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Home Energy Efficiency Rebate Program
GPY2 Evaluation Report

Draft

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

Presented to
Nicor Gas Company

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E. Executive Summary

This report presents a summary of the findings and results from the Impact and Process Evaluation of the Nicor Gas program year two (GPY2)[1] Home Energy Efficiency Rebate Program (Home EER)[2]. Under the Home EER program, cash incentives were offered to encourage Nicor 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. For GPY2, the Home EER program added rebates for several new measures, including pipe insulation, programmable thermostats, and high efficiency windows.

E.1. Program Savings

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

Table E-1. GPY2 Program Results

Savings Category	Nicor Gas
Ex Ante Gross Savings[3] (Therms)	2,847,533
Verified Gross Realization Rate	1.00‡
Verified Gross Savings (Therms)	2,858,644
Net to gross ratio (NTGR)	0.69†
Verified Net Savings (Therms)	1,972,464

Source: Utility tracking data and Navigant analysis.

† *A deemed value. Approved by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG).*

‡ *Based on evaluation research findings*

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

[2] While the Home EER and CSR program are jointly offered by Nicor Gas and ComEd, this report covers the evaluation of the Nicor Gas component of the program.

[3] From Tracking System

Table E-2. GPY2 Program Results by Measure

Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
High Efficiency Boiler	21,802	1.00‡	21,803*	0.69†	15,044
High Efficiency Furnace	2,545,517	1.00‡	2,545,849*	0.69†	1,756,636
Pipe Insulation	704	0.93‡	655	0.69†	452
Programmable Thermostat	216,819	0.99‡	215,475	0.69†	148,678
Storage Water Heater	44,246	1.27‡	56,329	0.69†	38,867
Indirect Water Heater	805	1.11‡	894	0.69†	617
High Efficiency Windows	17,639	1.00‡	17,639	0.69†	12,170

Source: Utility tracking data and Navigant analysis.
** Have higher verified gross savings due to rounding.*
†A deemed value. SAG approved NTG
‡ Based on evaluation research findings.

E.3. Impact Estimate Parameters

The evaluation used parameters as defined by the Illinois Technical Resource Manual (TRM).

Table E-3. Impact Estimate Parameters

Parameter	Data Source	Deemed or Evaluated?
NTGR	SAG Spreadsheet†	Deemed
RR	Evaluation research	Evaluated

Source: Navigant analysis
† Document provided by Nicor Gas to the SAG summarizing the SAG-approved NTGR for Nicor Gas for GPY1-GPY3 as negotiated in March-August 2013. Distributed in the SAG Meeting on August 5-6, 2013.
http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August 5-6, 2013 Meeting/Nicor_Gas_NTG_Results_and_Application_GPY1-3.pdf.

E.4. Impact Estimate Parameters for Future Use

In the course of our GPY2 research, the evaluation researched the 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 parameters that the evaluation team recommended for future use in the TRM are shown in the following table.

Table E-4. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source
Early Replacement Rate for a Furnace that is Replaced by a Furnace-Only Participant	7%	Evaluation team research.
Early Replacement Rate for a Furnace that is a Primary CSR Measure.	14%	Evaluation team research.
Early Replacement Rate for a Furnace that is a Secondary CSR Measure.	46%	Evaluation team research.
Non-Participant TA Spillover	0.04	Evaluation team research

Source: Navigant analysis

E.5. Participation Information

The program had 17,167 participants in GPY2 and distributed 22,230 measures as shown in the following table.

Table E-5. GPY2 Primary Participation Detail

Participation	Nicor Gas
Participants	17,167
Total Measures	9
Installed Measures	22,230

Source: Utility tracking data and Navigant analysis.

E.6. Conclusions and Recommendations

The following provides insight into key program findings and recommendations:

Program Savings

Finding 1. The Nicor Gas Home EER program achieved 1,972,464verified net therms savings for PY2, and had 17,167 program participants. Nicor Gas achieved 88% of its original GPY2 savings goal of 2,235,590 therm savings, and 53% of its targeted program participants. Nicor Gas also fell short of the implementation contractor's revised goals for PY2. Eighty-nine percent of the program savings were from high efficiency furnace participants.

Gross Realization Rates

Finding 2. The pipe insulation realization rate was 0.93 because the implementation contractor (IC) recorded the incorrect savings value. Additionally, the programmable thermostat realization rate was 0.99 because an incorrect in-service rate was used for self-installed thermostats. Storage water heaters received a realization rate of 1.27 because the

baseline efficiency assumption used in the ex-ante gross savings estimates was for the incorrect size water heater.

Recommendation 2a. The IC should thoroughly check the savings algorithms, assumptions, and deemed savings values being used in the program tracking system to ensure that they match the recommendations in the Illinois TRM.

Recommendation 2b. To ensure that the program meets the requirements as defined in the IL TRM, the Home EER program must ensure that contractors who install programmable thermostats know 1) how to program a programmable thermostat, 2) that the thermostats should be programmed using an appropriate set back schedule (such as the one suggested by ENERGY STAR), and 3) that they should instruct the homeowners on the appropriate use of a programmable thermostat. The program should also clearly indicate in the program tracking database whether a thermostat was installed by a contractor or by the customer.

To ensure that an ISR of 100% would be supported by primary research in an evaluation, Navigant also recommends the program consider making some or all of the following changes to the program implementation process: 1) make ENERGY STAR pre-programming a requirement for all qualified thermostats; 2) include properly programming the rebated thermostats as part of the list of measure requirements on the program application, literature, and website; and 3) implement a verification process to ensure that programmable thermostats installed by participating contractors are being properly programmed at the time of installation.

Trade Ally Participation: Spillover and Application Process

Finding 3. Forty-seven percent of non-participating trade allies interviewed reported that they had sold program qualified measures without applying for rebates for those measures, resulting in therm savings amounting to 4% of the program's gross savings. When asked why they did not submit these measures to the program, the most commonly cited reason was the perception or experience that the program requirements were burdensome. In many cases the trade allies claimed they relied on their customers to apply for the program, however Navigant was unable to find any evidence that those customers submitted program applications without a trade ally.

Recommendation 3a. Navigant recommends including the non-participating trade ally spillover savings rate, 4% of program gross savings, to future NTGR for this program.

Recommendation 3b. Because Nicor Gas completely revised the application for GPY3 to simplify it, Navigant recommends an outreach effort to ensure that all "drop-out" trade allies are aware of the new, simplified application process. This effort could also include temporarily offering trade ally spiffs, which would encourage trade allies to utilize the new application.

Finding 4. Of the never-participated trade allies who agreed to complete the survey, fifty-six percent reported that they were unaware of the Home EER program.

Recommendation 4. Navigant suggests that there are additional opportunities for Nicor Gas to increase program awareness among contractors in the service territory, and that the program would benefit from additional trade ally outreach efforts.

Early Replacement Analysis

Finding 5. Forty-six percent of furnaces that were installed as *secondary* units (the measure that did *not* cause the participant to contact a trade ally) by CSR participants can be considered early replacement measures instead of replace-on-burnout measures. Early replacement was calculated based on the condition, age, and repair history of the replaced units. Fourteen percent of furnaces installed as the *primary* CSR measures (the measure that caused the participant to contact a trade ally) can be considered early replacement, and seven percent of furnaces replaced by furnace-only participants can be considered early replacement.

Recommendation 5a. Navigant recommends that the Illinois TRM account for early replacement rates of furnaces as described above: 46% for *secondary* units of CSR participants, 14% for *primary* units of CSR participants, and 7% of furnace-only participants, rather than consider all CSR measures as replace-on-burnout.

Recommendation 5b. Navigant suggests that Nicor Gas consider the addition of an early replacement component to the stand-alone furnace program. This could include marketing materials, data collection, and additional incentives that would promote and encourage the early replacement of units that may be working, but are highly inefficient. The program qualifications may be similar to those for the furnace early replacement program currently offered in Ameren territory, where an additional rebate is offered for units that are working, and also either has an AFUE level of less than 75% or is more than thirty years old.

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1. Introduction

1.1 Program Description

Under the Rider 30 Home Energy Efficiency Rebate (Home EER) program, cash incentives and education were offered to encourage upgrading of water- and space-heating equipment among residential customers of Nicor Gas, and central air conditioning (CAC) systems for ComEd customers through the complete system replacement (CSR) portion of the program. The Home EER 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 Nicor Gas in order to receive rebates for gas saving measures, or Nicor Gas and ComEd to receive rebates for high efficiency furnaces and air conditioning systems under the CSR portion of the program, and the premises must be used for residential purposes in existing buildings.

The Home EER 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, programmable thermostats, domestic hot water (DHW) pipe insulation, windows, water heaters, and air conditioning systems. The dollar amount of the rebate depends on the size and efficiency of the replacement measures and ranged from $20 to $1,000. The GPY2 Rider 30 Home EER program is implemented by Resource Solutions Group (RSG) and ran from June 1, 2012 through May 30, 2013.

1.2 Evaluation Objectives

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

1.2.1 Impact Questions

1. Are interactive effects of "bundled" measures being properly captured?
2. What is the rate of non-participating and "drop-out" trade ally spillover?
3. What is the rate of early replacement of air conditioners and furnaces participating in the Home EER/CSR program?
4. What are the program's net and gross savings?
5. Are the TRM algorithms applied appropriately and the tracking system calculating savings correctly?

1.2.2 Process Questions

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

2. Evaluation Approach

This evaluation of the Nicor Gas Home EER program reflects the second full-scale year of program operation. During GPY2, 17,167 residential customers participated in the program. Navigant performed a tracking system review to determine ex ante gross savings by measure. To determine verified gross savings by measure, the evaluation team performed a measure verification for measures included in the Illinois TRM and a workpaper review for all other measures. These were compared to find the measure and program level realization rates for the Home EER program. The NTG ratio was determined using a combination of participant and participating trade ally free-ridership rates, and participating trade ally spillover rates from the GPY1 evaluation. For GPY2, a non-participating trade ally spillover rate was calculated in order to inform future program NTG ratios.

2.1 Overview of Data Collection Activities

The core data collection activities included non-participating trade ally surveys and participant surveys. The full set of data collection activities is shown in the following table.

