census	Census	May – September 2013	
3	Telephone Survey	Non-Participating Trade Allies	50-70	59	September-October 2013	Data collection supporting SO analysis
<i>Process Assessment</i>						
3	Telephone Survey	Non-Participating Trade Allies	50-70	59	September-October 2013	Data collection supporting process analysis

Source: Navigant Evaluation Team

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

⁴ Available at:

http://ilsagfiles.org/SAG_files/Evaluation_Documents/Peoples%20Gas%20and%20North%20Shore%20Gas/PG-NSG%20GPY1%20Evaluation%20Reports/PG%20and%20NSG%20GPY1%20Res%20Prescriptive,%20Complete%20System%20Replacement%20Programs%20Eval%20Report.pdf

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 measures not included in the Illinois TRM, Navigant reviewed ex-ante values and engineering assumptions provided by the implementation contractor, including boiler pipe insulation measures.

Table 2-2. Ex Ante and Verified Gross Savings Parameter Estimates

Parameter	Data Source	Deemed or Evaluated?
GPY2 Ex Ante NTGR	GPY1 Evaluation Research Findings NTGR, Illinois Stakeholder Advisory Group Process†	Deemed
GPY2 Participant Free-ridership and Spillover	GPY1 Evaluation Research	Deemed
GPY2 Non-Participant Spillover	GPY2 Evaluation Research	Evaluated
GPY2 Research Findings NTGR	GPY1 and GPY2 Evaluation Research	Evaluated
Verified Gross Realization Rate	Evaluation research	Evaluated
Number of measures installed	Program tracking system	Evaluated
Gas Storage Water Heater Savings	Illinois TRM, version 1.0, section 5.4.2 ‡	Deemed
Attic Insulation Savings	Illinois TRM, version 1.0, section 5.6.4 ‡	Deemed
Boiler Reset Control Savings	Integrays_Master_Measure_Document 010213 & Evaluation Research	Evaluated
High Efficiency Boiler Savings	Illinois TRM, version 1.0, section 5.3.5 ‡	Deemed
High Efficiency Furnace Savings	Illinois TRM, version 1.0, section 5.3.6 ‡	Deemed
Indirect Water Heater Savings	Integrays_Master_Measure_Document 010213 & Evaluation Research	Evaluated
Domestic Hot Water Pipe Insulation Savings	Illinois TRM, version 1.0, section 5.4.1 ‡	Deemed
Hot Water Pipe Insulation & Steam Pipe Insulation Measure Savings	Integrays_Master_Measure_Document 010213 & Evaluation Research	Evaluated
Residential Programmable Thermostat Savings	Illinois TRM, version 1.0, section 5.3.10 ‡	Deemed
Tankless Water Heater Savings	Illinois TRM, version 1.0, section 5.4.2 ‡	Deemed

† Source: Illinois Energy Efficiency Stakeholder Advisory Group web site, <http://ilsag.info/net-to-gross-framework-1.html>, Net-to-Gross Framework Peoples Gas and North Shore Gas - Consensus Document, NTG_PGL-NSG_GPY1-GPY3_and_Phase_II_Plan_07_15_13.xlsx.

‡ Integrays_Master_Measure_Document 010213; Illinois_Statewide_TRM_Effective_060112_Final_091412_Clean

2.1.3 Verified Gross Program Savings Analysis Approach

Navigant reviewed the programs' tracking system and procedures to verify that the program accurately reported measure counts. The majority of program savings were derived based on deemed values and algorithms from the State of Illinois Energy Efficiency Technical Reference Manual (Illinois TRM v1.0).⁵ For Peoples Gas and North Shore Gas, the Illinois TRM provides the per unit savings for gas measures, with some exceptions for measures that were not included in the applicable TRM version. For measures not included in the Illinois TRM, Navigant reviewed ex-ante values and engineering assumptions provided by the implementation contractor, including hot water and steam pipe insulation and boiler reset measures. Verified per unit savings reflect evaluation adjustments to per unit savings values based on Navigant measure review. The verified gross savings are the product of verified per unit savings and verified measure quantities.

2.1.4 Verified Net Program Savings Analysis Approach

NTG research methods in GPY2 combine GPY1 participant and participating trade ally survey results, and GPY2 non-participating trade ally survey results. Research for both years used a self-report method where participants and trade allies answer questions about the program. The trade ally survey instrument determined the increase in program qualified furnace sales that resulted from program participation and program awareness.

2.1.4.1 *Free-Ridership*

Free-ridership for GPY2 was deemed using the participant rates from the GPY1 evaluation.

2.1.4.2 *Spillover*

Non-participating trade ally spillover rates were calculated for GPY2. For the spillover calculation, two groups of non-participating trade allies were included:

1. Trade allies that dropped out of the program (so-called "drop out" trade allies): those who had participated in GPY1, but did not participate in GPY2; and
2. True non-participating trade allies: those who reported that they were aware of the RPR program, but had never participated.

Non-participating trade ally spillover was determined using a method comparing sales of program qualified furnaces and boilers before either GPY1 participation or becoming aware of the program, and after GPY1 program participation or becoming aware of the program. The methodology also looks at the influence of the program on any potential spillover. A detailed presentation of the spillover methodology can be found in Section 7.2.2.

Participating customer spillover was analyzed in GPY1 from telephone interviews and while there was some evidence of spillover, it was not quantifiable.

⁵ Illinois Statewide Energy Efficiency Technical Reference Manual (TRM), Version 1.0; Illinois_Statewide_TRM_Effective_060112_Final_091412_Clean.

2.1.5 Process Evaluation

The GPY2 evaluation activities included an inquiry into the reasons that trade allies may have participated in the RPR program in GPY1, but did not participate in GPY2. The trade ally interviews attempted to establish the reasons why trade allies did not continue participating, and the steps that the utility can take to increase trade ally retention.

3. Gross Impact Evaluation

Navigant determined that the GPY2 Peoples Gas RPR program achieved verified gross savings of 938,434 therms and a 101% verified gross realization rate. The GPY2 North Shore Gas RPR program achieved verified gross savings of 330,612 therms and a 102% verified gross realization rate.

3.1 Tracking System Review

For this evaluation, Navigant verified that the Peoples Gas and North Shore Gas program tracking system (using the Bensight Data Management platform) continued to capture relevant data required to track the program's actions for reporting and evaluation activities. Navigant found that the programs had implemented quality assurance and quality control procedures to minimize the likelihood of data entry errors and that the programs continued to maintain or improve upon these procedures.

Navigant did determine that assumed net-to-gross ratios were being applied twice to attic insulation savings: once when determining project level savings and once again in the Bensight system. This has been discussed with the program implementer. Additionally, the IC used actual R-values to determine attic insulation savings. These were not recorded in Bensight, but were recorded in the project files. Navigant verified the savings for a sample of attic insulation projects and determined that the savings approach was accurate. Navigant recommends that R-values be recorded in Bensight for ease of savings calculation both for the implementer and for the evaluator.

3.2 Gross Program Impact Parameter Estimates

As described in Section 2, Navigant calculated verified gross energy savings (therms) using Illinois TRM methodology and algorithms for deemed measures.

Most of the measures accurately applied the algorithms and assumptions provided by the Illinois TRM. 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 6 feet of hot pipe insulation and 3 feet of cold pipe insulation. To further clarify, this measure should only be applied up to the first elbow of the pipe. Because the distance to the first elbow is not a recorded value in Bensight, Navigant must rely on the assumption that the first elbow of pipe is 6 feet from the water heater. Therefore, all DHW pipe insulation projects have been capped at 6 feet of savings.

Boiler pipe insulation is not a measure found in the Illinois TRM. Because of this, Navigant verified the calculations performed by the implementation contractor. The implementation contractor used the industry software 3E Plus^{®6} to calculate the gross energy savings and Navigant agreed with the input values listed in Table 3-1 with the exception of the estimated hours per year of heating. The implementation contractor's estimate was based upon hours per year when the temperature is below

⁶ <http://www.pipainsulation.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."

65F, assuming 70F space temperature with internal loads, and weather data for O'Hare International Airport from TMY3 data (6,309 hours)⁷. This estimate may include hours outside a typical heating season when some boilers will not be in use. Navigant revised the hours of use to represent shut-down during the cooling season. We based our estimate of actual 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. This revises the gross savings to be 3.19 therms per linear foot (from 3.45).

Table 3-1. Boiler Pipe Insulation Input Values to 3E Plus and Energy Savings Output Value

Parameter	Value	Units	Notes
R Value of pipe insulation	5.6		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	11.85		Using 3E Plus®
Btu loss/hr, savings	58.35		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 WI
Therms/year saved	3.19	therms	Calculated (Equation)

Source: Navigant Evaluation Team

Additionally, indirect storage heater savings are not deemed in the Illinois TRM. Navigant reviewed the Peoples Gas/North Shore Gas approach along with the Nicor Gas approach and determined that the Nicor Gas approach was more accurate. A more detailed explanation of the algorithm and assumptions used can be found in the Section 7 Appendix.

Programmable thermostats achieved higher savings than were claimed because the in service rate (ISR) assigned to all thermostat projects had been 56%. The Illinois TRM assigns an ISR of 100% to all direct install programmable thermostats and 56% to all other programmable thermostat installations. The 100% direct install ISR also applies to projects installed by a qualified contractor.⁸ Therefore,

⁷ Email from Jay Boettcher, September 13, 2012.

⁸ Per email from Sam Dent of VEIC, February 3, 2014.

Navigant calculated the verified gross savings for this measure accordingly. Navigant calculated verified gross energy savings (therms) using measure savings values as identified in Table 3-2 below.

