NAVIGANT

Home Energy Savings

GPY4 Evaluation Report

Energy Efficiency Plan: Gas Plan Year 4 (6/1/2014-5/31/2015)

FINAL

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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 four (GPY4)[1] Home Energy Savings (HES) Program. The HES program is a joint program of Nicor Gas and Commonwealth Edison (ComEd), with Nicor Gas leading the program implementation. The HES program provides a free home energy assessment performed by an energySMART energy advisor. The energySMART energy advisor collects information about the home's energy use by examining the heating system (e.g. furnace or boiler), cooling system (air conditioner), water heater, and attic (if accessible). The energy advisor provides a customized report with recommendations identifying additional ways the customer can save energy and money. As part of the energy assessment the energy advisor may install showerheads, faucet aerators for bathrooms and kitchen, hot water pipe insulation, install and/or set a programmable thermostat and set back the water heater temperature. In addition to the free home energy assessment and free directly installed measures, the HES program also offers rebates for air sealing and insulation (ASI) measures for eligible homes installed by an energySMART-approved contractor. Measures include air sealing, attic insulation, duct sealing and wall insulation including exterior wall and foundation sidewall. The ASI component of HES changed June 1, 2015 to a separate activity and not a part of the assessment. This report focuses on natural gas savings achieved by Nicor Gas program participants.

E.1. Program Savings

The following two tables summarize the total program savings and program savings by measure. The GPY4 HES Program realized net energy savings of 360,184 therms.

Table E-1. GPY4 Program Results

Savings Category	Nicor Gas Result
Ex-Ante Gross Savings[2] (Therms)	420,041
Verified Gross Realization Rate (RR)	99.7% ‡
Verified Gross Savings (Therms)	418,819
Net-to-Gross Ratio (NTGR)	0.86 †
Verified Net Savings (Therms)	360,184

Source: Utility tracking data and Navigant analysis.
‡ Based on evaluation research findings
† A deemed value. Source:
http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

Table E-2 summarizes the ex-ante gross savings, verified gross savings, and verified net savings for the GPY4 HES Program by measure. Direct install measures include hot water pipe insulation, low-flow showerheads, low-flow kitchen and bathroom faucet aerators, hot water heater temperature setback,

[1] The GPY4 program year began June 1, 2014 and ended May 31, 2015.
[2] From Program Tracking System: "Nicor-HES Gas Impact-PY4-No Cap_20160412_updated.xlsx"

programmable thermostats, and thermostat education. The ASI measures include attic insulation, air sealing, duct sealing, wall insulation, and basement and sidewall insulation. Overall, direct install measures contributed 35 percent of the savings and ASI measure contributed 65 percent of the savings.

Table E-2. GPY4 Program Results by Measure

	Measure Category	Ex-Ante Gross Savings (Therms)	Verified Gross Realization Rate ‡	Verified Gross Savings (Therms)	NTGR †	Verified Net Savings (Therms)
Direct Install Measures	Hot Water Pipe Insulation	13,579	100%	13,579	0.86	11,678
	Showerhead	47,722	97.2%	46,388	0.86	39,894
	Kitchen Aerator	5,191	99%	5,152	0.86	4,431
	Bathroom Aerator	3,089	100%	3,077	0.86	2,646
	Water Heater Set Back	5,792	100%	5,792	0.86	4,981
	Programmable Thermostat	38,439	100.3%	38,556	0.86	33,158
	Thermostat Education	33,144	100.1%	33,190	0.86	28,543
Subtotal		146,955	99.2%	145,733	0.86	125,330
ASI Measures	Attic Insulation (>R19 to R49)	106,140	100%	106,140	0.86	91,280
	Air Sealing	128,554	100%	128,554	0.86	110,556
	Duct Sealing	18,024	100%	18,024	0.86	15,500
	Wall Insulation	8,956	100%	8,956	0.86	7,702
	Basement/Sidewall Insulation	11,413	100%	11,413	0.86	9,815
Subtotal		273,085	100%	273,085	0.86	234,853
Total		420,041	99.7%	418,819	0.86	360,184

Source: Program tracking data and Navigant analysis.
‡ Based on evaluation research findings.
† A deemed value. Source:
http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