Table 2-1. Core Data Collection Activities

N	What	Who	Target Completes	Completes Achieved	When	Comments
Impact Assessment						
1	Tracking System Review	Participants	Census	Census	May – September 2013	
2	Engineering Analysis	Participants	Census	Census	May – September 2013	
3	Telephone Survey	Non-Participating Trade Allies	50-70	60	September-October 2013	Data colleting supporting SO analysis
4	Telephone Survey	Program Participants	70 CSR/ 70 Furnace	70 CSR/ 70 Furnace	September-October 2013	Data collection supporting early replacement analysis.
Process Assessment						
5	In Depth Interviews	Program Manager/Implementer Staff	2-5	2	May – September 2013	

2.2 Verified Savings Parameters

Navigant used the Illinois TRM Version 1.0 methodology to calculate verified gross savings. However, both indirect water heaters and windows did not have methodologies included in the Illinois TRM. For these measures, Navigant verified workpapers provided by RSG. For the measures it covers, the Illinois TRM deems many values used in the algorithms. Table 2-2 lists the source of the

parameters that Navigant used. The Illinois TRM allows for some custom values to be used in the algorithms as well. Navigant used Nicor HEER tracking data for these values.

Table 2-2 Verified Gross Savings Parameters

Measure	Input Parameter Source
High Efficiency Boilers	Illinois TRM version 1.0 – Section 5.3.5
High Efficiency Furnaces	Illinois TRM version 1.0 – Section 5.3.6
DHW Pipe Insulation	Illinois TRM version 1.0 – Section 5.4.1, Nicor Gas memo[4]
Programmable Thermostats	Illinois TRM version 1.0 – Section 5.3.10
Storage Water Heaters	Illinois TRM version 1.0 – Section 5.4.2
Indirect Water Heaters	RSG workpaper
Windows	RSG workpaper

Source: Navigant analysis

2.3 Verified Gross Program Savings Analysis Approach

For the deemed savings estimates, Navigant calculated independent estimates of the savings for each measure based on the Illinois Technical Reference Manual (Illinois TRM). Navigant used the tracking data for participant location and equipment specifications. There was no TRM algorithm for both Indirect Water Heaters and Windows. In these cases, Navigant verified assumptions from RSG workpapers and then estimated savings based on them.

2.4 Verified Net Program Savings Analysis Approach

Verified net energy savings were calculated by multiplying the Verified Gross Savings estimates by a net-to-gross ratio (NTGR). For GPY2/EPY5, the evaluation team used NTGR values that were based on past evaluation research and defined through a negotiation process through SAG.[5] Navigant also conducted non-participating trade ally spillover research to inform future NTG ratios, discussed in Section 3.6.2 and detailed in Section 7.2.2.1.

2.5 Process Evaluation

The GPY2 evaluation activities included an inquiry into the reasons that trade allies may have participated in the Home EER program in GPY1, but did not participate in GPY2. 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.

[4] Nicor Gas Comments on HEER Report_010214 memo from Scott Dimetrosky of Apex Analytics (on behalf of Nicor Gas) and Atticus Doman of CLEAResult, January 2, 2014.

[5] http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August%205-6,%202013%20Meeting/Nicor_Gas_NTG_Results_and_Application_GPY1-3.pdf

3. Gross Impact Evaluation

This evaluation of the Nicor Gas Home EER program reflects the second full-scale year of program operation. During GPY2, 17,167 residential customers participated in the program. Navigant performed a tracking system review to determine ex ante gross savings by measure. To determine verified gross savings by measure, the evaluation team performed a measure verification for measures included in the Illinois TRM and a workpaper review for all other measures.. These were compared to find the measure and program level realization rates for the Home EER program.

3.1 Tracking System Review

Navigant performed a verification of the program tracking database to determine ex ante gross savings totals. The purpose of the tracking system review was to ensure these systems gather the data required to accurately calculate program savings. Navigant used customer site locations, measure quantities, efficiencies, and other such recorded information as inputs to Illinois TRM algorithms to determine verified gross savings.

Key findings include:

1. In both the High Efficiency Boilers and High Efficiency Furnaces measures, some AFUE values are recorded as decimals, while other are recorded as whole number percentages. For instance, a 92.5% AFUE boiler is recorded as 0.925 in one project, but as 92.5 in another project. It is recommended that this be standardized to either decimals or whole number percentages, but not both.
2. The quantity recorded for all DHW Pipe Insulation projects is one. It is unlikely that all pipe insulation projects had just one foot of insulation installed. It is recommended to record the actual linear feet of pipe insulation installed.

3.2 Program Volumetric Findings

In GPY2, the Nicor Gas Home EER program served 17,167 participants that installed a total of 22,320 projects across 9 different measures. This is an increase of approximately 115% from GPY1, which had a total of 10,327 projects across 5 different measures.

Key finding include:

1. High Efficiency Furnaces show the most participation and savings for the program. Programmable Thermostats have the second most participation and savings for the Home EER program.
2. Pipe Insulation showed the lowest savings for the program.

Table 3-1. GPY2 Volumetric Findings Detail

Measure	Total Participants	Percent of Participating Homes Installing Measure
High Efficiency Boiler	92	0.5%
High Efficiency Furnace	14,932	87%
DHW Pipe Insulation	108	0.6%
Programmable Thermostat	3,907	23%
Storage Water Heater	1,937	11%
Indirect Water Heater	22	0.1%
High Efficiency Windows	177	1%

Source: Navigant analysis.

3.3 Gross Program Impact Parameter Estimates

Navigant calculated verified gross savings from the GPY2 HEER program using algorithms and parameters defined in the Illinois TRM version 1.0. Navigant used the Illinois TRM for all measures except indirect water heaters and windows for which RSG work papers were used.

Table 3-2 Verified Gross Savings Parameters

Measure	Input Parameter Source
High Efficiency Boilers	Illinois TRM version 1.0 – Section 5.3.5
High Efficiency Furnaces	Illinois TRM version 1.0 – Section 5.3.6
DHW Pipe Insulation	Illinois TRM version 1.0 – Section 5.4.1, Nicor Gas memo[6]
Programmable Thermostats	Illinois TRM version 1.0 – Section 5.3.10
Storage Water Heaters	Illinois TRM version 1.0 – Section 5.4.2
Indirect Water Heaters	RSG workpaper
High Efficiency Windows	RSG workpaper

Source: Navigant analysis

The GPY2 HEER tracking database provided most input parameters necessary to calculate savings using the Illinois TRM version 1.0 and the provided RSG workpapers.

[6] Nicor Gas Comments on HEER Report_010214 memo from Scott Dimetrosky of Apex Analytics (on behalf of Nicor Gas) and Atticus Doman of CLEAResult, January 2, 2014.

Interactive effects (of a participant implementing multiple space heating measures or multiple water heating measures) to savings were not calculated by the program or by the evaluation team. The TRM does not define a method for determining relevant interactive effects; explicitly capturing interactive effects would require developing a new method to estimate them. The TRM does, however, account for various efficiencies of furnaces for their programmable thermostat measure, which achieved the second largest savings of all measures for this program. Thus, the evaluation team expects that developing a method to explicitly capture interactive effects for this program would yield negligible results and, thus, would not warrant the cost to calculate them.

3.4 Development of the Verified Gross Realization Rate

Navigant determined verified gross realization rates by comparing the ex-ante gross savings with the verified gross savings. The results are shown below.

Table 3-3. Verified Gross Realization Rates

Measure	Ex-Ante Gross Savings (therms)	Verified Gross Savings (therms)	Realization Rate
High Efficiency Boiler	21,802	21,803	1.00
High Efficiency Furnace	2,545,517	2,545,849	1.00
DHW Pipe Insulation	704	655	0.93
Programmable Thermostat	216,819	215,475	0.99
Storage Water Heater Generic	44,246	56,329	1.27
Indirect Water Heater Generic	805	894	1.11
Window	17,639	17,639	1.00
TOTAL	**2,847,533**	**2,858,644**	**1.00**

Source: Utility tracking data and Navigant analysis

3.5 Verified Gross Program Impact Results

As shown in the table above, the largest savings discrepancy was in the storage water heater measure which received a realization rate of 1.27. Additionally, pipe insulation received a realization rate of 0.93.

The pipe insulation ex ante gross savings were higher than the verified gross savings because Nicor Gas claimed 6.4 therms per 6 linear feet while Navigant determined the gross savings to be 6.0 therms per 6 linear feet. This savings value is based on the assumptions provided by Nicor Gas and RSG[7] applied to the Illinois TRM algorithm.

The programmable thermostat verified gross savings were lower than the ex-ante gross savings because RSG used an inappropriate in-service rate (ISR) for self-installed thermostats. The ISR used in the ex-ante gross savings for all non-self-install thermostat projects was 100% while the Illinois TRM prescribes an ISR of 56% for programmable thermostats that are not direct installed. The ISR of

[7] Nicor Gas Comments on HEER Report_010214 memo from Scott Dimetrosky of Apex Analytics (on behalf of Nicor Gas) and Atticus Doman of CLEAResult, January 2, 2014.

100% is to be used when thermostats have been direct installed by the program or installed by a qualified contractor. All other installations are to receive an ISR of 56%.[8]

To ensure that the program meets the requirements as defined in the IL TRM, the Home EER program must ensure that contractors who install programmable thermostats know 1) how to program a programmable thermostat, 2) that the thermostats should be programmed using an appropriate set back schedule (such as the one suggested by ENERGY STAR), and 3) that they should instruct the homeowners on the appropriate use of a programmable thermostat. The program should also clearly indicate in the program tracking database whether a thermostat was installed by a contractor or by the customer.

To ensure that an ISR of 100% would be supported by primary research in an evaluation, Navigant also recommends the program consider making some or all of the following changes to the program implementation process: 1) make ENERGY STAR pre-programming a requirement for all qualified thermostats; 2) include properly programming the rebated thermostats as part of the list of measure requirements on the program application, literature, and website; and 3) implement a verification process to ensure that programmable thermostats installed by participating contractors are being properly programmed at the time of installation.