Table 3-2. Verified Gross Savings Parameters

Measure	Verified Gross Savings (Therms/Unit)	Method	Source
0.67 EF Gas Storage Water Heaters	26.63	Deemed	v1.0 section 5.4.2
Attic Insulation	Varies ⁹	Deemed	v1.0 section 5.6.4
Boiler Reset Controls	97.44	Non-Deemed	Assumptions from IC
Boilers < 300 MBtu > 90% AFUE	169.17	Deemed	v1.0 section 5.3.5
Boilers < 300 MBtu > 95% AFUE	240.39	Deemed	
Boilers > 300 MBtu > 85% TE	N/A ¹⁰	Non-Deemed	
Furnace < 225 MBtu > 92% AFUE	131.41	Deemed	v1.0 section 5.3.6
Furnace < 225 MBtu > 95% AFUE	159.08	Deemed	
Indirect Storage Water Heaters	41.20	Non-Deemed	Nicor Gas workpaper
Pipe Insulation (DHW)	0.91	Deemed	v1.0 section 5.4.1
Pipe Insulation (HW Boiler)	3.19	Non-Deemed	Inputs from IC
Pipe Insulation (Steam Boiler)	3.19	Non-Deemed	
Res Programmable Thermostat (Self Install)	29.48	Deemed	v1.0 section 5.3.10
Res Programmable Thermostat (Contractor Install)	52.64	Deemed	v1.0 section 5.3.10
Tankless Water Heaters	43.83	Deemed	v1.0 section 5.4.2

Source: Navigant evaluation team research of the Illinois TRM and other sources

3.3 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 and Boilers > 300 MBtu > 85% TE, all verified counts match the ex ante measure counts. Peoples Gas installed a total of 5,961 projects in GPY2 and North

⁹ Franklin Energy Services used actual R-values to determine savings, meaning each project will have a different therms/unit savings. The algorithm and other assumptions are from the IL TRM.

¹⁰ Only one project was recorded for this measure in GPY2. Upon further inspection of this project, Navigant determined that the rebated boiler did not qualify as it was less 300 MBtu. It did not qualify for the less than 300 MBtu boiler measures because its efficiency was 85% AFUE. Therefore, a savings approach for this measure was not investigated further.

Shore Gas installed a total of 2,231 projects in GPY2. The details of this are shown in Table 3-3 and Table 3-4 below.

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

Measure	Unit	Ex-Ante Measure Count	Verified Measure Count
0.67 EF Gas Storage Water Heaters	Unit	135	135
Attic Insulation	Sq. Ft.	1,119,309	1,119,309
Boiler Reset Controls	Unit	8	8
Boilers < 300 MBtu > 90% AFUE	Unit	43	43
Boilers < 300 MBtu > 95% AFUE	Unit	40	40
Boilers > 300 MBtu > 85% TE	MBtu	140	0
Furnace < 225 MBtu > 92% AFUE	Unit	346	346
Furnace < 225 MBtu > 95% AFUE	Unit	3,293	3,293
Indirect Storage Water Heaters	Unit	18	18
Pipe Insulation (DHW)	Linear Ft.	3,617	722
Pipe Insulation (HW Boiler)	Linear Ft.	7,069	7,069
Pipe Insulation (Steam Boiler)	Linear Ft.	1,090	1,090
Res Programmable Thermostat	Unit	602	602
Tankless Water Heaters	Unit	341	341
GPY2 Peoples Gas Total		1,136,051	1,133,016

Source: Navigant analysis of GPY2 Residential Prescriptive program tracking data (September 12, 2013 data extract)

Table 3-4. North Shore Gas Ex Ante and Verified Measure Count

Measure	Unit	Ex-Ante Measure Count	Verified Measure Count
0.67 EF Gas Storage Water Heaters	Unit	51	51
Attic Insulation	Sq. Ft.	146,549	146,549
Boiler Reset Controls	Unit	2	2
Boilers < 300 MBtu > 90% AFUE	Unit	11	11
Boilers < 300 MBtu > 95% AFUE	Unit	19	19
Furnace < 225 MBtu > 92% AFUE	Unit	107	107
Furnace < 225 MBtu > 95% AFUE	Unit	1,516	1,516
Indirect Storage Water Heaters	Unit	4	4
Pipe Insulation (DHW)	Linear Ft.	2,127	204
Pipe Insulation (HW Boiler)	Linear Ft.	308	308
Res Programmable Thermostat	Unit	462	462
Tankless Water Heaters	Unit	74	74
GPY2 North Shore Gas Total		151,230	149,307

Source: Navigant analysis of GPY2 Residential Prescriptive program tracking data (September 12, 2013 data extract)

The Peoples Gas RPR program had 5,099 participants in GPY2 and distributed 14 measures across 5,961 projects. The North Shore Gas RPR program had 1,774 participants in GPY2 and distributed 13 measures across 2,231 projects as shown in the table below. This is shown in Table 3-5.

Table 3-5. GPY2 Volumetric Findings Detail

Participation	Peoples Gas	North Shore Gas
Participants	5,099	1,774
Total Measure Types	14	13
Number of Projects	5,961	2,231

Source: Navigant analysis

3.4 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 3-2 to verified measure quantities found in the program tracking systems to calculate verified gross savings.

As shown in the tables below, most of the GPY2 evaluation verified gross realization rates were 100%. The Peoples Gas measure Boilers >300 MBtu >85% TE Res received a realization rate of 0% because the one project recorded under that measure did not qualify. The rebated boiler was less than 300 MBtu, therefore making it fall into a different category of measures which it did not qualify for because its efficiency was 85% AFUE. Indirect water heater, pipe insulation, and programmable thermostat discrepancies are discussed in Section 3.2. Navigant used the verified per unit savings values shown in Table 3-2 and the verified measure counts in Table 3-3 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 938,434 therms and a verified gross realization rate of 101 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
0.67 EF Gas Storage Water Heaters	3,596	3,596	100%
Attic Insulation	247,621	247,621	100%
Boiler Reset Controls	780	780	100%
Boilers < 300 MBtu > 90% AFUE Res	8,847	8,847	100%
Boilers < 300 MBtu > 95% AFUE Res	9,616	9,616	100%
Boilers > 300 MBtu > 85% TE Res	120	0	0%
Furnace < 225 MBtu > 92% AFUE	45,469	45,469	100%
Furnace < 225 MBtu > 95% AFUE	550,067	550,067	100%
Indirect Storage Water Heaters	951	742	78%
Pipe Insulation (DHW)	3,284	657	20%
Pipe Insulation (HW Boiler)	24,397	22,550	92%
Pipe Insulation (Steam Boiler)	3,762	3,477	92%
Res Programmable Thermostat	17,745	30,067	169%
Tankless Water Heaters	14,946	14,946	100%
TOTALS	931,200	938,434	101%

Source: Navigant analysis of GPY2 RPR program tracking data (September 12, 2013 data extract). Navigant verified gross savings therms; verified gross realization rates shown are rounded values.

Navigant used the verified per unit savings values shown in Table 3-2 and the verified measure counts in Table 3-4 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 330,612 therms and a 102% verified gross realization rate.

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
0.67 EF Gas Storage Water Heaters	1,358	1,358	100%
Attic Insulation	27,126	27,126	100%
Boiler Reset Controls	195	195	100%
Boilers < 300 MBtu > 90% AFUE Res	2,263	2,263	100%
Boilers < 300 MBtu > 95% AFUE Res	4,568	4,568	100%
Furnace < 225 MBtu > 92% AFUE	14,061	14,061	100%
Furnace < 225 MBtu > 92% AFUE NSG	92,040	92,040	100%
Furnace < 225 MBtu > 95% AFUE	161,195	161,195	100%
Indirect Storage Water Heaters	211	165	78%
Pipe Insulation (DHW)	1,931	186	10%
Pipe Insulation (HW Boiler)	1,063	983	92%
Res Programmable Thermostat	13,619	23,230	171%
Tankless Water Heaters	3,243	3,243	100%
TOTALS	322,873	330,612	102%

Source: Navigant analysis of GPY2 RPR program tracking data (September 12, 2013 data extract). Navigant verified gross savings therms; verified gross realization rates shown are rounded values.

3.5 Verified Gross Program Impact Results

Table 3-8 below illustrates that the Peoples Gas GPY2 Residential Prescriptive Rebate Program reported ex-ante gross energy savings of 931,200 therms. Evaluation adjustments described in the sections above resulted in evaluation verified gross energy savings of 938,434 therms. The overall Peoples Gas program verified gross energy savings realization rate was 101 percent.

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

	Sample	Gross Energy Savings (Therms)	90/10 Significance?
Attic Insulation			
Ex-Ante GPY2 Gross Savings	NA†	247,621	NA†
Verified Gross Realization Rate		100%	
Verified Gross Savings‡		247,621	
Water Heater Measures			
Ex-Ante GPY2 Gross Savings	NA†	19,493	NA†
Verified Gross Realization Rate		99%	
Verified Gross Savings‡		19,283	
Furnaces, Boilers & Controls Measures			
Ex-Ante GPY2 Gross Savings	NA†	614,898	NA†
Verified Gross Realization Rate		100%	
Verified Gross Savings‡		614,779	
Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	31,443	NA†
Verified Gross Realization Rate		85%	
Verified Gross Savings‡		26,684	
Programmable Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	17,745	NA†
Verified Gross Realization Rate		169%	
Verified Gross Savings‡		30,067	
Peoples Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings	NA†	931,200	NA†
Verified Gross Realization Rate		101%	
Verified Gross Savings‡		938,434	

Source: Navigant analysis of GPY2 RPR program tracking data (September 12, 2013 data extract).

†NA when the Illinois TRM determines the gross savings.

‡ Based on evaluation research findings.

The North Shore Gas GPY2 Residential Prescriptive Rebates Program reported ex-ante gross energy savings of 322,873 therms. Evaluation adjustments described in the sections above resulted in evaluation verified gross energy savings of 330,612 therms. Table 3-9 below illustrates that the overall North Shore Gas program verified gross energy savings realization rate was 102 percent.