E.2. Impact Estimate Parameters

In the course of estimating verified gross and net savings, Navigant used a variety of parameters for our savings calculations. For the direct install measures, our evaluation used parameters as defined by the

Illinois Technical Reference Manual (TRM)[3]. For the ASI measures, the implementation contractor, CLEAResult, used their own calculations in their propriety EnergyMeasure® Home (EM Home) software, which Navigant verified in GPY1/EPY4 (see Section 2.3 for detail). For the calculations of net savings, Navigant used an overall NTGR value deemed by the Illinois Energy Efficiency Stakeholder Advisory Group (SAG) for Nicor Gas GPY4 HES Program savings. This report provides further overview of impact parameters in Section 2.2.

Table E-3. Impact Estimate Parameters and Methodologies

Parameter/Measure	Data Source	Deemed or Evaluated?
NTGR – Nicor Gas HES	SAG Document †	Deemed
Faucet Aerators	Illinois TRM v3.0, Section 5.4.4	Deemed
Showerhead	Illinois TRM v3.0, Section 5.4.5	Deemed
Hot Water Pipe Insulation	Illinois TRM v3.0, Section 5.4.1	Deemed
Water Heater Set Back	Illinois TRM v3.0, Section 5.4.6	Deemed
Programmable Thermostat	Illinois TRM v3.0, Section 5.3.11	Deemed
ASI Measures	HES PY4 Utility Tracking Data	Evaluated

Source: Navigant analysis
† A *deemed value. Source:*
http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

E.3. Participation Information

Table E-4 provides an overview of GPY4 participants. The HES Program had 4,380 total participants, including 3,382 assessment participants and 998 ASI participants. Of the 3,382 assessment participants, 3,145 customers had direct install products or services. Total participants increased about 47 percent from GPY3 levels (2,891 participants).

Table E-4. GPY4 Primary Participation Detail

Participation	Nicor Gas Result
Assessment Participants	3,382
Direct Install Participants	3,145
ASI Participants	998 †

Source: Program tracking data and Navigant analysis.
†: The tracking system lists 999 ASI participants, however no measures were installed for project PRJ-266563.

[3] Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0 June 1, 2014. http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_3/Final_Draft/Illinois_Statewide_TRM_Effective_060114_Version_3%200_021414_Final_Clean.pdf.

E.4. Finding and Recommendations

This section summarizes the key findings and recommendations.

Program Savings Achievement

Finding 1. Navigant verified gross savings of 418,819 therms and net savings of 360,184 therms, resulting a realization rate (RR) of 99.7 percent compared to the ex-ante gross savings of 420,041 therms. Navigant utilized the SAG deemed program NTGR of 0.86 to calculate the verified net savings. The program achieved 116 percent of their net therm goal of 311,000[4].

Gross Realization Rates

Finding 2. Navigant reports an overall gross realization rate of 99.7 percent for therms savings—virtually 100 percent. Most of the measures have a realization rate of 100 percent. The realization rate for showerheads is 97.2 percent due to the tracking database using a per unit savings of 14.40 therms while TRM v3.0 uses 14.04 therms for the per unit savings.

Recommendation 1. Navigant recommends updating ex-ante calculations for showerheads.

Tracking System Review

Finding 3. For both the showerhead and handheld showerhead measure, Navigant found several calculation parameters in the tracking database that need to be updated based on the Illinois TRM v3.0. The single family household factor used in the tracking database is 2.1 while the Illinois TRM v3.0 shows this value as 2.56. Showers per capita per day (SPCD) are 0.6 in the Illinois TRM v3.0 instead of 1.79 used in the tracking database. The value 1.79 is actually the deemed value for showerheads per household (SPH) from the Illinois TRM v3.0. For the showerhead measure, the “faucets per household” data label in the current tracking database needs to be updated to “showerheads per household”. In addition, project PRJ-323391 listed 12 handheld showerheads installed in a single family house which may be not reasonable. Nicor Gas attempted to confirm the actual number of showerheads in this residence, however the customer was unreachable. According to the Illinois TRM v3.0, there are 1.79 showerheads per single-family household. Navigant assumed two handheld showerheads were installed for this project.