Navigant determined the verified gross savings for storage water heaters to be higher than the ex-ante gross savings because a lower baseline efficiency was used in the engineering analysis. The Illinois TRM recommends a baseline efficiency of 0.575 for 50 gallon storage water heaters. A baseline efficiency of 0.594 was being used to calculate the ex-ante gross savings.

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

The resulting total program verified gross savings is 2,766,657 therms as shown in the following table.

Table 3-4. GPY2 Verified Gross Impact Savings Estimates

	Gross Energy Savings (Therms)
Ex-Ante GPY2 Gross Savings	2,847,533
Verified Gross Realization Rate	1.00‡
Verified Gross Savings	2,858,644

Source: Utility tracking data and Navigant analysis.
‡ Based on evaluation research findings

3.6 Impact Estimate Parameters for Future Use

In the course of our GPY2 research, the evaluation team researched 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 recommends the parameters shown below in Table 3-5.

Table 3-5. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source
Early Replacement Rate for a Furnace that is Replaced by a Furnace-Only Participant	7%	Evaluation team research.
Early Replacement Rate for a Furnace that is a Primary CSR Measure.	14%	Evaluation team research.
Early Replacement Rate for a Furnace that is a Secondary CSR Measure.	46%	Evaluation team research.
Non-Participant TA Spillover	0.04	Evaluation team research

Source: Navigant analysis

3.6.1 Early Replacement

The GPY2 evaluation activities included a survey of Home EER furnace participants and Home EER and CSR participants who replaced a furnace and central air conditioning (CAC) units simultaneously. These two groups of participants were surveyed to determine the rate at which furnaces and CAC units were replaced early as opposed to being replaced when the units failed (replace on burnout). The purpose of this analysis is to inform future changes to the Illinois Technical Resource Manual, which currently does not account for additional early replacement savings for furnaces and CAC units replaced simultaneously

CSR participants were asked questions to determine whether they contacted a trade ally because of issues with their furnace or their CAC unit. The unit (furnace or CAC unit) that initially caused the customer to contact the trade ally was labeled the "primary unit". The furnace or CAC unit that was also replaced but did not initially prompt the customer to contact the trade ally was labeled the "secondary unit". The CSR participants were asked a series of questions about the condition of the primary unit and the secondary unit replaced to determine the rate of early replacement.

Forty-six percent of furnaces that were installed as *secondary* units (the measure that did *not* cause the participant to contact a trade ally) by CSR participants can be considered early replacement measures instead of replace-on-burnout measures. Early replacement was calculated based on the condition, age, and repair history of the replaced units. Fourteen percent of furnaces installed as the *primary* CSR measures (the measure that caused the participant to contact a trade ally) can be considered early replacement, and seven percent of furnaces replaced by furnace-only participants can be considered early replacement.

3.6.2 Non-Participating Trade-Ally Spillover

To calculate non-participating trade ally spillover, two groups of non-participating trade allies were included: so-called "drop out" trade allies (those who had participated in GPY1 but did not participate in GPY2) and true non-participating trade allies. Non-participating trade ally spillover was determined using a method comparing sales of program-qualified furnaces before either GPY1 participation or becoming aware of the program, and after GPY1 participation or becoming aware of the program. The methodology also accounted for the influence of the program on any potential spillover. A detailed presentation of the spillover methodology can be found in Section 7.2.2.1.

In the future, Navigant suggests that the Illinois TRM deem the early replacement rate for furnaces as described above: 46% for *secondary* units of CSR participants, 14% for *primary* units of CSR participants, and 7% of furnace-only participants, rather than consider all CSR measures as replace-on-burnout. Nicor Gas is also modifying the CSR program applications to ensure that they will also begin collecting information to determine the early replacement rate for future use. The evaluation team also suggests that the deemed NTGR be increased to include the non-participant trade ally spillover. These changes would allow for a more accurate estimate of gross and net savings, accounting for savings not currently considered.

4. Net Impact Evaluation

For GPY2, SAG[9] deemed the NTGR value of 0.69 to calculate net savings for Nicor Gas. Table 4-1 shows the verified GPY2 net savings by measure type.

The overall program NTGR was calculated during the GPY1 evaluation by averaging the GPY1 participant and the trade ally free-ridership rates, and then adding the GPY1 participant, and participating trade ally spillover, as follows:

$$NTG_{Program} = 1 - \frac{(FR_{Part.} + FR_{TA})}{2} + SO_{Part.} + SO_{Part.TA}$$

Where NTGProgram = Program NTGR
FRPart. = Participant Free-Ridership
FR_{TA} = Trade Ally Free-Ridership
$SO_{Part.}$ = Participant Spillover

The resulting program GPY1 NTG ratio is as follows:

$$1 - \frac{0.38 + 0.37}{2} + 0 + 0.06 = 0.69$$

Table 4-1. Verified Net Savings by Measure

Measure	Verified Gross Savings (therms)	Verified Net Savings (Therms)
High Efficiency Boiler	21,803	15,044
High Efficiency Furnace	2,545,849	1,756,636
DHW Pipe Insulation	655	452
Programmable Thermostat	215,475	148,678
Storage Water Heater Generic	56,329	38,867
Indirect Water Heater Generic	894	617
Window	17,639	12,170
TOTAL	**2,858,644**	**1,972,464**

Source: Utility tracking data and Navigant analysis

[9] Document provided by Nicor Gas to the SAG summarizing the SAG-approved NTGR for Nicor Gas for GPY1-GPY3 as negotiated in March-August 2013. Distributed in the SAG Meeting on August 5-6, 2013. http://ilsagfiles.org/SAG_files/Meeting_Materials/2013/August 5-6, 2013 Meeting/Nicor_Gas_NTG_Results_and_Application_GPY1-3.pdf.

5. Process Evaluation

5.1 Non-Participating Trade Ally Process Finding

This section discusses the process results obtained from interviews with 60 non-participating trade allies. More detailed results can be found in Section 7.3.1.

5.1.1 Reasons for Trade Ally Non-Participation

One of the main reasons for non-participation among trade allies who have never participated is unawareness. Of the forty-one never participated trade allies that the evaluation team surveyed, 23 (56%) reported that they were unaware of the program. Based on this response rate, it appears that there are additional opportunities for Nicor Gas to increase its outreach efforts to these non-participating trade allies. Increasing the number of contractors who are aware of the program will help increase participation and program savings.

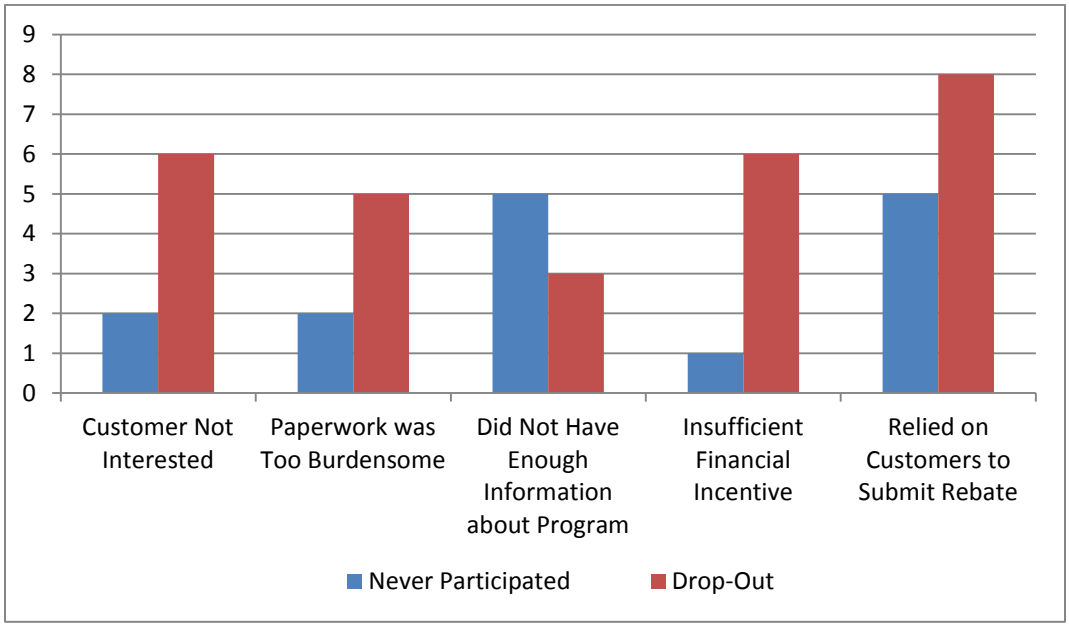
Non-participating trade allies who reported that they sold program-qualified furnaces but did not submit the measures for a rebate were asked the reasons that they did not submit them to the program. The most commonly cited reason (by thirteen trade allies) was that the trade allies were relying upon their customers to submit the rebates to Nicor Gas instead of doing it themselves. Another commonly cited reason was that the 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.

The trade allies also stated that they did not submit rebate application for program qualified furnaces because they themselves thought that the program paperwork was burdensome. Reasons also cited were that the trade ally did not have enough information about the program, and that the financial incentive was insufficient.

None of the trade allies reported that either they or any of the customers had prior bad experiences with any Nicor Gas or other utility program that would discourage them from participating in the Home EER program.

The trade allies who never participated in the program were more likely to report that they did not submit rebates for all qualified furnaces because they did not have sufficient information about the program. However, the "drop-out" trade allies were more likely to report that they thought that the program application process was too burdensome, and they were more likely to rely on their customers to complete and submit the application . In order to verify if any of these customers applied for the program rebate on their own, Navigant compared the trade ally contact information in the tracking database to the survey respondents. By definition, drop-out trade allies are not in the GPY2 tracking database, and less than 1% of GPY2 applications contained no trade ally contact information. Together this suggests that very few, if any, of these customers submitted rebate applications without a trade ally.

Figure 5-1. Reason for Not Submitting Qualified Furnaces for a Rebate (Never Participated: n = 13, Drop-Out: n = 21)



Source: Evaluation Team analysis.

5.1.2 Suggestions for Improving Trade Ally Retention

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.