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

	Sample	Gross Energy Savings (Therms)	90/10 Significance?
Attic Insulation			
Ex-Ante GPY2 Gross Savings	NA†	27,126	NA†
Verified Gross Realization Rate		100%	
Verified Gross Savings‡		27,126	
Water Heater Measures			
Ex-Ante GPY2 Gross Savings	NA†	4,813	NA†
Verified Gross Realization Rate		99%	
Verified Gross Savings‡		4,767	
Furnaces, Boilers & Controls Measures			
Ex-Ante GPY2 Gross Savings	NA†	274,321	NA†
Verified Gross Realization Rate		100%	
Verified Gross Savings‡		274,321	
Pipe Insulation Measures			
Ex-Ante GPY2 Gross Savings	NA†	2,994	NA†
Verified Gross Realization Rate		39%	
Verified Gross Savings‡		1,168	
Programmable Thermostats			
Ex-Ante GPY2 Gross Savings	NA†	13,619	NA†
Verified Gross Realization Rate		171%	
Verified Gross Savings‡		23,230	
North Shore Gas GPY2 Total			
Ex-Ante GPY2 Gross Savings	NA†	322,873	NA†
Verified Gross Realization Rate		102%	
Verified Gross Savings‡		330,612	

Source: Navigant analysis of GPY2 RPR program tracking data (September 12, 2013 data extract).

†NA when the Illinois TRM determines the gross savings.

‡ Based on evaluation research findings.

4. Net Impact Evaluation

The Illinois SAG determined¹¹ that GPY2 NTG value should be partially calculated by the evaluation team and applied retrospectively to calculate research findings net savings.

The overall program GPY2 NTG ratio was calculated by using the GPY1 participant free ridership and spillover and then adding the GPY2 non-participating trade ally spillover, as follows:

$$NTG_{Program} = 1 - FR_{Part.} + SO_{Part.} + SO_{Non-Part.TA}$$

Where NTG_{Program} = Program NTG
 FR_{Part.} = Participant Free-Ridership
 SO_{Part.} = Participant Spillover
 SO_{Non-Part.TA} = Non-Participating TA Spillover

As noted in Section 2.1.4.2, non-participating trade ally spillover was explored for boilers and furnaces in “drop-out” and never-participated trade ally surveys. Because of the difficulty finding non-participating trade allies who worked exclusively in either Peoples Gas or North Shore Gas territory, the non-participating trade ally values were combined. Navigant calculated spillover for each drop-out trade ally and then calculated an overall spillover percentage for boilers and furnaces applicable for both utility programs. There was minimal evidence of spillover among trade allies that never participated. A detailed presentation of the net-to-gross methodology can be found in Section 7.2.

Table 4-1. Non-Participating Trade Ally Spillover for Boilers and Furnaces

Trade Ally Segment	Sales Weighted Spillover for Boilers and Furnaces	N
Drop-Out Trade Allies	0.15	50
Never Participated Trade Allies	<0.004	9
Non-Participating Trade Allies	0.15	59

Source: Evaluation Team analysis.

The verified gross savings for furnaces and boilers in the GPY2 Peoples Gas program was 613,999 therms, and the spillover is 92,100 therms (0.15 times 613,999 therms). As a proportion of total verified gross savings of 926,112 therms for all GPY2 measures, the furnace and boiler spillover adder is 0.10 (92,100 therms divided by 926,112 therms). The resulting program NTG rate for Peoples Gas is as follows:

$$\text{Peoples Gas GPY2 Research Findings NTGR} = 1 - 0.72 + 0.10 = 0.82$$

¹¹ Source: http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August 5-6, 2013 Meeting/NTG Values for Peoples Gas and North Shore Gas.xls, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework-1.html>

The verified gross savings for furnaces and boilers in the GPY2 North Shore Gas program was 274,127 therms, and the spillover is 41,119 therms (0.15 times 274,127 therms). As a proportion of total verified gross savings of 321,000 therms for all GPY2 measures, the furnace and boiler spillover adder is 0.13 (41,119 therms divided by 321,000 therms). The resulting program NTG rate for North Shore Gas is as follows:

$$\text{North Shore Gas GPY2 Research Findings NTGR} = 1 - 0.67 + 0.13 = 0.80$$

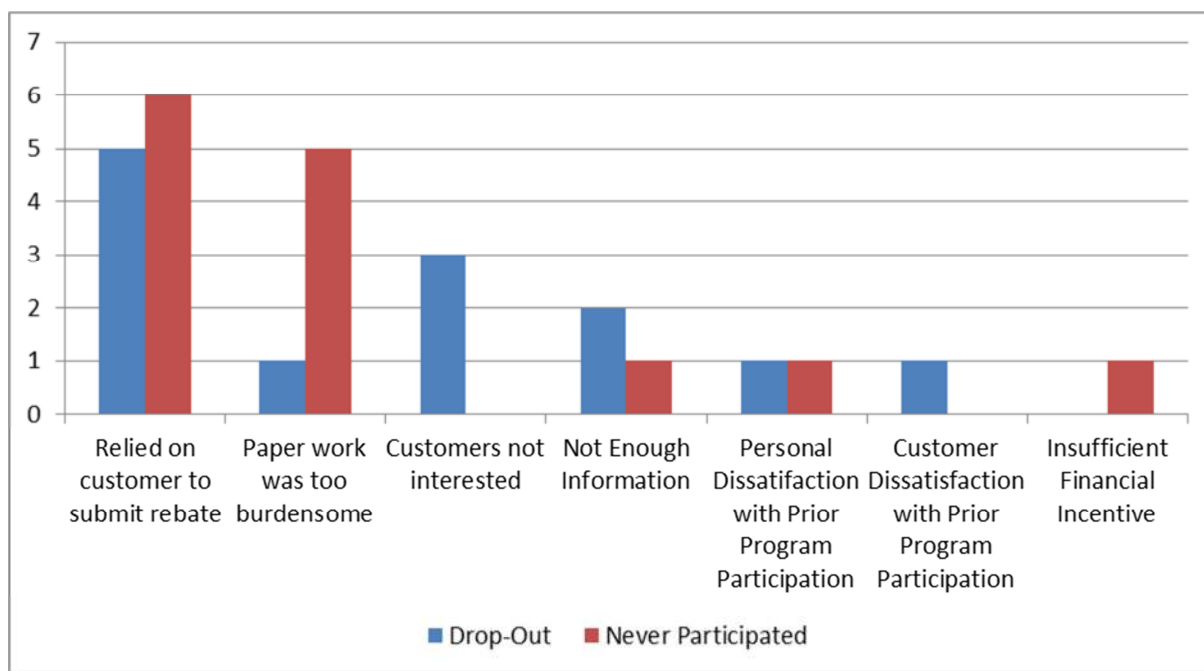
5. Process Evaluation

This section discusses the process results obtained from the non-participating trade ally interviews. More detailed results can be found in Section 7.3.1.

Non-participating trade allies who reported that they sold program qualified furnaces, but did not submit the measures for a rebate, were asked the reasons that they did not submit them to the program. The most commonly cited reason (by eleven trade allies out of the twenty-three who reported having program qualifying high efficiency sales outside of the program) was that the trade allies were relying upon their customers to submit the rebates instead of doing it themselves. The trade allies who had never participated in the program also stated that they did not submit rebate application for program qualified furnaces because they themselves thought that the program paperwork was burdensome, however, only one drop-out trade ally stated that this was a reason.

Another commonly cited reason by drop-out trade allies was that their customers were not interested in participating in the program. When asked why their customers were not interested in participating in the program, the trade allies stated that the customers thought that the program rebates were not sufficient to warrant the effort to submit the application.

**Figure 5-1. Reason for Not Submitting Qualified Furnaces for a Rebate
(Drop-Out Trade Ally: n = 10, Never Participated Trade Ally: n = 9)**



Source: Evaluation Team analysis of survey data.

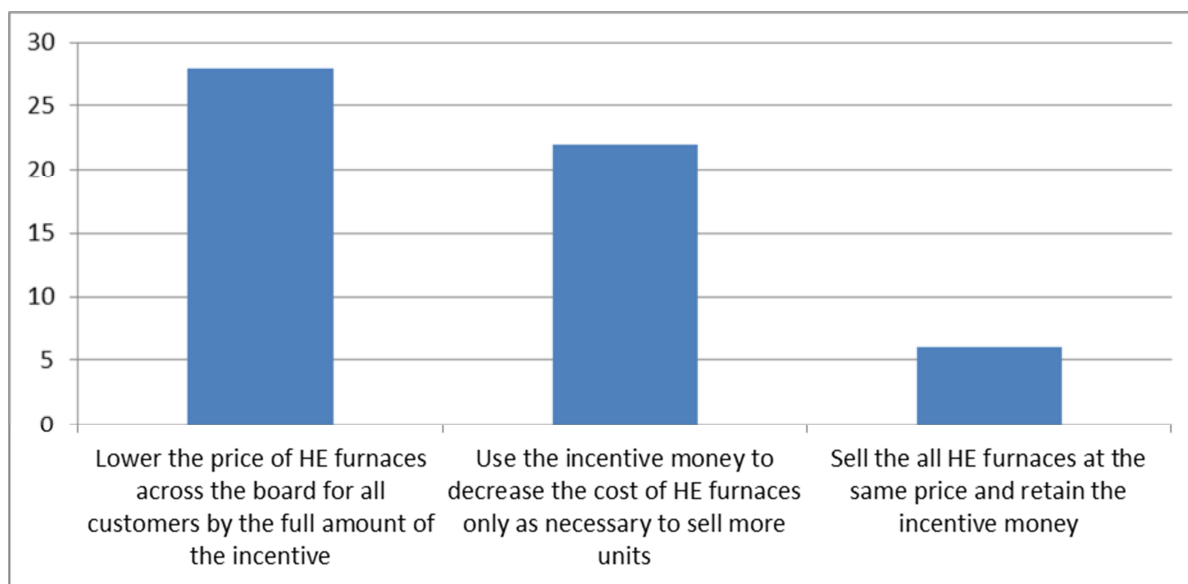
The non-participating trade allies were also asked if they had any recommendations for changes that could be made to the program to increase participation by contractors like themselves. The most commonly cited changes were to simplify the rebate process, increase incentives, and provide more

information about the program. These responses are consistent with previous trade ally survey responses. One of the contractors requested that advanced notice be given to trade allies of any impending specials. Also, multiple non-participating trade allies requested program materials in Spanish, to better reach out to Spanish-speaking customers.