Recommendation 2. Navigant recommends updating the parameters in the tracking database for both showerhead measures. In addition, Navigant recommends adding a QC procedure for verifying the actual number of showerheads in a single-family residence if four or more are reported.

[4] Email from Nicor Gas on 4/21/2016.

Program Improvement

Finding 4. The program's quality assurance activities include inspecting a randomized sample of all home assessments which ensures that each energy assessor's home energy assessments are checked for quality. The QA/QC documentation states that the results of the inspections are available to Nicor Gas, however there is no mention of a proactive step to present the results of the inspections to Nicor Gas. Also, the QA/QC documentation provided to Navigant did not include the ASI measures.

Recommendation 3. Navigant recommends that the implementation contractor provide the results of the quality assurance inspections to both Nicor Gas and Navigant for review. In addition, Navigant recommends that the implementation contractor develop quality assurance and quality control procedures for the ASI measures installed by the approved contractors.

1. INTRODUCTION

1.1 Program Description

The HES program provides a free home energy assessment performed by an energySMART energy advisor. The energySMART energy advisor collects information about the home's energy use by examining the heating system (e.g. furnace or boiler), cooling system (air conditioner), water heater, and attic (if accessible). The energy advisor provides a customized report with recommendations identifying additional ways the customer can save energy and money. As part of the energy assessment the energy advisor may install showerheads, faucet aerators for use in bathrooms and kitchens, hot water pipe insulation, install and/or set a programmable thermostat and set back the water heater temperature. In addition to the directly installed measures, the HES program also offers rebates for ASI measures for eligible homes installed by an energySMART approved contractor including air sealing, attic insulation, duct sealing and wall insulation including exterior wall and foundation sidewall.

1.2 Evaluation Objectives

As planned, the Nicor Gas program year four (GPY4) evaluation primarily focused on the following key researchable questions for GPY4:

Impact Questions:

1. What is the program's verified gross savings?
2. What is the program's verified net savings?
3. What updates are recommended for the Illinois Technical Reference Manual (TRM)?

Process Questions:

1. What changes have been made to the program since GPY3 and how have these changes affected program satisfaction, participation, savings, and costs?
2. Are the QA/QC activities adequate and unbiased (including procedures for incentive approval, complaints, assuring product quality, etc.)?
3. What opportunities exist for program improvement in terms of program administration and implementation?

2. EVALUATION APPROACH

During GPY4, the program tracking data showed that 4,380 residential customers participated in the HES Program. To determine verified gross savings, the evaluation team used the Illinois TRM v3.0 for direct install measures. For ASI measure savings estimates, the implementation contractor, CLEAResult, used its own calculations in its propriety EnergyMeasure® Home (EM Home) software, which Navigant verified in GPY1/EPY4 (see Section 2.3 for detail). Navigant accepted the ex-ante savings of ASI measures calculated by CLEAResult. The verified net savings was calculated using a net-to-gross ratio (NTGR) that was deemed for the GPY4 HES Program. The process evaluation for GPY4 was limited in scope as planned.

2.1 Overview of Data Collection Activities

The core data collection activities included a tracking system review and an engineering analysis as shown in the table below.

Table 2-1. Data Collection Activities

What	Who	Target Completes	Completes Achieved	When
Tracking System Review	Participants	Census	Census	February-April 2016
Engineering Analysis	Participants	Census	Census	February-April 2016
Review program materials	N/A	N/A	N/A	June – November 2015
Interviews	Program Managers at Nicor Gas and Implementation Contractor	2	2	May, November 2015

2.2 Verified Savings Parameters

Navigant used the Illinois TRM Version v3.0 methodology to calculate verified gross savings for direct install measures. The Illinois TRM deems many values used in the algorithms whose sources are shown in Table 2-2. The Illinois TRM allows for some custom values to be used in the algorithms as well. Navigant used energySMART tracking data for these values. Additionally, Navigant sourced HVAC and hot water heating variables from the tracking database provided by CLEAResult. Navigant used SAG deemed NTGR to calculate verified net savings. For ASI measures, Navigant accepted the ex-ante savings calculated using CLEAResult's EM Home software.