The "drop-out" trade allies participated in GPY1, and would have used the Home EER program's original rebate application. Nicor Gas significantly changed the program application for GPY3, as suggested in the GPY1 program evaluation. The program application was simplified and clarified, and Navigant will be evaluation the trade ally response to the new application as part of the GPY3 evaluation process.

Navigant suggests that Nicor Gas make an effort to reach out to the "drop-out" trade allies to inform them of the new program application. Because none of the trade allies reported any negative experiences with the Home EER program beyond the application process, Navigant believes that efforts to promote the new application process will encourage the "drop-out" trade allies to reconsider future program participation.

5.1.1 Other Suggestions for Program Improvement

Several of the non-participating trade allies had some additional comments that are worth considering. One of the contractors requested that advanced notice be given to trade allies of any impending specials. He mentioned a specific instance where rebates were increased shortly after he had sold a standard efficiency furnace to a customer, and felt that had he known about the future special, he could have upsold a high efficiency unit. Another contractor mentioned that as a smaller

contractor, in-person training sessions are often inconvenient, and he would prefer webinar type training sessions, where he could learn about the program without committing additional travel time.

Also mentioned by a non-participating trade ally was a desire to see the program add additional incentives for quality installation practices, such as the use of Manual J or Manual D, or post-installation combustion analysis. A couple of contractors also mentioned including rebates to contractors (spiffs) as part of the rebate process. These were smaller contractors, who stated that the rebates process had been more complicated and time consuming then they had anticipated, and they felt that without an additional incentive they were unwilling and unable to encourage their customers to participate in the program.

6. Conclusions and Recommendations

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

Program Savings Goals Attainment

Finding 1. The Nicor Gas Home EER program achieved 1,972,464 verified net therms savings for PY2, and had 17,167 program participants. Nicor Gas achieved 88% of its GPY2 goal of 2,235,590 therm savings, and 53% of its targeted program participants. Nicor Gas also fell short of the implementation contractor's revised goals for PY2. Eighty-nine percent of the program savings were from high efficiency furnace participants.

Gross Realization Rates

Finding 2. The pipe insulation realization rate was 0.93 because the implementation contractor (IC) recorded the incorrect savings value. Additionally, the programmable thermostat realization rate was 0.99 because an incorrect in-service rate was used for self-installed thermostats. Storage water heaters received a realization rate of 1.27 because the baseline efficiency assumption used in the ex-ante gross savings estimates was for the incorrect size water heater.

Recommendation 2a. The IC should thoroughly check the savings algorithms, assumptions, and deemed savings values being used in the program tracking system to ensure that they match the recommendations in the Illinois TRM.

Recommendation 2b. To ensure that the program meets the requirements as defined in the IL TRM, the Home EER program must ensure that contractors who install programmable thermostats know 1) how to program a programmable thermostat, 2) that the thermostats should be programmed using an appropriate set back schedule (such as the one suggested by ENERGY STAR), and 3) that they should instruct the homeowners on the appropriate use of a programmable thermostat. The program should also clearly indicate in the program tracking database whether a thermostat was installed by a contractor or by the customer.

To ensure that an ISR of 100% would be supported by primary research in an evaluation, Navigant also recommends the program consider making some or all of the following changes to the program implementation process: 1) make ENERGY STAR pre-programming a requirement for all qualified thermostats; 2) include properly programming the rebated thermostats as part of the list of measure requirements on the program application, literature, and website; and 3) implement a verification process to ensure that programmable thermostats installed by participating contractors are being properly programmed at the time of installation.

Savings Estimates.

Finding 3. The savings algorithms used to determine the ex-ante gross savings estimates for windows were not immediately apparent. It is not a measure detailed in the Illinois TRM, and the documentation provided did not provide the level of detail needed to thoroughly investigate the measure.

Recommendation. While the windows measure is no longer in use for the HEER program, Navigant recommends that any measure not in the Illinois TRM have an accompanying calculator and/or workpaper to detail how ex ante savings estimates are calculated. The indirect water heater measure is a good example of this.

Trade Ally Participation: Spillover and Application Process

Finding 4. Forty-seven percent of non-participating trade allies interviewed reported that they had sold program qualified measures without applying for rebates for those measures, resulting in therm savings amounting to 4% of the program's gross savings. When asked why they did not submit these measures to the program, the most commonly cited reason was the perception or experience that the program requirements were burdensome. In many cases the trade allies claimed they relied on their customers to apply for the program, however Navigant was unable to find any evidence that those customers submitted program applications without a trade ally.

Recommendation 4a. Navigant recommends including the non-participating trade ally spillover savings rate, 4% of program gross savings, to future NTGR for this program.

Recommendation 4b. Because Nicor Gas completely revised the application for GPY3 to simplify it, Navigant recommends an outreach effort to ensure that all "drop-out" trade allies are aware of the new, simplified application process. This effort could also include temporarily offering trade ally spiffs, which would encourage trade allies to utilize the new application.

Finding 5. Of the never-participated trade allies who agreed to complete the survey, fifty-six percent reported that they were unaware of the Home EER program.

Recommendation 5. Navigant suggests that there are additional opportunities for Nicor Gas to increase program awareness among contractors in the service territory, and that the program would benefit from additional trade ally outreach efforts.

Early Replacement Analysis

Finding 6. Forty-six percent of furnaces that were installed as *secondary* units (the measure that did *not* cause the participant to contact a trade ally) by CSR participants can be considered early replacement measures instead of replace-on-burnout measures. Early replacement was calculated based on the condition, age, and repair history of the replaced units. Fourteen percent of furnaces installed as the *primary* CSR measures (the measure that caused the participant to contact a trade ally) can be considered early replacement, and seven percent of furnaces replaced by furnace-only participants can be considered early replacement.

Recommendation 6a. Navigant recommends that the Illinois TRM account for early replacement rates of furnaces as described above: 46% for *secondary* units of CSR participants, 14% for *primary* units of CSR participants, and 7% of furnace-only participants, rather than consider all CSR measures as replace-on-burnout.

Recommendation 6b. Navigant suggests that Nicor Gas consider the addition of an early replacement component to the stand-alone furnace program. This could include marketing materials, data collection, and additional incentives that would promote and

encourage the early replacement of units that may be working, but are highly inefficient. The program qualifications may be similar to those for the furnace early replacement program currently offered in Ameren territory, where an additional rebate is offered for units that are working, and also either has an AFUE level of less than 75% or is more than thirty years old.

7. Appendix

7.1 Glossary

High Level Concepts

Program Year

- EPY1, EPY2, etc. Electric Program Year where EPY1 is June 1, 2008 through May 31, 2009, EPY2 is June 1, 2009 through May 31, 2010, etc.
- GPY1, GPY2, etc. Gas Program Year where GPY1 is June 1, 2011 through May 31, 2012, GPY2 is June 1, 2012 through 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 EPY5/GPY2 the Illinois TRM was in effect and was the source of most deemed parameters. Some of ComEd's deemed parameters were defined in its filing with the ICC but the TRM takes precedence when parameters were in both documents.
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, Retrocommissioning), 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, Retrocommissioning), 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 research 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 ComEd's approved deemed values. Values that are based upon a deemed measure shall use the superscript "D" (e.g., delta watts^{D}, HOU-Residential^{D}).

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 ComEd'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, 2012[10].

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

[10] 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 Detailed Verified Gross Savings Approach and Findings

High Efficiency Boilers

Nicor Gas rebates two levels of high efficiency boilers: greater than 90% AFUE and greater than 95% AFUE. In both cases, RSG correctly applied the Illinois TRM algorithm for residential boilers.

$$\Delta therms = Gas\_Boiler\_Load \times \left(\frac{1}{AFUE_{base}} - \frac{1}{AFUE_{eff}}\right)$$

Table 7-1. Verified Gross Savings Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
Gas_Boiler_Load	Actual based on customer site location	Actual based on customer site location	Evaluated
$AFUE_{base}$	80%	80%	Deemed Illinois TRM
$AFUE_{eff}$	Actual AFUE of installed equipment	Actual AFUE of installed equipment	Evaluated
Δtherms	Varies	Varies	Evaluated

Source: Navigant analysis.

High Efficiency Furnaces

Nicor Gas rebates two levels of high efficiency furnaces: greater than 92% AFUE and greater than 95% AFUE. In both cases, RSG correctly applied the Illinois TRM algorithm for residential furnaces.

$$\Delta therms = Gas\_Furnace\_Load \times \left(\frac{1}{AFUE_{base}} - \frac{1}{AFUE_{eff}}\right)$$

Table 7-2. High Efficiency Furnaces Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
Gas_Furnace_Load	Actual based on customer site location	Actual based on customer site location	Evaluated
$AFUE_{base}$	80%	80%	Deemed Illinois TRM
$AFUE_{eff}$	Actual AFUE of installed equipment	Actual AFUE of installed equipment	Evaluated
Δtherms	Varies	Varies	Evaluated

Source: Navigant analysis.

Pipe Insulation

Nicor Gas rebates insulation on domestic hot water pipes. The tracking system shows that each project listed had a quantity of one and savings of 6.4 therms. Navigant was unable to recreate this savings value using the Illinois TRM algorithm. However, a memo from Nicor Gas dated January 2, 2014 details the assumptions used to determine the ex ante savings.[11]

$$\Delta therms = \left(\left(\frac{1}{R_{exist}} - \frac{1}{R_{new}}\right) \times (L \times C) \times \Delta T \times 8766\right) \Big/ \eta DHW / 100{,}000$$

Table 7-3. Pipe Insulation Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
R_{exist}	1.0	1.0	Deemed Illinois TRM
R_{new}	4.0	4.0	Verified from Nicor Gas memo[12].
L	6.0	6.0	Verified from Nicor Gas memo.
C	0.196	0.196	Verified from Nicor Gas memo.
ΔT	60	60	Deemed Illinois TRM
ηDHW	0.78	0.78	Deemed Illinois TRM
Δtherms	6.4	6.0	Evaluated

Source: Navigant analysis.

Programmable Thermostat

The Home EER program rebates programmable thermostats for residential gas customers. From the analysis performed, Navigant has determined that RSG used the incorrect in-service rate for this

[11] Nicor Gas Comments on HEER Report_010214 memo from Scott Dimetrosky of Apex Analytics (on behalf of Nicor Gas) and Atticus Doman of CLEAResult, January 2, 2014.