The non-participating trade allies were asked about the possibility of receiving the rebate themselves, to subsidize the sale of high efficiency furnaces. The trade allies were asked if changing the program would make them more likely, less likely, or neither more nor less likely to participate in the program. A large majority of the non-participating trade allies (62%) stated that changing the rebate structure would make them more likely to participate. Only five percent of the trade allies stated that changing the rebate structure would make them less likely to participate. Slightly less than one-third (32%) of the trade allies stated that receiving the rebate themselves would have no effect on their future participation.

The non-participating trade allies were also asked how changing the incentive structure would affect their behavior. Half of the trade allies responded that they would lower the price of the high efficiency furnaces for all customers by the full amount of the incentive. An additional forty percent stated that they would use the incentive as a sales tool, decreasing the cost of high efficiency furnaces only as necessary to sell more units. Approximately eleven percent of trade allies stated that they would not change their prices, but would retain the incentive money for themselves.

Figure 5-2. Effect of Trade Ally Incentives (n = 58)



Source: Evaluation Team analysis of survey data.

6. Conclusions and Recommendations

Program Savings Goals Attainment

Finding 1. The PGL RPR Program achieved research findings net savings of 769,516 therms, which is 94 percent of the GPY2 goal of 820,000 net therms. The NSG RPR Program achieved research findings net savings of 264,489 therms, which is 78 percent of the GPY2 goal of 340,000 net therms.

Recommendation 1. To expand participation in GPY3, the implementation contractor should consider the process findings from evaluation research conducted in GPY2 on dropout and non-participating trade allies.

Gross Realization Rates

Finding 2. The lowest realization rates for the RPR Program were for domestic hot water (DHW) pipe insulation where Navigant capped the savings at 3 feet of cold pipe and 6 feet of hot pipe, as specified by the Illinois TRM, because the location of the first elbow was unknown.

Recommendation. Navigant recommends that the Implementation Contractor (IC) either record the location of the first pipe elbow in Bensight or cap the DHW pipe insulation rebate and savings at 6 feet hot water pipe to comply with the Illinois TRM.

Net-to-Gross Rate

Finding 3. The NTGR for Peoples Gas is calculated at 0.82, and for North Shore Gas is calculated at 0.80, based on GPY2 evaluation research to estimate spillover from non-participating trade allies. Evaluation did not research free-ridership in GPY2.

Recommendation. Navigant recommends that the NTGR for GPY2 be calculated using participant free-ridership and spillover based on GPY1 evaluation research, and non-participant spillover based on GPY2 evaluation research. The Illinois Stakeholder Advisory Group may review the GPY2 NTGR updated with spillover research for retrospective application in GPY2 and deeming in GPY3.

Savings Estimates.

Finding 4. The boiler pipe insulation measure savings estimates were lowered slightly by Navigant because the hours of use assumption was adjusted. This was done to account for the typical boiler that does not operate during the cooling season.

Recommendation. Navigant recommends that the hours of use assumption be adjusted to account for a boiler not operating during the cooling season.

Finding 5. The energy savings estimate for indirect water heaters was adjusted by Navigant to include the boiler efficiency.

Recommendation. Navigant recommends adopting the energy savings estimation approach detailed in the Appendix for indirect water heaters.

Trade Ally and Other Participation.

Finding 6. Forty percent of “drop-out” trade allies (those who participated in GPY1 but were not identified on any GPY2 applications) reported that the program had influenced them

to sell program qualified boilers and furnaces since they last participated, without applying for rebates, resulting in a non-participating spillover rate of 15% on those measures. When asked why they did not submit these measures to the program, the most commonly cited reason was that the trade allies were relying on their customers to apply for the program. The program tracking records indicated that customers did not submit applications identifying the drop out trade allies.

Recommendation. Navigant recommends that efforts be taken to reach out to trade allies who “dropped out” of the program from year to year, to ensure they have the necessary training and information about the program to assist their customers in the rebate process.

Finding 7. When the trade allies were asked how changing the incentive structure (from the customer receiving the rebate to the trade ally receiving the rebate) would affect their behavior, a large majority of the non-participating trade allies (62%) stated it would make them more likely to participate. Additionally, half of the trade allies responded that they would lower the price of the high efficiency furnaces for all customers by the full amount of the incentive. An additional forty percent stated that they would use the incentive as a sales tool, decreasing the cost of high efficiency furnaces only as necessary to sell more units.

Recommendation. The non-participating trade ally reaction to the possibility of changing the incentive structure was positive, and could increase participation. However, there is the possibility the utilities will lose some of the “goodwill” that comes from providing rebates to customers, since the customers may be less aware that they are receiving a rebate for their high efficiency units.

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/GPY2.

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, 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, 2012¹².

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)**

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

¹² IL-TRM_Policy_Document_10-31-12_Final.docx

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

Navigant conducted a review of savings estimates included in the RPR program for GPY2. Below are the algorithms and assumptions used in this review.

Gas Storage Water Heaters

$$\Delta \text{therms} = \left(\frac{1}{EF_{\text{base}}} - \frac{1}{EF_{\text{efficient}}} \right) \times (GPD \times 365.25 \times \gamma \text{Water} \times (T_{\text{out}} - T_{\text{in}}) \times 1.0) / 100,000 = \mathbf{26.63 \text{ therms/unit}}$$

Where:

- Δtherms = Difference between baseline usage and efficient storage water heater usage in therms
- EF_{base} = Energy Factor rating for baseline equipment = 0.575
- $EF_{\text{efficient}}$ = Energy Factor Rating for efficient equipment = 0.67
- GPD = Gallons Per Day of hot water use per household = 50 gallons
- 365.25 = Days per year, on average
- γWater = Specific Weight of water = 8.33 lb/gal
- T_{out} = Tank temperature = 125°F
- T_{in} = Incoming water temperature from well or municipal system = 54°F
- 1.0 = Heat Capacity of water (1 Btu/lb*°F)

Attic Insulation

$$\Delta \text{therms} = \frac{\left(\left(\left(\frac{1}{R_{\text{old}}} - \frac{1}{R_{\text{attic}}} \right) \times A_{\text{attic}} \times (1 - \text{Framing_factor}/2) \right) \times 24 \times \text{HDD} \right)}{\eta \text{Heat} \times 100,067}$$

Where:

- Δtherms = Difference between baseline heating usage and additional insulation heating usage in therms
- R_{old} = R-value value of existing assemble and any existing insulation = actual, varies
- R_{attic} = R-value of new attic assembly (including all layers between inside air and outside air) = actual, varies
- A_{attic} = Total area of insulated ceiling/attic (ft²) = actual, varies
- Framing_factor = Adjustment to account for area of framing = 15%
- HDD = Heating Degree Days = 5,113
- ηHeat = Efficiency of heating system = 70%

High Efficiency Boilers

$$\Delta thermals = Gas_{BoilerLoad} \times \left(\frac{1}{AFUE_{base}} - \frac{1}{AFUE_{eff}} \right)$$

=169.17 therms/unit, >90% AFUE

=240.39 therms/unit, >95% AFUE

Where:

- $\Delta thermals$ = Difference between baseline usage and high efficiency boiler usage in therms
- Gas_Boiler_Load = Estimate of annual household Load for gas boiler heated single-family homes = 1,218
- $AFUE_{base}$ = Baseline Boiler Annual Fuel Utilization Efficiency Rating = 80%
- $AFUE_{eff}$ = Efficient Boiler Annual Fuel Utilization Efficiency Rating = 92.5%, 95%

High Efficiency Furnaces

$$\Delta thermals = Gas_Furnace_Load \times \left(\frac{1}{AFUE_{base}} - \frac{1}{AFUE_{eff}} \right)$$

=131.41 therms/unit, >92% AFUE

=159.08 therms/unit, >95% AFUE

Where:

- $\Delta thermals$ = Difference between baseline usage and high efficiency furnace usage in therms
- $Gas_Furnace_Load$ = Estimate of annual household Load for gas furnace heated single-family homes = 1,218
- $AFUE_{base}$ = Baseline Furnace Annual Fuel Utilization Efficiency Rating = 80%
- $AFUE_{eff}$ = Efficient Furnace Annual Fuel Utilization Efficiency Rating = 92%, 95.9%

Indirect Storage Water Heaters

The approach below is very similar to the approach that the implementer used in GPY2 to calculate energy savings from indirect water heaters. However, the below methodology uses the boiler efficiency as the new efficiency. This approach is based on an evaluation report of Focus on Energy.¹³

$$\Delta thermals = \left(\left(\frac{1}{Eff_{base}} - \frac{1}{Eff_{eff}} \right) \times GPD \times 365.25 \times \gamma_{Water} \times \Delta T \times 1 \right) / 100,000 = \mathbf{41.20 \text{ therms/unit}}$$

Where:

- $\Delta thermals$ = Difference between baseline usage and indirect water heater usage in therms
- Eff_{base} = Baseline efficiency, storage water heater = 0.67
- Eff_{eff} = Efficient boiler efficiency = 0.90
- GPD = Gallons Per Day of hot water use per household = 50 gallons
- 365.25 = Days per year, on average
- γ_{Water} = Specific Weight of water = 8.33 lb/gal
- ΔT = Temperature rise = 70°F
- 1.0 = Heat Capacity of water (1 Btu/lb*°F)