Table 2-2. Verified Gross Savings Parameters for Direct Installation Measures

Measure	Input Parameter Source
Low Flow Showerhead	Illinois TRM version 3.0 – Section 5.4.5
Low Flow Bathroom Faucet Aerator	Illinois TRM version 3.0 – Section 5.4.4
Low Flow Kitchen Faucet Aerator	Illinois TRM version 3.0 – Section 5.4.4
Hot Water Pipe Insulation	Illinois TRM version 3.0 – Section 5.4.1
Water Heater Set Back	Illinois TRM version 3.0 – Section 5.4.6
Programmable Thermostat	Illinois TRM version 3.0 – Section 5.3.11

Source: Navigant analysis

2.3 Verified Gross Program Savings Analysis Approach

For the direct install measures in GPY4 HES Program, Navigant performed engineering analysis based on the Illinois TRM v3.0. For ASI measures, Navigant conducted a thorough literature review to compare evaluated savings values for projects with ASI offerings similar to the HES Program. Based on the findings from the literature review, Navigant determined that the savings values from CLEAResult's EnergyMeasure® Home (EM Home) software compare favorably with evaluated savings for similar programs and climates. Navigant accepts CLEAResult's ASI measure savings assumptions for GPY4. Further detail on Navigant's ASI literature review can be found in the GPY1/EPY4 HES Report[5].

2.4 Verified Net Program Savings Analysis Approach

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a NTGR. For GPY4, the evaluation team used the deemed NTGR value of 0.86.

2.5 Process Evaluation

As part of the process evaluation, Navigant performed a review of the program materials and conducted interviews with the program manager and the implementation contractor's program manager.

[5] Energy Efficiency ComEd Plan Year 4, Nicor Gas Plan Year 1 (6/1/2011-5/31/2012) evaluation report: Home Energy Savings Program, May 2013.

3. GROSS IMPACT EVALUATION

Navigant performed a tracking data review to determine quantity of measures distributed and the ex-ante gross savings by measure. To determine the verified gross savings by measure, the evaluation team performed an engineering analysis for each direct install measure using the Illinois TRM Version 3.0.[6] Navigant accepted the ex-ante savings of ASI measures calculated by CLEAResult. The verified savings were compared with ex ante savings to calculate the measure and program level realization rates for the program.

3.1 Tracking System Review

Navigant performed a verification of the program tracking database to determine ex ante gross savings totals for each measure. The purpose of the tracking system review was to ensure these systems accurately gather the data required to calculate program savings. Navigant used measure quantities and measure specifications supplied by Nicor Gas as inputs to Illinois TRM algorithms to determine verified gross savings.

Key findings include:

1. For both the showerhead and handheld showerhead measure, Navigant found several calculation parameters in the tracking database that need to be updated based on the Illinois TRM v3.0:
    a. The single family household factor used in the tracking database is 2.1 while the Illinois TRM v3.0 shows this value as 2.56.
    b. Showers per capita per day (SPCD) are 0.6 in the Illinois TRM v3.0 instead of 1.79 used in the tracking database. The value 1.79 is actually the deemed value for showerheads per household (SPH) from the Illinois TRM v3.0.
    c. Showerheads per household is used to calculate savings of the showerhead measure based on the Illinois TRM v3.0. For the showerhead measure, the “faucets per household” data label in the current tracking database needs to be updated to “showerheads per household”.
    d. In addition, project PRJ-323391 listed 12 handheld showerheads installed in a single family house which may be not reasonable. Nicor Gas attempted to confirm the actual number of showerheads in this residence, however the customer was unreachable. According to the Illinois TRM v3.0, there are 1.79 showerheads per single-family household. Navigant assumed two handheld showerheads were installed for this project.
2. For the kitchen aerator and bathroom aerator measure:
    a. Navigant verified that the TRM v3.0 value for single family household factor is 2.56 instead of 2.1 used in the tracking database.
    b. The TRM v3.0 value for faucets per household is one for kitchens and 2.83 for bathrooms instead of two for both measures used in the tracking database.
    c. The average flow rate of the low-flow faucet aerator in the TRM v3.0 is 0.94 gpm instead of 1.5 gpm for kitchens and 1.0 gpm for bathrooms used in the tracking system