[12] Nicor Gas Comments on HEER Report_010214 memo from Scott Dimetrosky of Apex Analytics (on behalf of Nicor Gas) and Atticus Doman of CLEAResult, January 2, 2014.

measure. According to the Illinois TRM, if the thermostat was direct installed or contractor installed, it is to receive an in-service rate of 100%. All other methods of installation are assigned an in-service rate of 56%. Projects that were determined to be contractor installed received an ISR of 100%. All others received an ISR of 56%. The ISRs were assigned based on information provided by Samuel Dent of VEIC.

$$\Delta therms = \%FossilHeat \times Gas\_Heating\_Consumption \times Heating\_Reduction \times HF \times Eff\_ISR$$

Table 7-4. Programmable Thermostats Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
%FossilHeat	100%	100%	Deemed Illinois TRM
Gas_Heating_Consumption	Actual	Actual	Deemed Illinois TRM
Heating_Reduction	6.2%	6.2%	Deemed Illinois TRM
HF	100%	100%	Deemed Illinois TRM
Eff_ISR	100%	Self Installed: 56% Contractor Installed: 100%	Deemed Illinois TRM
Δtherms	Varies	Varies	Evaluated

Source: Navigant analysis.

Storage Water Heater

The Nicor Gas Home EER program incents storage water heaters with an energy factor (EF) greater than or equal to 0.67. Navigant's analysis determined that RSG used a baseline EF of 0.594. The Illinois TRM recommends this value for 40 gallon water heaters. However, the tracking data shows that all of the water heaters rebated through the program in GPY2 were 50 gallon units. This means that a baseline EF of 0.575 should be used.

$$\Delta therms = \left(\frac{1}{EF_{base}} - \frac{1}{EF_{efficient}}\right) \times (GPD \times 365.25 \times \gamma Water \times (T_{Out} - T_{In}) \times 1.0)/100{,}000$$

Table 7-5. Storage Water Heaters Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
EF_{base}	0.594	0.575	Deemed Illinois TRM
$EF_{efficient}$	Actual	Actual	Evaluated
GPD	50	50	Deemed Illinois TRM
γWater	8.33	8.33	Deemed Illinois TRM
T_{Out}	125°F	125°F	Deemed Illinois TRM
T_{In}	54°F	54°F	Deemed Illinois TRM
Δtherms	Varies	Varies	Evaluated

Source: Navigant analysis.

Indirect Water Heater

The Nicor Gas rebated indirect water heaters through the Home EER program in GPY2. This measure is not specified in the Illinois TRM. Therefore, the RSG workpapers were evaluated and all assumptions were verified. As such, Navigant adjusted the GPD to 50 gallons per day to match the Illinois TRM's value for other water heater measures.

$$\Delta therms = \left(\left(\frac{1}{Eff_{base}} - \frac{1}{Eff_{eff}}\right) \times GPD \times 365.25 \times \gamma Water \times \Delta T \times 1\right) / 100{,}000$$

Table 7-6. Indirect Water Heaters Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
Eff_{base}	0.67	0.67	Evaluated
Eff_{eff}	0.90	0.90	Evaluated
GPD	45	50	Deemed Illinois TRM
γWater	8.33	8.33	Deemed Illinois TRM
ΔT	70	70	Evaluated
Δtherms	36.6	40.6	Evaluated

Source: Navigant analysis.

Windows

During GPY2, the Home EER program offered rebates for windows with a u-value less than 0.20. This measure has since been discontinued. Additionally, this measure is not specified in the Illinois TRM. Energy modeling was used to determine the savings algorithm below. Because the measure is no longer in use and had relatively few participants, Navigant has not evaluated this measure in depth.

$$\Delta therms = 0.80 \times SqFt$$

Table 7-7. Windows Parameters

Input Parameters	Ex Ante Value	Verified Value	Deemed or Evaluated?
SqFt	Actual	Actual	Evaluated
Δtherms	Varies	Varies	Evaluated

Source: Navigant analysis.

7.2.2 Net Program Impact Methodology

For the GPY2 evaluation, Navigant used the SAG approved NTGR of 0.69 to calculate the verified net savings. Navigant also conducted non-participating trade ally spillover research for inclusion in the NTGR in future program years.

7.2.2.1 Spillover

Non-Participating Trade Ally Spill over

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

1. What percentage of customers purchased high efficiency furnaces (those with 92% AFUE ratings of above) before participating in the Home EER program/becoming aware of the Home EER program?
2. What percentage of customer purchased high efficiency furnaces (those with 92% AFUE ratings or above) since participating in the Home EER program/becoming aware of the Home EER program?
3. (For trade allies who reported an increase in high efficient furnace sales) 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 Home EER program/becoming aware of the Home EER program on increasing the percentage of customers who purchased high efficiency furnaces?

Both "drop-out" trade allies (those who participated in GPY1 but did not participate in GPY2) and trade allies who never participated in the program were included in the survey effort. The "drop-out" trade allies were asked about their sales from before they participated in the program and their sales since they *last* participated in the program. The trade allies who had never participated were asked about their sales before they became aware of the Home EER program and their sales after they became aware of the program.

The difference between high efficiency furnace sales after participating in the program/becoming aware of the program and high efficiency furnace sales before participating in the program/becoming aware of 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 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 HE sales that were potential spillover, to give an estimate of the number of HE units each TA sold that were not part of the program. That number of units was then multiplied by 161.4 Therms to calculate the overall therm spillover savings

associated with each trade ally. The per unit savings of 161.4 therms was calculated based on an average program furnace efficiency of 95.49% AFUE.

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

$$Non - Part\ TA\ SO = (\%\ of\ HE\ Sales\ After\ Program\ Participation - \%\ of\ HE\ Sales\ Before\ Program\ Participation) * Program\ Influence\ Score * Number\ of\ Total\ Furnaces\ and\ Boilers\ Sold * 131.41\ Therms$$

The program influence score was calculated by dividing the rated level of program influence (Question 3 above) by five, and was applied in increments of 20%.

The SO therm savings associated with the individual trade allies was then totaled, giving the spillover savings for the sample population. The sample population spillover was then scaled up to the entire non-participating trade ally population.

The following table presents the results of the drop-out and never-participated trade ally spillover calculations.

Table 7-8. Non-Participating Trade Ally Spillover

	Sample Population SO Savings (Therms)	N	PY2 Non-Participant Population	PY2 Non-Participant TA SO Savings (Therms)
Drop-Out Trade Allies	7,411.52	42	227	49,199
Never Participated Trade Allies	1,747.75	41*	1,164	60,943

Source: Navigant analysis.

** The never participated trade ally sample included 23 non-participating TAs who responded that they were unaware of the program.*

After the population spillover savings were calculated, the spillover savings were divided by the program savings to achieve the program non-participating trade ally spillover rate. The non-participating trade ally population was calculated from a list of non-participating trade allies received from the implementation contractor. The list contained the contact information for 1,164 unique trade allies, and was used as a proxy for total non-participating trade ally population in Nicor Gas territory.

Table 7-9. Non-Participating Trade Ally Spillover

Non-Part TA SO Savings (Therms)	Program Savings	Non-Part TA SO Rate
110,142	2,545,849	0.04

Source: Navigant analysis.

It should be noted that 23 out of the 41 never participated trade allies who agreed to participate in the survey stated that they were unaware of the Home EER program. Based on this response rate, it appears that there are additional opportunities for Nicor Gas to increase its outreach efforts to these unaware non-participating trade allies. Increasing the number of contractors who are aware of the program will help increase participation and program savings.

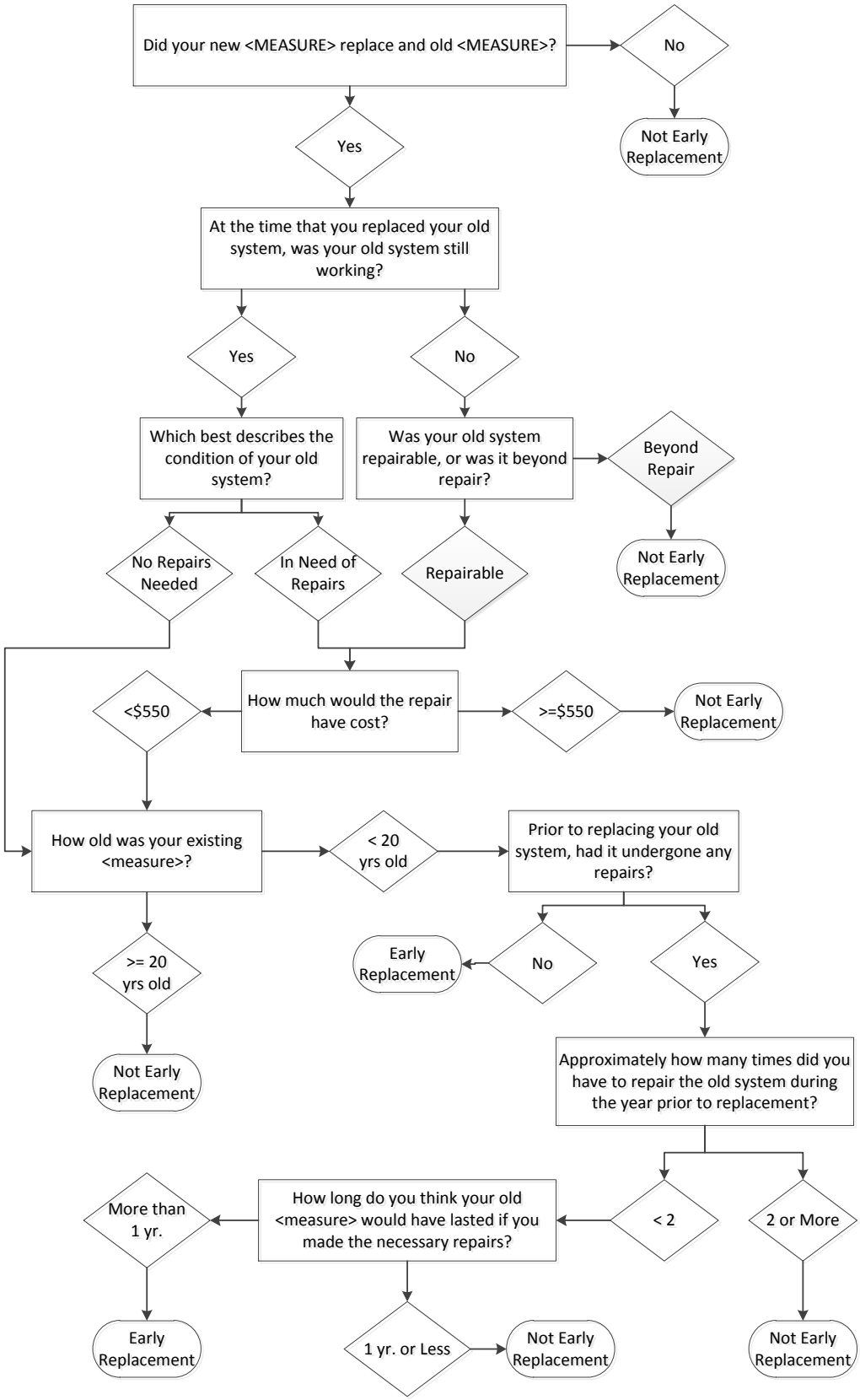
7.2.3 Early Replacement Analysis Methodology and Results