¹³ Public Service Commission of Wisconsin. Focus on Energy Evaluation. *Residential Programs: CY09 Deemed Savings Review*. March 26th, 2010.

http://www.focusonenergy.com/sites/default/files/cy09residentialdeemedavingsreview_evaluationreport.pdf

Domestic Hot Water Pipe Insulation

$$\Delta \text{therms} = \left(\left(\frac{1}{R_{\text{exist}}} - \frac{1}{R_{\text{new}}} \right) \times (L \times C) \times \Delta T \times 8766 \right) / \eta_{\text{DHW}} / 100,000 = \mathbf{0.908 \frac{\text{therms}}{\text{linear foot}}}$$

Where:

- Δtherms = Difference between baseline usage and insulated domestic hot water pipe usage in therms
- R_{exist} = Pipe heat loss coefficient of uninsulated pipe (existing) [(hr-°F-ft)/Btu] = 1
- R_{new} = Pipe heat loss coefficient of insulated pipe (existing) [(hr-°F-ft)/Btu] = 3.2
- L = Length of pipe from water heating source covered by pipe wrap (ft) = 1
- C = Circumference of pipe (ft) (Diameter (in) * $\pi/12$) = 0.196
- ΔT = Average temperature difference between supplied water and outside air temperature (°F) = 60°F
- 8766 = Hours per year
- η_{DHW} = Recovery efficiency of gas hot water heater = 0.78

Programmable Thermostats

$$\begin{aligned} \Delta \text{therms} &= \% \text{FossilHeat} \times \text{Gas}_{\text{HeatingConsumption}} \times \text{Heating}_{\text{Reduction}} \times \text{HF} \times \text{Eff}_{\text{ISR}} \\ &= \mathbf{29.48 \frac{\text{therms}}{\text{unit}} (\text{Self Install}); 52.64 \frac{\text{therms}}{\text{unit}} (\text{Contractor Install})} \end{aligned}$$

Where:

- Δtherms = Difference between baseline usage and programmable thermostat usage in therms
- $\% \text{FossilHeat}$ = Percentage of heating savings assumed to be Natural Gas = 100%
- $\text{Gas}_{\text{HeatingConsumption}}$ = Estimate of annual household heating consumption for gas heated single-family homes = 849
- $\text{Heating}_{\text{Reduction}}$ = Assumed percentage reduction in heating energy consumption due to programmable thermostat = 6.2%
- HF = Household factor, to adjust heating consumption for non-single-family households = 100%
- Eff_{ISR} = Effective In-Service Rate, the percentage of thermostats installed and programmed effectively = 56% for self installed thermostats, 100% for contractor installed thermostats

Tankless Water Heaters

$$\begin{aligned} \Delta \text{therms} &= \left(\frac{1}{\text{EF}_{\text{base}}} - \frac{1}{\text{EF}_{\text{efficient}}} \right) \\ &\quad \times (\text{GPD} \times 365.25 \times \gamma_{\text{Water}} \times (T_{\text{Out}} - T_{\text{In}}) \times 1.0) / 100,000 = \mathbf{43.83 \text{ therms/unit}} \end{aligned}$$

Where:

- Δtherms = Difference between baseline usage and efficient storage water heater usage in therms
- EF_{base} = Energy Factor rating for baseline equipment = 0.575
- $\text{EF}_{\text{efficient}}$ = Energy Factor Rating for efficient equipment = 0.75
- GPD = Gallons Per Day of hot water use per household = 50 gallons
- 365.25 = Days per year, on average
- γ_{Water} = Specific Weight of water = 8.33 lb/gal
- T_{Out} = Tank temperature = 125°F

- T_{in} = Incoming water temperature from well or municipal system = 54°F
- 1.0 = Heat Capacity of water (1 Btu/lb*°F)

7.2.2 Net Program Impact Results

7.2.2.1 Free-Ridership

Participant Free-ridership (GPY1 Calculation)

In order to calculate participant free-ridership using data obtained from the participant interviews, the program participants were asked the likelihood that they would have purchased the high efficiency equipment had the program been unavailable, and the importance of the program on their decision.

If the customer did not have specific plans to install the program measure prior to participation, the qualifying measure was considered “early replacement”, and free-ridership is estimated to be zero.

If the installation was not an early replacement, then the first of two equations is used:

$$FR = \frac{LIKELIHOOD * \left(\frac{1}{3}\right) + (10 - IMPORTANCE) * \left(\frac{2}{3}\right)}{10}$$

Else, if the participant had specific plans to install equipment and the likelihood score was greater than 3:

$$FR = \frac{\frac{(LIKELIHOOD + TIMING)}{2} * \left(\frac{1}{3}\right) + (10 - IMPORTANCE) * \left(\frac{2}{3}\right)}{10}$$

Where:

LIKELIHOOD = 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 installed <MEASURE> if you had not received an incentive from the program? (LIKELIHOOD, 0-10)

IMPORTANCE = There may have been several reasons for the installation of the <MEASURE>, but the program was a critical factor in my decision to have the <MEASURE> installed. (IMPORTANCE, 0-10)

TIMING = I would have installed <MEASURE> within a year of when I did, if I had not received an incentive from the program. (TIMING, 0-10)

7.2.2.2 Spillover

Non-Participating Trade Ally Spillover

In order to calculate non-participating trade ally spillover using data obtained from the telephone interviews, the drop-out trade allies were asked the following:

1. What percentage of customers purchased high efficiency heating units (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings and above) before participating in the RPR program?
2. What percentage of customer purchased high efficiency heating units (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings and above) since participating in the RPR program?
3. (For trade allies who reported an increase in high efficient heating units) On a scale from zero to five, where zero is not at all influential and five is highly influential, how influential was your participation in the RPR program?

The difference between high efficiency furnace and boiler sales after participating in the program and high efficiency furnace and boiler sales before participating in the program was classified as potential spillover. The potential spillover was discounted based on the reported influence of the program on the high efficiency furnace and boiler sales. The trade allies were also asked the number of furnaces and boilers, regardless of efficiency, that they sold in the previous year. This was multiplied by the percentage of high efficiency sales that were potential spillover, to give an estimate of the number of high efficiency units each trade ally sold that were not part of the program. That number of units was then multiplied by 131.41 therms (the per unit savings) to calculate the overall therm spillover savings associated with each trade ally.

The spillover therm savings for each trade ally was calculated using the following formula:

$$\begin{aligned} \text{Non-Participant Trade Ally SO Therm Savings} &= (\% \text{ of HE Sales After Program Participation} \\ &\quad - \% \text{ of Sales Before Program Participation}) * \text{Program Influence Score} \\ &\quad * \text{Number of Total Furnaces and Boilers Sold} * 131.41 \text{ Therms} \end{aligned}$$

The spillover therm savings associated with the individual trade allies was then totaled, giving the spillover savings for the sample population. The drop out sample population spillover was then scaled up to the entire drop-out trade ally population. The spillover for trade allies that never participated followed a similar approach, except the sample results were not scaled up because the population was not known for Peoples Gas and North Shore Gas.

Table 7-1. Non-Participant Trade Ally Spillover Savings

Trade Ally Segment	Sample Population SO Savings (Therms)	N	Population	Trade Ally SO Savings (Therms)
Drop Out Trade Allies	26,296	50	246	129,379
Never Participated Trade Allies	3,075	9	NA	3,075
Non-Participating Trade Allies		59		132,454

Source: Evaluation Team analysis.

After the population spillover savings were calculated, the spillover savings were divided by the program savings to achieve the program non-participant trade ally spillover rate.

Table 7-2. Non-Participant Trade Ally Spillover

PGL and NSG Non-Participating Trade Ally Spillover Savings for Furnaces and Boilers (Therms)	PGL and NSG Boiler and Furnace Verified Gross Savings, Therms	Non-Part TA SO Ratio for Furnaces and Boilers
132,454	888,126	0.15

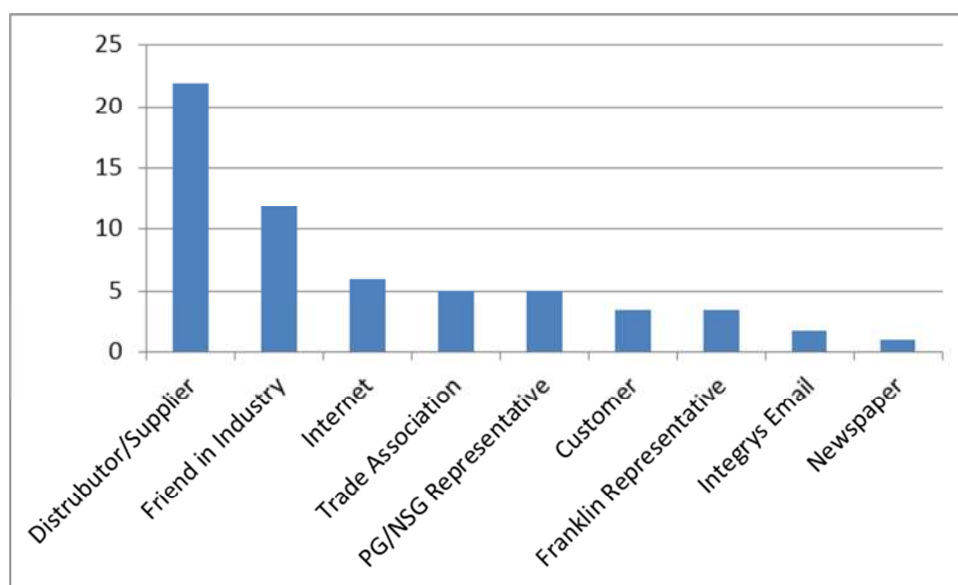
Source: Evaluation Team analysis.