[6] Nicor Gas Kits ISR and Process Results Final 2015 08 28

d. The energy per gallon of hot water supplied by gas for a bathroom is 0.00341 therms per gallon in the TRM v3.0 instead of 0.004 therms per gallon in the tracking database.

e. In project PRJ-353812, nine kitchen faucet aerators were installed in a single family house which may be not reasonable, since this single family house has 1,233 square feet in total. Nicor Gas was able to reach the customer for this project and confirmed there were only two kitchen aerators. Navigant found three additional projects where nine bathroom faucet aerators were installed in single family homes (PRJ-361561, PRJ-361567, and PRJ-361581). Nicor Gas attempted to confirm the actual number of bathroom faucet aerators in these residences, however the customers were unreachable. According to the Illinois TRM v3.0, there are 2.83 bathroom faucets per single-family household. Navigant assumed three bathroom faucets were installed for each of these three projects.

3. Navigant found 999 ASI participants, however the tracking database does not show any measures installed for project PRJ-266563. The tracking data reported there were costs incurred and incentives received for this ASI project.

3.2 Program Volumetric Findings

The GPY4 HES Program had 4,380 participants. Table 3-1 summarizes the total installed measures for each measure, including both direct install measures and ASI measures.

Table 3-1. GPY4 Volumetric and Participation Findings

Measure	Ex-Ante Quantity	Verified Quantity
Hot Water Pipe Insulation /Linear foot	13,716	13,716
Showerhead/unit	3,314	3,304
Kitchen Aerator/unit	927	920
Bathroom Aerator/unit	4,477	4,459
Water Heater Set Back/unit	905	905
Programmable Thermostat/unit	667	667
Thermostat Education/unit	543	543
Attic Insulation (>R19 to R49)/Square Foot	2,217,231	2,217,231
Air Sealing/unit	940	940
Duct Sealing/unit	35	35
Wall Insulation/Square Foot	82,943	82,943
Basement/Sidewall Insulation/Square Foot	19,309	19,309

Source: Navigant analysis.

3.3 Gross Program Impact Parameter Estimates

Navigant calculated verified gross savings for the direct install measures in the GPY4 HES Program using algorithms and parameters defined in the Illinois TRM v3.0. Navigant has no new recommendations for the Illinois TRM based on the GPY4 evaluation.

Although the GPY4 Nicor Gas tracking database provided all input parameters to calculate savings, Navigant recommends updating the tracking database, as detailed in Section E.4.

Navigant performed a thorough literature review in GPY1/EPY4 to compare evaluated savings values for projects with similar ASI offerings as the HES program. This was done in order to vet the ex-ante savings for ASI measures in the HES program. Based on findings from the literature review, Navigant determined that the savings values from CLEAResult's EnergyMeasure® HOME (EM HOME) model compares favorably with evaluated savings for similar programs and climates. Navigant accepts CLEAResult's ASI measure savings assumptions for GPY4. Further detail on Navigant's ASI literature review can be found in the GPY1/EPY4 HES report.

3.4 Development of the Verified Gross Program Impact Results

Navigant performed a detailed engineering review of the ex-ante savings assumptions provided by CLEAResult and developed verified gross therms savings values for all of the direct install and ASI measures. Navigant determined the verified gross realization rates by comparing the ex-ante gross savings with the verified gross savings. The results by measure are shown in Table 3-2.