This section presents the results of the Home EER/Complete System Replacement early replacement analysis. Navigant sought to determine the number of Home EER/CSR participants for whom either the furnace, central air conditioning unit, or both units would be considered an "early replacement," as opposed to a "standard replacement" or "replace or burnout". The purpose of this analysis is to inform future changes to the Illinois Technical Resource Manual. Telephone interviews were conducted with seventy Home EER/CSR participants who replaced both their furnaces and central air conditioning units, and seventy Home EER participants who only replaced their furnaces.

In order to classify a replaced furnace or CAC unit, the CSR program participants were asked a series of questions about the condition of their furnaces and CAC units at the time they were replaced. The furnace participants were asked the same series of questions about the condition of their furnaces at the time they were replaced, and, if they have them, their CAC units at the time that the furnace was replaced.

The questions used to determine early replacement included questions about whether the units had undergone and repairs, the cost and number of any repairs, the age of the replaced equipment, and how long the equipment would have lasted had it not been replaced. A detailed presentation of the early replacement algorithm can be found in Figure 7-1.

Figure 7-1. CSR Early Replacement Algorithm



The seventy Home EER/CSR participants were selected randomly from the Home EER tracking database. These participants were grouped into two categories: those who initially contacted their contractor because of their furnace, and those who initially contacted their contractor because of their CAC unit. These classifications were based on self-report data from the telephone interview. Measure 1 and Measure 2 are assigned based on these categories.

Table 7-10. Home EER/CSR Participant Classification

	Measure 1	Measure 2	N
Initial Furnace Customer	Furnace	CAC	42
Initial CAC Customer	CAC	Furnace	28

Source: Navigant analysis.

The following table presents the results from the early replacement survey. As shown in the following table, there is an increase in the number of early replacement units between Measure 1 and Measure 2, from 14% to 43% for both furnaces and CAC units.

Table 7-11. Home EER/CSR Early Replacement Rates

	Measure 1 Early Replacement		Measure 2 Early Replacement	
Initial Furnace Customer	6	14%	17	40%
Initial CAC Customer	4	14%	13	46%
Total	**10**	**14%**	**30**	**43%**

Source: Navigant analysis.

Seventy Home EER furnace participants were also randomly selected from the program tracking database. The furnace participants were asked the same early replacement questions as the Home EER/CSR participants. Table 7-12 presents the results of the furnace only participant surveys. Fewer furnace only participants were classified as early replacement than CSR participants. One possible reason for the discrepancy was the high upfront cost of replacing both units. Program participants who are willing and able to pay to replace both the furnace and CAC unit are possibly more willing and able to replace their systems before it is absolutely necessary.

Table 7-12. Home EER Early Replacement Rates

	Furnace Early Replacement		n
Furnace Only Participants	5	7%	70

Source: Navigant analysis.

Navigant also calculated the early replacement rates based on the definition of early replacement found in the Illinois TRM. The Illinois TRM defines early replacement as "the removal of an existing functioning AFUE 75% or less furnace from service, prior to its natural end of life, and replacement with a new high efficiency unit." The IL TRM defines "functioning" as fully operational unit or one

where the repair costs will not exceed $528. [13] Since it was not possible to determine the AFUE of the replaced units, it was assumed that they all were less than 75% AFUE. The following tables present the early replacement rate as calculated based on the TRM definition.

Table 7-13. Home EER/CSR Early Replacement Rates – TRM Calculations

	Measure 1 Early Replacement		Measure 2 Early Replacement	
Initial Furnace Customer	15	36%	24	57%
Initial CAC Customer	8	29%	20	71%
Total	**23**	**33%**	**44**	**63%**

Source: Navigant analysis.

Table 7-14. Home EER Early Replacement Rates – TRM Calculation

	Furnace Early Replacement		n
Furnace Only Participants	11	16%	70

Source: Navigant analysis.

Navigant chose to include the additional components of previous repairs and expected useful life of the unit because the evaluation team feels that excluding units that were likely to be replaced within a year presents a more accurate number of units that are truly early replacement.

Navigant recommends that the Illinois TRM be changed to allow the *secondary* measure replaced by a CSR participant to be considered early replacement. Navigant proposes that the early replacement rate for the *secondary* measure be deemed at 40% for CAC units and 46% for furnaces. Additionally, Navigant recommends that 14% of the furnaces that are the *primary* unit of the HEER/CSR replacement be deemed as early replacement, and that 7% of units replaced by furnace-only participants be deemed as early replacement. These changes would allow for a more accurate estimate of gross savings, accounting for an early replacement baseline not currently considered.

7.3 Detailed Process Results

7.3.1 Non-Participating Trade Ally Survey Results

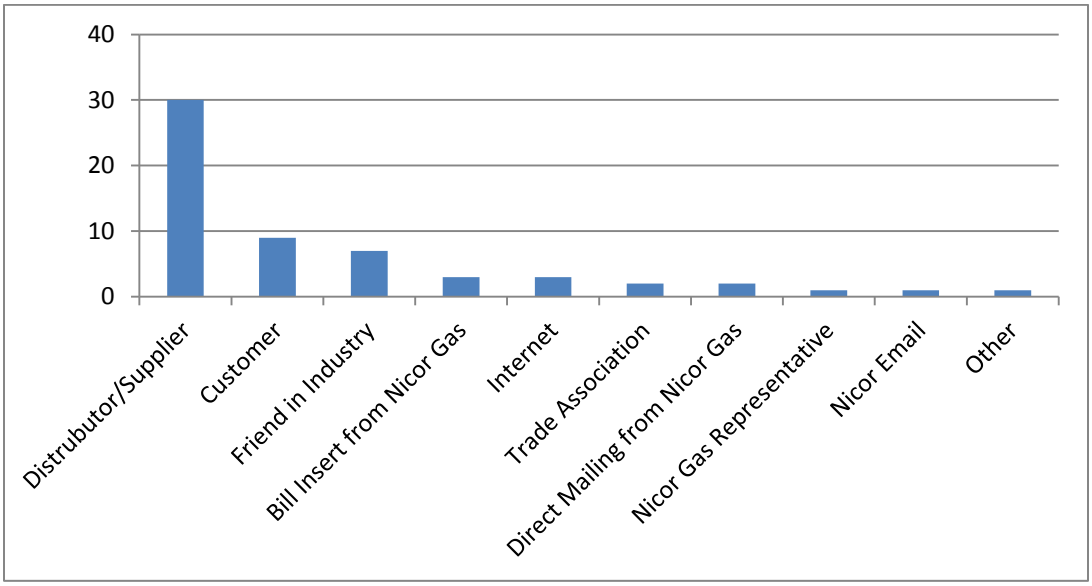
Contractor Outreach

The non-participating trade allies were asked how they were first made aware of the Nicor Gas Home EER program. Slightly more than half (51%) responded that they had been made aware of the program through their distributor or supplier. Fifteen percent of non-participating trade allies stated that they had been made aware of the program through a customer, and an additional twelve percent

[13] IL-TRM_Policy_Document_10-31-12_Final.docx

stated that they had been made aware of the program through a friend in the HVAC/water heating industry.

Figure 7-2. Method by Which Contractor First Became Aware of Home EER Program (n = 59)



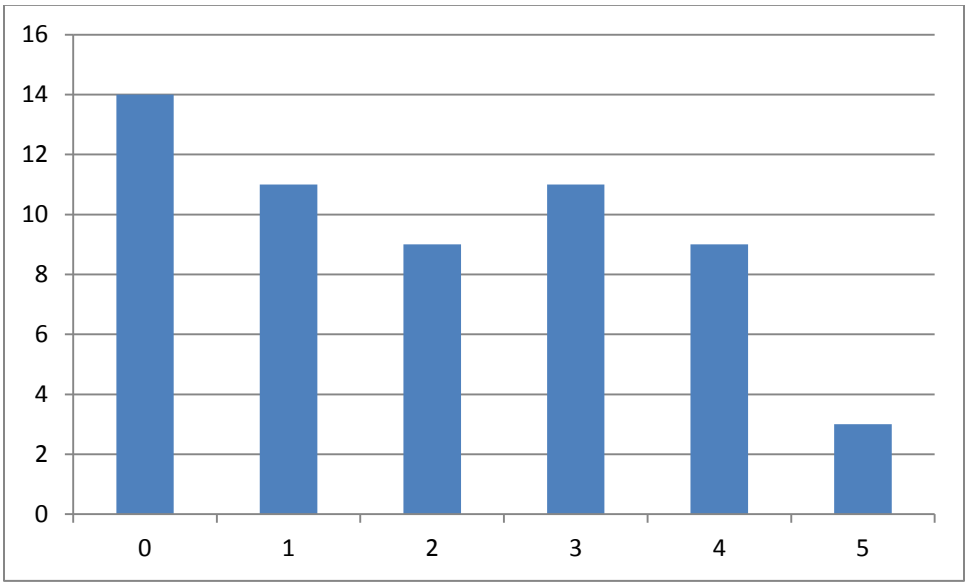
Source: Navigant analysis.