7.3 Detailed Process Results

7.3.1 Non-Participating Trade Ally Survey Results

Contractor Outreach

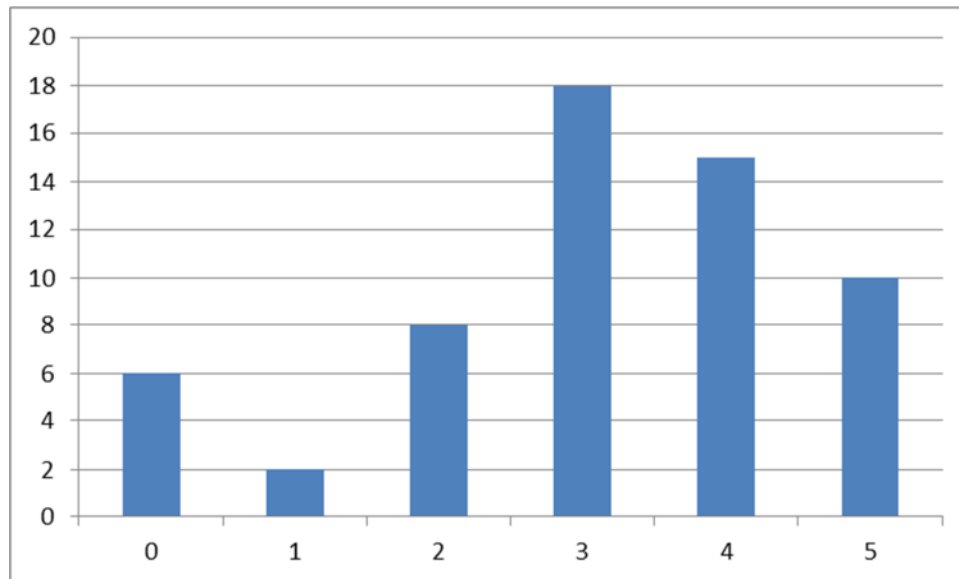
The non-participating trade allies were asked how they were first made aware of the Residential Prescriptive Rebate program. Approximately 37% responded that they had been made aware of the program through their distributor/supply company. Twenty percent of non-participating trade allies stated that they had been made aware of the program through a friend in the HVAC/water heating industry, and an additional ten percent stated that they had become aware of the program through an internet search.

Figure 7-1. Method by Which Contractor First Became Aware of RPR Program (n = 58)


Source: Evaluation Team analysis.

The non-participating trade allies were asked to gauge their level of knowledge about the RPR program. When asked to rate their level of knowledge on a scale from zero to five, where zero is not at all knowledgeable and five is knowledgeable, approximately thirty percent of the non-participating trade allies rated their knowledge level at a “3”.

Figure 7-2. Non-Participating Trade Ally Program Knowledge (n = 59)



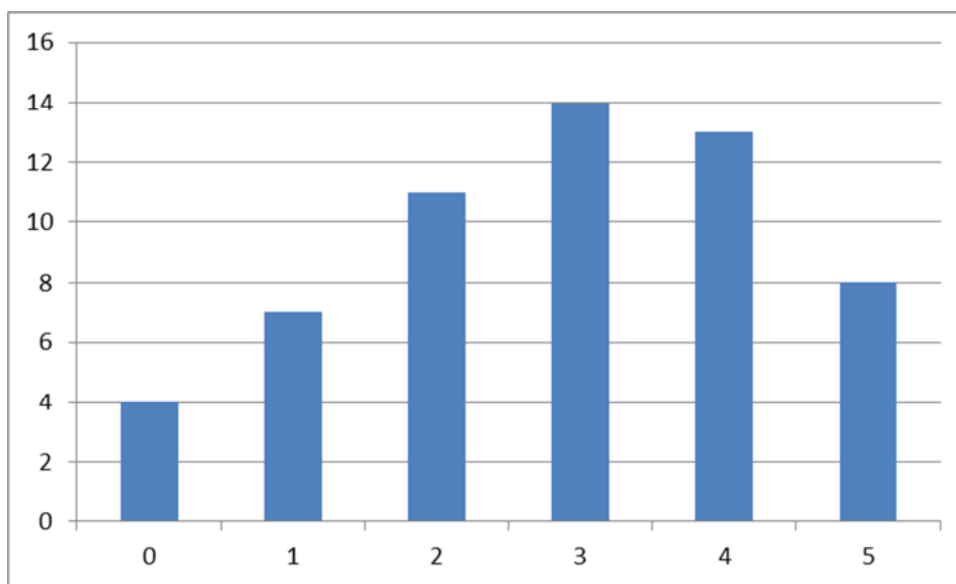
Source: Evaluation Team analysis.

Slightly more than one-third (36%) of non-participating trade allies reported that they had received any RPR promotional materials from Peoples Gas or North Shore Gas. When asked to describe the materials that they received, the trade allies cited promotional emails and printed brochures describing the program. When asked if they had looked at the program website to find information, nearly forty (39%) percent of the non-participating trade allies replied that they had done so. When asked if they had been able to find the information they needed, ninety-three percent replied in the affirmative.

Customer Awareness

The non-participating trade allies were asked to estimate what percentage of their customers were aware of the Residential Prescriptive Rebate program. The average reported percentage was 60%. Additionally, twenty-four non-participating trade allies reported that greater than 75% of their customers were aware of the program. When the non-participating trade allies were asked to rate their customers level of knowledge about the RPR program, on a scale from zero to five, where zero is not at all knowledgeable and five is highly knowledgeable, the average rating given was almost three (2.8). Additionally, thirty-seven percent of the non-participating trade allies rated their customer awareness at a four or greater.

Figure 7-3. Perceived Level of Customer Home EER Knowledge (n = 57)



Source: Evaluation Team analysis.

Price Matching

The non-participating trade allies were asked if they had ever lowered the price of a furnace to match the RPR program rebate, without submitting an application for the rebate. Fifty-one (88%) of the non-participating trade allies reported that they had never done so. When the trade allies who reported that they had lowered their price to match the program rebate were asked why they did not submit a rebate for the measures, the most commonly reported reason was that they did not want to bother with the paper work and the program requirements. However, none of the trade allies indicated that price matching the rebates was something they did on a regular basis.

7.4 Data Collection Instruments

Peoples Gas and North Shore Gas RPR and CSR GPY2 Non-Participating Trade Ally Survey July 25, 2013 Draft

INTRODUCTION AND SCREENING QUESTIONS

INTRO1 Hello, my name is _____, and I'm calling from an independent research firm on behalf of Peoples Gas and North Shore Gas. May I please speak with <CONTACT NAME>? This is not a sales call. [IF NECESSARY] We are currently conducting important research about sales of heating and cooling equipment in Peoples Gas and North Shore Gas territory. By participating in the short survey, you will help the utilities understand area HVAC sales practices, which will help design better programs in the future. We will be reporting in aggregate form, and therefore your company-specific information will remain confidential.

1. CONTINUE WITH CONTACT ONCE THEY ARE ON THE PHONE
2. CONTACT NOT AVAILABLE [SCHEDULE CALLBACK]
3. NOT A GOOD TIME TO CONDUCT SURVEY [SCHEDULE CALLBACK]

[ASK IF <PART DATE> IS NOT NULL]

SCR1 We are contacting you because your company participated in the Residential Prescriptive Rebate Program in <PART DATE>, but have not participated since. Does this sound correct?

1. YES [SKIP TO FurnSO1] [CONTACT TYPE = PART]
2. NO [ASK SCR2]

888. Don't Know [ASK SCR2]

999. Refused [ASK SCR2]

[ASK IF <PART DATE> IS NULL or SCR1 = 2, 888, or 999]

SCR2 Are you familiar with Peoples Gas and North Shore Gas' Residential Prescriptive Rebate Program, where your customers can receive rebates for purchasing high efficiency HVAC and water heating equipment?

1. YES [ASK SCR2a]
2. NO [SKIP TO INFO]

888. Don't Know [SKIP TO INFO]

999. Refused [SKIP TO INFO]

For the sake of brevity, from now on I'm going to refer to the Residential Prescriptive Rebate Program simply as "the Program". I'm also going to refer to Peoples Gas and North Shore Gas as "the utilities".

[ASK IF SCR2 = 1]

SCR2a Did you participate in the Program?

1. YES [ASK SCR2b] [CONTACT TYPE = PART]
2. NO [SKIP TO AW1] [CONTACT TYPE = NONPART]
889. Don't Know [SKIP TO AW1] [CONTACT TYPE = NONPART]
999. Refused [SKIP TO AW1] [CONTACT TYPE = NONPART]

SCR2b When did you last participate in the Program?

RECORD DATE (e.g., approximate date is acceptable = July of 2012)

890. Don't Know
999. Refused

[ASK IF SCR2 = 2, 888, or 999]

INFO1 Would you like to receive information about the Program or be contacted by a Gas utility representative to hear more about the benefits of the program?

1. YES – RECEIVE INFO [THANK AND TERMINATE]
2. YES – CONTACT [THANK AND TERMINATE]
3. YES – RECEIVE INFO AND CONTACT [THANK AND TERMINATE]
4. NO [THANK AND TERMINATE]
888. Don't Know
999. Refused

AWARENESS

AW1 How did you first learn about the Program as a trade ally?

1. Trade association [IF YES, RECORD WHICH]
2. Customer
3. Friend in the furnace/boiler/water heater industry
4. Radio
5. TV
6. Other news media
7. Bill insert from Peoples Gas/North Shore Gas
8. Direct mailing to me from Peoples Gas/North Shore Gas
9. Peoples Gas/North Shore Gas Representative

10. Franklin Energy Representative

11. Other Utility

777. Other RECORD VERBATIM

888. Don't Know

999. Refused

AW2 When did you first learn about the Program?

RECORD APPROXIMATE DATE

888. Don't Know

999. Refused

AW3 On a scale from zero to five, where zero is not at all knowledgeable and five is highly knowledgeable, how knowledgeable are you about the Program?