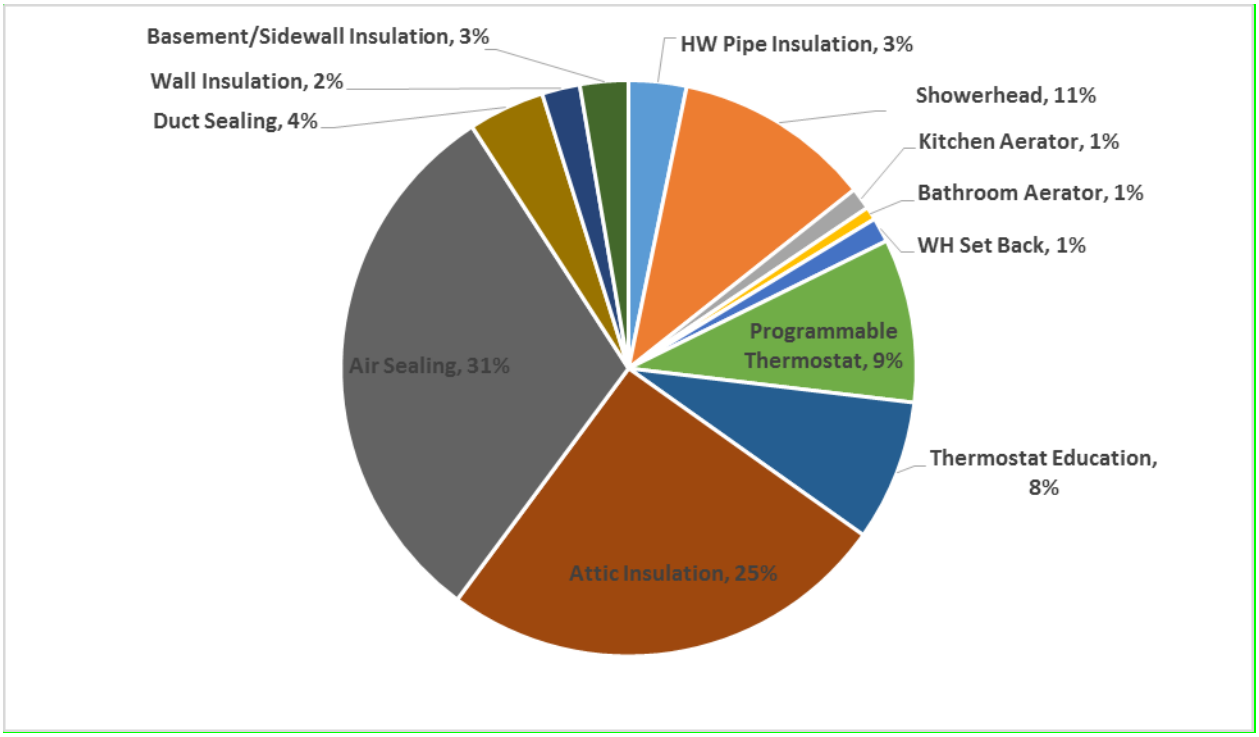
Table 3-2. Verified Gross Savings by Measure

	Measure Category	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Gross Realization Rate ‡
Direct Install Measures	Hot Water Pipe Insulation	13,579	13,579	100%
	Showerhead	47,722	46,388	97.2%
	Kitchen Aerator	5,191	5,152	99%
	Bathroom Aerator	3,089	3,077	100%
	Water Heater Set Back	5,792	5,792	100%
	Programmable Thermostat	38,439	38,556	100.3%
	Thermostat Education	33,144	33,190	100.1%
Subtotal		146,955	145,733	99.2%
ASI Measures	Attic Insulation (>R19 to R49)	106,140	106,140	100%
	Air Sealing	128,554	128,554	100%
	Duct Sealing	18,024	18,024	100%
	Wall Insulation	8,956	8,956	100%
	Basement/Sidewall Insulation	11,413	11,413	100%
Subtotal		273,085	273,085	100%
Total		420,041	418,819	99.7%

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

Figure 3-1 below shows the relative distribution of gross energy savings by measure.

Figure 3-1. Distribution of Gross Therms Savings by Measure



Source: Utility tracking data and Navigant analysis.

4. NET IMPACT EVALUATION

For GPY4, Navigant used an Illinois SAG-approved deemed NTG value of 0.86 to calculate net savings for Nicor Gas. To calculate the verified net savings, Navigant applied the NTG ratio to the verified gross savings. Table 4-1 presents the program net savings.

Table 4-1. GPY4 Verified Net Impact Savings Estimates

	Energy Savings (Therms)
Verified Gross Savings	418,819
Net-to-Gross Ratio	0.86†
Verified Net Savings	360,184

Source: Utility tracking data and Navigant analysis.

† Deemed value. Source: http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

5. PROCESS EVALUATION

The GPY4 process evaluation effort consisted of a review of the program materials and interviews with the program manager and implementation contractor. The program manager interview discussed implemented or planned changes to the program that could affect program satisfaction, participation, savings, or costs.