Slightly less than one-quarter (24%) of non-participating trade allies reported that they had received any Home EER promotional materials from Nicor Gas. When asked to describe the materials that they received, the trade allies cited promotional emails and printed brochures describing the program. Eighteen percent of non-participating trade allies reported attending a Nicor Gas training session, however, they were not able to provide specifics as to which type of training session it was. When asked if they had looked at the program website to find information, sixty 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, they all replied in the affirmative.

Customer Awareness

The non-participating trade allies were asked to estimate what percentage of their customers were aware of the Nicor Gas Home EER program. The average reported percentage was 52%. Additionally, twenty-one non-participating trade allies reported that greater than 75% of their customers were aware of the program. However, when the non-participating trade allies were asked to rate their customers level of knowledge about the Home EER 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 a two. This indicated that while there may be a high level of awareness about the program, there is a lack of knowledge about the program among the customers of non-participating trade allies.

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



Source: Navigant analysis.

Price Matching

The non-participating trade allies were asked if they had ever lowered the price of a furnace to match the Home EER program rebate, without submitting an application for the rebate. Fifty (86%) 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 TRM Recommendations

The following research findings and recommendations may assist the Illinois TRM Technical Advisory Committee annual updating process:

Navigant recommends that the Illinois TRM be changed to allow the *secondary* measure replaced by a CSR participant to be considered early replacement. Navigant proposes that the early replacement rate for the *secondary* measure be deemed at 40% for CAC units and 46% for furnaces. Additionally, Navigant recommends that 14% of the furnaces that are the *primary* unit of the HEER/CSR replacement be deemed as early replacement, and that 7% of units replaced by furnace-only participants be deemed as early replacement.

7.5 Data Collection Instruments

7.5.1 Home EER/CSR Non-Participating Trade Ally Survey

INTRODUCTION AND SCREENING QUESTIONS

INTRO1 Hello, my name is _____, and I'm calling from an independent research firm on behalf of Nicor 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 Nicor Gas territory. By participating in the short survey, you will help Nicor Gas 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 Nicor Gas Home Energy Efficiency 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 Nicor Gas' Home Energy Efficiency Rebate Program, where your customers can receive financial incentives 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 Home Energy Efficiency Rebate Program as the "HEER Program" or simply "the Program".

[ASK IF SCR2 = 1]

SCR2a Did you participate in the HEER Program?

1. YES [ASK SCR1b] [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 HEER Program or be contacted by a Nicor Gas 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 contractor? [DO NOT READ]

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 Nicor Gas
8. Direct mailing to me from Nicor Gas
9. Nicor Representative
10. RSG 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 Nicor Gas 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 Nicor Gas training sessions, such as a Nicor Gas PEEZA session with Program representatives?
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 HEER 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 participate 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 Program?

RECORD DATE

888. Don't Know

999. Refused

DROP OUT PARTICIPANT SPILLOVER

[ASK FurnSO1 – FurnQuanPart_A IF CONTACT TYPE = PART]

I'm going to ask you a few questions about your HVAC sales in Nicor Gas territory. Please answer ONLY for sales in Nicor Gas territory.

Furnaces

FurnSO1 Before you participated in the Program, of all the furnaces you sold, what percentage of your customers purchased high efficiency furnaces, meaning those with 92% AFUE ratings or above? [PROBE FOR PERCENTAGE]

RECORD PERCENTAGE

888. Don't Know

999. Refused

FurnSO2 Since participating in the Program, has the percentage of your customers who purchase high efficiency furnaces (those with 92% 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 (those with 92% 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 furnace 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 NECCESARY]

[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 furnaces (those with 92% AFUE ratings or above)? [PROBE FOR RATING]

RECORD RATING
888. Don't Know
999. Refused

[ASK ALL PARTS]

FurnQuanPart About how many 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]

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

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]

Furnaces

FurnSO5 Before you learned about the Program, of all the furnaces you sold, what percentage of your customers purchased high efficiency furnaces, those with 92% AFUE ratings or above? [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 (those with 92% AFUE ratings or 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 (those with 92% AFUE ratings or 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 furnace 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 furnaces (those with 92% AFUE ratings or above)? [PROBE FOR RATING]

RECORD RATING
888. Don't Know

999. Refused

FurnQuanNP About how many 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 NECCESARY]

[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 Nicor Gas HEER 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 you customers about the HEER 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 your 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 HEER program participation

6. Personal dissatisfaction with prior Nicor Gas program participation
7. Personal dissatisfaction with other utility program participation
8. Customer dissatisfaction with prior HEER program participation
9. Customer dissatisfaction with prior Nicor 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 HEER program 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 HEER program 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 Nicor 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]

7.5.2 Early Replacement Participant Survey

INTRODUCTION AND SCREENING QUESTIONS

INTRO1 Hello, my name is _____, and I'm calling on behalf of Nicor Gas to ask your help in evaluating the energy efficiency program that gave you a rebate on equipment you had installed in your home in <PARTIC_DATE>. Let me assure you that this is not a sales call.
May I speak with <**CUST NAME**>?

4. CONTINUE WITH CUSTOMER ONCE THEY ARE ON THE PHONE
5. CUSTOMER NOT AVAILABLE [SCHEDULE CALLBACK]
6. NOT A GOOD TIME TO CONDUCT SURVEY [SCHEDULE CALLBACK]

INTRO2 Nicor Gas has hired us to evaluate their energy efficiency programs, and we'd like to talk briefly with you because records in Nicor Gas' files show that you took part in their Home Energy Efficiency Rebate program this past year and installed a high efficiency furnace and redeemed a program rebate.

SCR1 Do you live at <SERVICE_ADDRESS>?

3. Yes [SKIPTO SCR2]
4. No
5. Not now, but did live there
889. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

SCR2 The **Home Energy Efficiency Rebate** Program gives a cash rebate for Nicor Gas customers buying a high-efficiency furnace. The check may have been paid directly to the equipment contractor, in which case you should have been seen a credit reducing the cost of equipment on the contractor's bill. Do you remember the program?

1. Yes [SKIPTO EQT1]
2. No, I don't recall having any equipment installed in the past year (since June 2012) [SKIP TO SCR2A]
3. Yes, I had equipment installed but I don't recall hearing about a Nicor Gas rebate. [SKIPTO EQT1]

888.Don't Know
999. Refused

SCR2a Is there someone in the household at <SERVICE_ADDRESS> who might recall the program and could talk about your household's experience with the Home Energy Efficiency Rebate program?

1. Yes [ASK TO SPEAK WITH PERSON WHO RECALLS PROGRAM & CONTINUE WITH THAT PERSON; take call-back info] [SKIPTO INTRO2]
2. No, I'm sure your records are in error**.** [THANK AND TERMINATE]

888.Don't Know
999. Refused

The following questions refer to the Home Energy Efficiency Rebate Program, which may be referred to as "the Program" or the "HEER Program" throughout the survey for the sake of brevity.

[ASK IF PARTTYPE = FURN]

SCR3 Our records indicate that you purchased and received a rebate for a high efficiency furnace from the HEER program. Does this sound correct?

1. Yes [SKIPTO C1]
2. No [ASK SCR3a]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

SCR3a Do you recall what equipment you purchased through the program?

1. Boiler
2. Water Heater
3. Central Air Conditioner [ASK SCR3b]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

SCR3b You stated that you received a rebate for a central air conditioning unit, which would have been part of a packaged rebate along with a high efficiency furnace. Does this sound familiar?

1. Yes [SKIPTO A1] [PARTTYPE = CSR]
2. No [THANK AND TERMINATE]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

[ASK IF PARTTYPE = CSR]

SCR4 Our records indicate that you purchased and received a rebate for a high efficiency furnace and a high efficiency central air conditioning unit through the complete system replacement portion of the HEER program. Does this sound correct?

1. Yes [SKIPTO A0]
2. No [ASK SCR4a]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

SCR4a Did you recall what equipment you purchased through the program?

1. Furnace Only [ASK SCR4b]
2. Boiler [THANK AND TERMINATE]
3. Water Heater [THANK AND TERMINATE]
4. Central Air Conditioner Only [ASK SCR4c]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

SCR4b You stated that you received a rebate for a furnace only, and did not purchase or receive a rebate for a central air conditioning unit. Is this correct?

1. Yes [SKIPTO C1] [PARTTYPE = Furn]
2. No [THANK AND TERMINATE]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

SCR4c You stated that you received a rebate for a central air conditioning unit, which would have been part of a packaged rebate along with a high efficiency furnace. Does this sound familiar?

1. Yes [SKIPTO A0] [PARTTYPE = CSR]
2. No [THANK AND TERMINATE]
888. Don't Know [THANK AND TERMINATE]
999. Refused [THANK AND TERMINATE]

CSR PARTICIPANTS

[ASK IF A0 – B8 IF PARTTYPE = CSR]

A0 Thinking back to when you first decided to contact a contractor, what was the main reason you decided to call a contractor? [DO NOT READ – ACCEPT ONLY ONE RESPONSE]

1. Furnace broke down [MEASURE 1 = FURNACE]
2. Furnace appeared to be at end of useful life [MEASURE 1 = FURNACE]
3. Furnace was not working optimally [MEASURE 1 = FURNACE]
4. Needed new furnace [MEASURE 1 = FURNACE]
5. CAC unit broke down [MEASURE 1 = air conditioning system (AC)]
6. CAC unit appeared to be at end of useful life [MEASURE 1 = air conditioning system (AC)]
7. CAC unit was not working optimally [MEASURE 1 = air conditioning system (AC)]
8. Needed new CAC [MEASURE 1 = air conditioning system (AC)]
9. Something else broke down, not the furnace or CAC unit [ASK A0a]
10. Learned there were rebates or discounts available for a limited time [ASK A0a]
11. Decided to replace furnace to save energy/money [MEASURE 1 = FURNACE]
12. Decided to replace CAC to save energy/money [MEASURE 1 = air conditioning system (AC)]

777. Other [PROBE FOR AC OR FURNACE, ASSIGN MEASURE 1]
888. Don't Know
999. Refused

[ASK IF A0 = 9 or 10]

A0a When you were deciding to replace your furnace and air conditioning system, did you first decide to replace your furnace or your air conditioning system?