RECORD RATING

888. Don't Know

999. Refused

AW4 Have you received any promotional materials from the utilities regarding the program?

1. Yes [\[ASK AW4a\]](#)

2. No

888. Don't Know

999. Refused

AW4a Can you please describe the promotional materials that you received?

RECORD VERBATIM

888. Don't Know

999. Refused

AW5 Have you attended any utility training sessions?

1. Yes [\[ASK AW5a\]](#)

2. No

888. Don't Know

999. Refused

AW5a Can you please describe the training sessions that you attended?

RECORD VERBATIM

888. Don't Know

999. Refused

AW6 Have you looked at the program website to find information?

1. Yes [ASK AW6a]

2. No

888. Don't Know

999. Refused

AW6a Did you find the information that you needed?

1. Yes

2. No

888. Don't Know

999. Refused

CSR1 Are you familiar with the Complete System Replacement, or CSR, aspect of the Residential Prescriptive Rebate program? [IF NECESSARY] The CSR Program is a joint program run with ComEd, where your customers can receive an additional rebate for replacing their central air conditioning unit at the same time as their furnace.

1. Yes [ASK CSR2]

2. No [SKIP TO FURNSO1]

888. Don't Know [SKIP TO FURNSO1]

999. Refused [SKIP TO FURNSO1]

CSR2 Using the same 0 to 5 scale, where zero is not at all familiar and 5 is very familiar, how familiar are you with the CSR program?

RECORD RATING

888. Don't Know

999. Refused

CSR3 Did you participant in the CSR Program?

1. YES [ASK CSR3a] [CSR CONTACT TYPE = PART]

2. NO [SKIP TO AW7] [CSR CONTACT TYPE = NONPART]

888. Don't Know [SKIP TO AW7] [CSR CONTACT TYPE = NONPART]

999. Refused [SKIP TO AW7] [CSR CONTACT TYPE = NONPART]

[IF CSR3a = 1]

CSR3a When did you last participant in the CSR Program?

RECORD DATE

888. Don't Know

999. Refused

DROP OUT PARTICIPANT SPILLOVER (Questions were modified as appropriate for trade allies that had never participated)

[ASK FurnSO1 – FurnQuanPart_A IF CONTACT TYPE = PART]

Now I'm going to ask you a few questions about your HVAC sales. The next few questions are about your heating measure sales. When I refer to a high efficiency heating unit, I'm specifically asking about high efficiency furnaces with a AFUE rating of 92% or above, and boilers with an AFUE of 90% or greater.

I am also asking about sales only in Peoples Gas and North Shore Gas Territory. Please do your best to only count sales in those territories.

Heating Units (Furnaces and Boilers)

FurnSO1 Before you participated in the Program, of all the heating units you sold, what percentage of your customers purchased high efficiency heating unit, ? [PROBE FOR PERCENTAGE]

RECORD PERCENTAGE

888. Don't Know

999. Refused

FurnSO2 Since you last participated in the Program, has the percentage of your customers who purchase high efficiency heating units (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings or above) increased, decreased, or remained the same? I'm asking specifically about the time period after you *last* participated in the program.

1. INCREASED FREQUENCY

2. DECREASED FREQUENCY

3. REMAINED THE SAME [SKIP TO FurnQuanPart]

888. Don't Know

999. Refused

FurnSO3 Since you last participated in the Program, of all the furnaces you sold, what percentage of your customers purchased high efficiency furnaces (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings or above)? [\[IF NECESSARY\]](#)
Remember, I'm asking specifically about the time period after you *last* participated in the program. [\[PROBE FOR PERCENTAGE\]](#)

RECORD PERCENTAGE

888. Don't Know

999. Refused

[PERCENT EFFIC = FurnSO3 or FurnSO1 if FurnSO2 = 3](#)

CONSISTENCY CHECK:

[\[ASK IF FurnSO2 = 1 AND FurnSO3 < FurnSO1\]](#) or [\[ASK IF FurnSO2 = 2 AND FurnSO3 > FurnSO1\]](#)

FurnConCh I noticed that you stated that your high efficiency heating unit sales have been higher/lower since your participation in the program, but the percentage of sales that you gave was lower/higher after your participation in the program. These responses seem to contradict each other; can you help me understand this? [\[REPEAT QUESTIONS FurnSO1 – FurnSO3 AS NECESSARY\]](#)

[\[ASK IF FurnSO2 = 1\]](#)

FurnSO4 On a scale from zero to five, where zero is not at all influential and five is very influential, how influential was your participation in the Program on increasing the percentage of your customer who purchased high efficiency heating units (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings or above)? [\[PROBE FOR RATING\]](#)

RECORD RATING

888. Don't Know

999. Refused

[\[ASK ALL PARTS\]](#)

FurnQuanPart About how many heating units (furnaces and boilers), regardless of efficiency, did you sell in the past year? [\[IF NECESSARY\]](#) All answers given will remain confidential.

RECORD QUANTITY

888. Don't Know

999. Refused

[PROBE FOR QUANTITY IF NECESSARY]

FurnQuanPart_A Was it...

1. Fewer than 10
2. Between 10 and 25
3. Between 25 and 50
4. Between 50 and 100
5. Between 100 and 250
6. More than 250

888. Don't Know

999. Refused

[ASK CACSO1 – CACQuanPart_A IF CAC CONTACT TYPE = PART]

CACs

Now I'm going to ask you a few questions about your participation in the Complete System Replacement (CSR) portion of the Residential Prescriptive Rebate program. [IF NECESSARY] The CSR program offers additional rebates to your customers for installing a high efficiency CAC unit at the same time as a high efficiency furnace.

CACSO1 Before you participated in the CSR program, what percentage of your customer purchased high efficiency central air conditioning units, meaning those with 14.5 SEER ratings or above? [PROBE FOR PERCENTAGE]

RECORD PERCENTAGE

888. Don't Know

999. Refused

CACSO2 Since your participation in the CSR program, has the percentage of your customer who purchase high efficiency CAC units (those with 14.5 SEER ratings or above) increased, decreased, or remained the same? I'm asking specifically about the time since you *last* participated in the program.

1. INCREASED FREQUENCY
2. DECREASED FREQUENCY
3. REMAINED THE SAME [SKIP TO CACQuanPart]

888. Don't Know

999. Refused

CACSO3 Since you last participated in the CSR program, what percentage of your customers purchased high efficiency CAC units (those with 14.5 SEER ratings or above)? [\[IF NECESSARY\]](#) Remember, I'm asking specifically about the time since you *last* participated in the program. [\[PROBE FOR PERCENTAGE\]](#)

RECORD PERCENTAGE

888. Don't Know

999. Refused

CONSISTENCY CHECK:

[\[ASK IF CACSO2 = 1 AND CACSO3 < CACSO1\]](#) or [\[ASK IF CACSO2 = 2 AND CACSO3 > CACSO1\]](#)

CACConCh I noticed that you stated that your high efficiency CAC sales have been higher/lower since your participation in the program, but the percentage of sales that you gave was lower/higher after your participation in the program. These responses seem to contradict each other; can you help me understand this? [\[REPEAT QUESTIONS CACSO1 – CACSO3 AS NECCESARY\]](#)

[\[ASK IF CACSO2 = 1\]](#)

CACSO4 On a scale from zero to five, where zero is not at all influential and five is very influential, how influential was your participation in the CSR program on increasing the percentage of your customer who purchased high efficiency furnaces (those with 14.5 SEER ratings or above)?

RECORD RATING

888. Don't Know

999. Refused

[\[ASK ALL CSR PARTS\]](#)

CACQuanPart About how many total CAC units did you sell in the past year? I'm asking about all CAC units, not just high efficiency ones. [\[IF NECESSARY\]](#) All answers given will remain confidential.

RECORD QUANTITY

888. Don't Know

999. Refused

[\[PROBE FOR QUANTITY IF NECESSARY\]](#)

CACQuanPart_A Was it...

1. Fewer than 10
 2. Between 10 and 25
 3. Between 25 and 50
 4. Between 50 and 100
 5. Between 100 and 250
 6. More than 250
888. Don't Know

999. Refused

AWARE NON-PARTICIPANT SPILLOVER

[ASK FurnSO5 – FurnQuanNP_A IF CONTACT TYPE = NONPART]

Now I'm going to ask you a few questions about your HVAC sales. The next few questions are about your heating measure sales. When I refer to a high efficiency heating unit, I'm specifically asking about high efficiency furnaces with a AFUE rating of 92% or above, and boilers with an AFUE of 90% or greater.

I am also asking about sales only in Peoples Gas and North Shore Gas Territory. Please do your best to only count sales in those territories.

Furnaces

FurnSO5 Before you learned about the Program, of all the heating units you sold, what percentage of your customers purchased high efficiency units? [PROBE FOR PERCENTAGE]

RECORD PERCENTAGE

888. Don't Know

999. Refused

FurnSO6 Since you've learned about the Program, has the percentage of your customers who purchase high efficiency furnaces (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings and above) increased, decreased, or remained the same?

1. INCREASED FREQUENCY
 2. DECREASED FREQUENCY
 3. REMAINED THE SAME [SKIP TO FurnQuanNP]
888. Don't Know

999. Refused

FurnSO7 Since you've learned about the Program, of all the furnaces you sold, what percentage of your customers purchased high efficiency furnaces (furnaces with 92% AFUE

ratings or above and boilers with 90% AFUE ratings and above)? [\[PROBE FOR PERCENTAGE\]](#)

RECORD PERCENTAGE

888. Don't Know

999. Refused

[PERCENT EFFIC = FurnSO7 or FurnSO5 if FurnSO6 = 3](#)

CONSISTENCY CHECK:

[\[ASK IF FurnSO6 = 1 AND FurnSO7 < FurnSO6\]](#) or [\[ASK IF FurnSO6 = 2 AND FurnSO7 > FurnSO6\]](#)

FurnConCh I noticed that you stated that your high efficiency heating unit sales have been higher/lower since you learned about the program, but the percentage of sales that you gave was lower/higher after you learned about the program. These responses seem to contradict each other; can you help me understand this? [\[REPEAT QUESTIONS FurnSO5 – FurnSO7 AS NECCESARY\]](#)

[\[ASK IF FurnSO6 = 1\]](#)

FurnSO8 On a scale from zero to five, where zero is not at all influential and five is very influential, how influential was learning about the Program on increasing the percentage of your customers who purchased high efficiency heating units (furnaces with 92% AFUE ratings or above and boilers with 90% AFUE ratings and above)? [\[PROBE FOR RATING\]](#)

RECORD RATING

888. Don't Know

999. Refused

FurnQuanNP About how many heating units (boilers and furnaces), regardless of efficiency, did you sell in the past year? [\[IF NECESSARY\]](#) All answers given will remain confidential.

RECORD QUANTITY

888. Don't Know

999. Refused

[\[PROBE FOR QUANTITY IF NECESSARY\]](#)

FurnQuanNP_A Was it...

1. Fewer than 10
2. Between 10 and 25

- 3. Between 25 and 50
- 4. Between 50 and 100
- 5. Between 100 and 250
- 6. More than 250
- 888. Don't Know

999. Refused

[ASK CACSO5 – CACQuanNP_A IF CSR CONTACT TYPE = NONPART]

CAC

CACSO5 Before you learned about the CSR program, what percentage of your customer purchased high efficiency CAC units, meaning those with 14.5 SEER ratings or above? [PROBE FOR PERCENTAGE]

RECORD PERCENTAGE

888. Don't Know

999. Refused

CACSO6 Since you've learned about the CSR program, has the percentage of your customer who purchased high efficiency CAC units (those with 14.5 SEER ratings or above) increased, decreased, or remained the same?

- 1. INCREASED FREQUENCY
- 2. DECREASED FREQUENCY
- 3. REMAINED THE SAME [SKIP TO CACQuanNP]

888. Don't Know

999. Refused

CACSO7 Since you've learned about the CSR program, what percentage of your customers purchased high efficiency CAC units (those with 14.5 SEER ratings or above)? [PROBE FOR PERCENTAGE]

RECORD PERCENTAGE

888. Don't Know

999. Refused

CONSISTENCY CHECK:

[ASK IF CACSO6 = 1 AND CACSO7 < CACSO6] or [ASK IF CACSO6 = 2 AND CACSO7 > CACSO6]

CACConCh I noticed that you stated that your high efficiency CAC sales have been higher/lower since you learned about the program, but the percentage of sales that you gave was lower/higher after you learned about the program. These responses seem to contradict each other; can you help me understand this? [\[REPEAT QUESTIONS CACSO5 – CACSO7 AS NECESSARY\]](#)

[\[ASK IF CACSO6 = 1\]](#)

CACSO8 On a scale from zero to five, where zero is not at all influential and five is very influential, how influential was learning about the CSR program on increasing the percentage of your customer who purchased high efficiency CAC units (those with 14.5 SEER ratings or above)?

RECORD RATING

888. Don't Know

999. Refused

CACQuanNP About how many CAC units did you sell in the past year? I'm asking about all CAC units, not just high efficiency ones. [\[IF NECESSARY\]](#) All answers given will remain confidential.

RECORD QUANTITY

888. Don't Know

999. Refused

[\[PROBE FOR QUANTITY IF NECESSARY\]](#)

CACQuanNP_A Was it...

1. Fewer than 10
2. Between 10 and 25
3. Between 25 and 50
4. Between 50 and 100
5. Between 100 and 250
6. More than 250

888. Don't Know

999. Refused

PRICE MATCHING

PM1 In your best estimate, approximately what percentage of your customers are aware of the Residential Prescriptive Rebate program?

RECORD PERCENTAGE

888. Don't Know

999. Refused

PM2 Using a zero to five scale, where zero is not at all knowledgeable and five is highly knowledgeable, how knowledgeable are your customers about the program?

RECORD RATING

888. Don't Know

999. Refused

PM3 Have you ever had to lower your sales price on a furnace to match the program rebate, without submitting a program application for a rebate?

1. Yes [\[ASK PM4\]](#)

2. No

888. Don't Know

999. Refused

PM4 Why did you not submit a rebate for these units?

RECORD VERBATIM

888. Don't Know

999. Refused

[\[ASK PM5 – PM8 IF CSR CONTACT TYPE = PART OR NONPART\]](#)

PM5 In your best estimate, approximately what percentage of your customers are aware of the CSR program?

RECORD PERCENTAGE

888. Don't Know

999. Refused

PM6 Using a zero to five scale, where zero is not at all knowledgeable and five is highly knowledgeable, how knowledgeable are you customers about the CSR program?

RECORD RATING

888. Don't Know

999. Refused

PM7 Have you ever had to lower your sales price on a CAC unit to match the program rebate, without submitting a program application for a rebate?

1. Yes [\[ASK PM8\]](#)

2. No

888. Don't Know

999. Refused

PM8 Why did you not submit a rebate for these units?

RECORD VERBATIM

888. Don't Know

999. Refused

PROCESS SECTION

Barriers to participation

B1 Earlier you stated that approximately <PERCENT EFFIC> percent of your sales since you <participated in/learned about> the program were for energy efficiency furnaces, but you did not submit rebates for these units. Can you explain why you chose not to? [DO

NOT READ, ACCEPT UP TO 3]

1. Customers not interested
2. Paper work was too burdensome
3. Did not have enough information about the program
4. Insufficient financial incentive
5. Personal dissatisfaction with prior RPR program participation
6. Personal dissatisfaction with prior North Shore/Peoples Gas program participation
7. Personal dissatisfaction with other utility program participation
8. Customer dissatisfaction with prior RPR program participation
9. Customer dissatisfaction with prior North Shore/Peoples Gas program participation
10. Customer dissatisfaction with prior other utility program participation

777. OTHER – RECORD VERBATIM

888. Don't Know

999. Refused

[IF B1 = 1]

B1a Do you know why your customers were not interested in participating?

RECORD VERBATIM

888. Don't Know

999. Refused

[IF B1 = 5, 6, 7 ASK B1b and B1c]

B1b Do you remember what program it was?

RECORD VERBATIM

888. Don't Know

999. Refused

B1c Can you describe how you were dissatisfied with your experience?

RECORD VERBATIM

888. Don't Know

999. Refused

[IF B1 = 8, 9, 10 ASK B1d and B1e]

B1d Did your customer mention what program it was?

RECORD VERBATIM

888. Don't Know

999. Refused

B1e Do you know why your customer was dissatisfied with their experience?

RECORD VERBATIM

888. Don't Know

999. Refused

B2 Do you have any recommendations for changes that can be made to the program to increase participation by contractors like yourself?

RECORD VERBATIM

888. Don't Know

999. Refused

B3 If the utilities were to offer a rebate directly to you, the trade ally, to subsidize the sale of a high efficiency furnace, would you be more likely to participate in the program, less likely to participate in the program, or neither more or less likely to participate?

1. More Likely
2. Less Likely
3. Neither

888. Don't Know

999. Refused

B4 If the utilities were to offer a rebate directly to its trade allies to subsidize the sale of high efficiency furnaces, what affect would this have on the price that your customers pay for a high efficiency unit? Would you

1. Lower the price of HE furnaces across the board for all customers by the full amount of the incentive
2. Use the incentive money to decrease the cost of HE furnaces only as necessary to sell more units
3. Sell the all HE furnaces at the same price and retain the incentive money

888. Don't Know

999. Refused

INSTALLATION PRACTICES/EARLY REPLACEMENT SECTION

Now I'd like to ask you a few questions about your general installation practices.

D1 When you install HVAC equipment, about what percent of the time do you typically...

[READ EACH AND RECORD % FOR EACH, 777 FOR DO NOT SELL CAC UNITS, 888 FOR DON'T KNOW AND 999 FOR REFUSED]

- A Perform a load calculation to determine proper equipment sizing?
- B Measure for and adjust the airflow level?
- C Charge the refrigerant to the manufacturer's recommended sub-cooling value?
- D Check the quality of the duct sealing of associated ducts?
- E Perform duct sealing as part of the HVAC installation?

D2 About how often do you recommend replacing both heating and cooling equipment when a customer decides to replace one or the other? Would you say always, most of the time, sometimes, or never?

1. Always
2. Most of the time
3. Sometimes
4. Never [SKIP TO INFO]

888. Don't know

999. Refused

D3 What are the main reasons you would recommend replacing both units at the same time? [DO NOT READ, UP TO 3 MULTIPLE RESPONSES ALLOWED]

1. Sell more units

2. More cost effective for the customer
3. To ensure system compatibility
4. The other unit is close to failing
5. Units are a similar age
6. To convert them to a type of unit we sell and maintain

777. Other [SPECIFY]

888. Don't know

999. Refused

D4 About what percentage of the time do your customers follow through on this recommendation?

RECORD PERCENTAGE

888. Don't Know

999. Refused

D5 In your opinion, what is the primary reason customers do not follow through on the recommendation to replace both units at the same time? [DO NOT READ LIST; RECORD ONE ANSWER]

1. Do not wish to pay the upfront costs
2. Cannot afford to incur upfront costs at this time
3. Believe the other unit is in good enough shape/will last longer
4. Moving soon

777. Other [SPECIFY]

888. Don't Know

999. Refused

[ASK ALL]

INFO Would you like to receive additional information about the Program or be contacted by a North Shore or Peoples Gas representative to hear more about the benefits of the program?

1. YES – RECEIVE INFO
2. YES – CONTACT

3. YES – RECEIVE INFO AND CONTACT

4. NO

888. Don't Know

999. Refused

[INSERT STANDARD THANK YOU AND SIGN OFF]