1. Furnace [MEASURE 1 = FURNACE]
2. Air Conditioning system [MEASURE 1 = air conditioning system (AC)]
3. Both at same time [MEASURE 1 = FURNACE]
888. Don't know
999. Refused

[IF MEASURE 1 = FURNACE, MEASURE 2 = air conditioning system (AC)]
[IF MEASURE 1 = air conditioning system (AC), MEASURE 2 = FURNACE]

A1 Did your new <MEASURE 1> replace an old <MEASURE 1>?

1. Yes
2. No [SKIP TO B1]
888. Don't Know

999. Refused

[ASK A2 and A3 IF A0 IS NOT 1 or 4]

A2 At the time you replaced your old system with a new <MEASURE 1>, was your old <MEASURE 1> still working?

1. Yes
2. No [SKIP TO A4]
888. Don't Know
999. Refused

A3 Which of the following best describes the condition of your old <MEASURE 1>?

1. The old system was working with no need of repair
2. The old system was working but needed repair
888. Don't Know
999. Refused

[ASK IF A0 = 1 or 4 or IF A2 = 2]

A4 Was your old <MEASURE 1> repairable, or was it beyond repair?

1. Repairable
2. Beyond Repair
888. Don't Know
999. Refused

[ASK IF A4 = 1 or IF A3 = 2]

A5 Do you remember how much the repair would have cost? Was it…

1. Less than $550
2. More than $550
888. Don't Know
999. Refused

A6 How old was your existing <MEASURE 1>? [IF NEEDED] In years.

NUMERIC OPEN END

888. Don't know
999. Refused

[ASK IF A6 = 888, 999]

A6a. What would you estimate the approximate age of your old <MEASURE 1> to be?

1. Less than 2 years
2. 2 to (less than) 5 years
3. 5 to (less than) 10 years
4. 10 to (less than) 15 years
5. 15 to (less than) 20 years
6. 20 or more years
888. Don't know
999. Refused

A7 Prior to replacing your old <MEASURE 1>, had it undergone any repairs?

1. Yes
2. No
888. Don't know
999. Refused

[ASK IF A7 = 1]

A7a Approximately how many times did you have to repair the old <MEASURE 1> during the year prior to replacement?

NUMERIC OPEN END
888. (Don't know)
999. (Refused)

A8 How long do you think your old <MEASURE 1> would have lasted if you had made the necessary repairs? Would you say..?

1. 1 year or less
2. 2 or 3 years
3. 4 or 5 years
4. or more than five years
888. Don't know
999. Refused

Now I have a few questions about the other equipment that you replaced as part of the CSR program, the <MEASURE 2>.

B1 Did your new <MEASURE 2> replace an old <MEASURE 2>?

1. Yes
2. No [SKIP TO Q1]
888. Don't Know
999. Refused

B2 At the time you replaced your old system with a new <MEASURE 2>, was your old <MEASURE 2> still working?

1. Yes
2. No [SKIP TO B4]
888. Don't Know
999. Refused

B3 Which of the following best describes the condition of you old <MEASURE 2>?

1. The old system was working with no need of repair
2. The old system was working but needed repair
888. Don't Know
999. Refused

[ASK IF B2 = 2]

B4 Was your old <MEASURE 2> repairable, or was it beyond repair?

1. Repairable
2. Beyond Repair

888. Don't Know
999. Refused

[ASK IF B4 = 1 or IF B3 = 2]

B5 Do you remember about how much the repair would have cost? Was it…

1. Less than $550
2. More than $550
888. Don't Know
999. Refused

B6 How old was your existing <MEASURE 2>? [IF NEEDED] In years.

NUMERIC OPEN END
888. Don't know
999. Refused

[ASK IF B6 = 888, 999]

B6a. What would you estimate the approximate age of your old <MEASURE 2> to be?

1. Less than 2 years
2. 2 to (less than) 5 years
3. 5 to (less than) 10 years
4. 10 to (less than) 15 years
5. 15 to (less than) 20 years
6. 20 or more years
888. Don't know
999. Refused

B7 Prior to replacing your old <MEASURE 2>, had it undergone any repairs?

1. Yes
2. No
888. Don't know
999. Refused

[ASK IF B7 = 1]

B7a Approximately how many times did you have to repair the old <MEASURE 2> during the year prior to replacement?

NUMERIC OPEN END
888. (Don't know)
999. (Refused)

B8 How long do you think your old <MEASURE 2> would have lasted if you had made the necessary repairs? Would you say..?

1. 1 year or less
2. 2 or 3 years
3. 4 or 5 years
4. or more than five years
888. Don't know
999. Refused

FURNACE ONLY PARTICIPANTS
[ASK IF C1 – D8 IF PARTTYPE = FURN]

C1 Did your new furnace replace an old furnace?
1. Yes
2. No [SKIP TO D1]
888. Don't Know
999. Refused

C2 At the time you replaced your old system with a new furnace, was your old furnace still working?
1. Yes
2. No [SKIP TO C4]
888. Don't Know
999. Refused

C3 Which of the following best describes the condition of your old furnace?
1. The old system was working with no need of repair
2. The old system was working but needed repair
888. Don't Know
999. Refused

[ASK IF C2 = 2]
C4 Was your old furnace repairable, or was it beyond repair?
1. Repairable
2. Beyond Repair
889. Don't Know
999. Refused

[ASK IF C4 = 1 or IF C3 = 2]
C5 Do you remember how much the repair would have cost? Was it…
1. Less than $550
2. More than $550
889. Don't Know
999. Refused

C6 How old was your existing furnace (in years)?
NUMERIC OPEN END
888. Don't know
999. Refused

[ASK IF C6 = 888, 999]
C6a. What would you estimate the approximate age of your old furnace to be?
1. Less than 2 years
2. 2 to (less than) 5 years
3. 5 to (less than) 10 years
4. 10 to (less than) 15 years

5. 15 to (less than) 20 years
6. 20 years
888. Don't know
999. Refused

C7 Prior to replacing your old furnace, had it undergone any repairs?
1. Yes
2. No
888. Don't know
999. Refused

[ASK IF C7 = 1]
C7a Approximately how many times did you have to repair the old furnace during the year prior to replacement?
NUMERIC OPEN END
888. (Don't know)
999. (Refused)

C8 How long do you think your old furnace would have lasted if you had made the necessary repairs? Would you say..?
1. 1 year or less
2. 2 or 3 years
3. 4 or 5 years
4. or more than five years
888. Don't know
999. Refused

D1 Do you currently have a central air conditioning system?
1. Yes
2. No [SKIP TO Q1]
888. Don't Know [SKIP TO Q1]
999. Refused [SKIP TO Q1]

CSR1 When you replaced your furnace, did you consider replacing your air conditioning system at the same time?
1. Yes, and I replaced my air conditioning system. [ASK B1 – B7, MEASURE 2 = air conditioning system]
2. Yes, I considered replacing my air conditioning system, but did not replace it.
3. No, I did not consider replacing my air conditioning system.
000. Other [RECORD VERBATIM]
888. Don't know
999. Refused

[ASK IF CSR1 = 2]
CSR2 What were the reasons that you did not replace your air conditioning unit? [DO NOT READ, ACCEPT MULTIPLE]
1. Too expensive

2. Air Conditioning System works fine
3. Repair costs were reasonable
000. Other [RECORD VERBATIM]
888. (Don't know)
999. (Refused)

D3 Which of the following best describes the condition of your air conditioning system at the time that you replaced your furnace?

1. The CAC unit was working with no need of repair
2. The CAC unit was working but needed repair
888. Don't Know
999. Refused

[ASK IF D3 = 2]

D5 Do you remember how much the repair cost? Was it…

1. Less than $550
2. More than $550
888. Don't Know
999. Refused

D6 How old is your existing air conditioning system (in years)?

NUMERIC OPEN END
888. Don't know
999. Refused

[ASK IF D6 = 888, 999]

D6a. What would you estimate the approximate age of your old air conditioning system to be?

1. Less than 2 years
2. 2 to (less than) 5 years
3. 5 to (less than) 10 years
4. 10 to (less than) 15 years
5. 15 to (less than) 20 years
6. 20 or more years
888. Don't know
999. Refused

[SKIP IF D3 = 2]

D7 Has your air conditioning system undergone any repairs?

1. Yes
2. No
888. Don't know
999. Refused

[ASK IF D3 = 2 or IF D7 = 1]

D7a Approximately how many times have you had to repair your air conditioning system over the past year?

NUMERIC OPEN END

888. (Don't know)
999. (Refused)

D8 How long do you think your air conditioning system will last? Would you say..?
1. 1 year or less
2. 2 or 3 years
3. 4 or 5 years
4. or more than five years
888. Don't know
999. Refused

DEMOGRAPHICS

Q1. I have just a few questions left to ask for classification purposes. "First, do you own or rent the home at <SERVICE_ADDRESS>?"
1. Own
2. Rent
000. Other, specify
888. Don't know
999. Refused

Q2. What type of home do you live in? Is it a…
1. Single Family detached,
2. Single Family attached (duplex, town home, etc.)
3. Multifamily Apartment or Condominium
000. Other, specify
888. Don't know
999. Refused

Q3. How many people currently live full-time in that home, at least six months of the year, including you?
ENTER NUMBER OF PEOPLE
888. Don't know
999. Refused

Q4. Approximate when was your home built? [READ LIST ONLY IF NEEDED]
1. Before 1950
2. 1950 – 1959
3. 1960 – 1969
4. 1970 – 1979
5. 1980 – 1989
6. 1990 – 1999
7. 2000 – 2009
8. Since 2010
888. Don't know
999. Refused

Comments Do you have any comments about the HEER program that you would like to share today?

RECORD SUMMARY

888. Don't know

999. Refused

Thank you for taking the time to help with our survey and the helpful information you provided. Have a nice day/evening.