5.1 Program Manager Interview and Program Changes

The program manager interview revealed several significant changes in GPY4: the implementation contractor changed from CSG to CLEAResult, the home assessment was no longer connected to the ASI measure installation process, and the marketing and outreach shifted from the implementer to the utility. The direct install measures remained the same. The GPY3 recommendations for program improvement were presented in the HES Evaluation Report dated August 28, 2015 and included a recommended change to the ex ante calculation for pipe insulation which was incorporated into the GPY4 ex ante calculations.

Program participation for assessments increased compared to the previous year from 2,981 to 3,382, an increase of 13 percent. Program participation for ASI decreased compared to the previous year from 1,366 ASI participants to 998, a decrease of 27 percent. However, according to the program manager, the air sealing and insulation portion of the program exceeded their goal and went over the budget before the end of the program year. At the contractors' request, the program manager made adjustments to the rebate amount so that the program could continue with lower rebate levels. The net savings goal for GPY4 was 311,000 therms, and the program achieved a net savings of 360,184 representing 116 percent of the goal. According to the program manager, Nicor Gas knew the program would exceed the goal in the third quarter because of the steady level of participation throughout the program year. The program was well managed and the marketing effectively used bill inserts (sent to 10,000 customers), bill boards, emails and the Nicor Gas Web site. Customer "word of mouth" was also effective. The feedback to the customer call center and the postcards was both positive, overall with few escalations and "nothing out of the ordinary." According to the program manager, when asked about their satisfaction with the program via a postcard survey, the 15% - 20% of the customers that returned the survey gave their satisfaction average score of "4 out of 5." According to the program manager, the time between a customer requesting an assessment and the assessment completed was one to two weeks indicating an efficient work flow for the program.

5.2 Program QA/QC Procedures

The HES QA/QC procedures are contained in the "Home Energy Assessments PY4/7 Operations Manual, dated December 15, 2014- Final", and Appendix B of the Operations Manual "Home Energy Assessments Quality Assurance and Quality Control" dated December 7, 2014, Final" provided to the evaluation team in October of 2015. The QA/QC procedures and activities are primarily the responsibility of CLEAResult whose staff conduct the assessments and work with the approved trade allies on the ASI portion of the program. The Operations Manual and Appendix B documents do not include QA/QC procedures and activities for ASI measures.

According to the implementation contractor manager, the QC occurs in a parallel path with the assessment (meaning that the quality assurance coordinator conducts the inspection while the energy advisor is conducting the assessment) to verify that home assessments and installations "meet all program requirements while delivering an excellent customer service experience."

The documentation provided by CLEAResult describes multiple layers of quality assurance, including quality control coordinator oversight during the assessment and installation process, random inspections of completed installations by the quality control coordinator, and inspections done at the request of a homeowner. CLEAResult conducts 2.5% (or more) inspections of all home assessments. The quality assurance inspection inspects a randomized sample of all home assessments ensuring that all energy assessor staff is represented. The documentation states that the results of the inspections are available to Nicor Gas, however there is no mention of a proactive step to present the results of the inspections to Nicor.

> *". If issues are found during the inspections, the Coordinator will correct any issues for the customer during the site visit and will set up positive feedback loops to conduct further training of the Energy Advisor following any negative findings specific to measure installations. The Coordinator will share the results of the inspection with the Energy Advisors, assessor manager and program manager, whether positive or negative, in the weekly check-in so the team can continue to develop best practices and adjust protocols as needed. The assessor's manager and program manager will be notified of inspection results for non-measure installation aspects in order to facilitate other training and resources required to ensure assessors are following program protocols. Statistics and results of these inspections will be available to Nicor Gas and ComEd, including total number of homes inspected, the total number of measures inspected, the percentage of measures that have passed inspection, and the measure types that have been flagged as requiring additional training.[7]"*

Navigant recommends that the implementation contractor provide the results of the inspections to both Nicor Gas and Navigant for review. In addition, Navigant recommends that the implementation contractor develop quality assurance and quality control activities for the ASI installation measures installed by the approved contractors.

5.3 Program Improvement

The program exceeded the savings goals, the participant satisfaction is expected to remain high and consistent with the previous evaluation efforts, and the program has expanded the marketing effort (one of our GPY3 evaluation recommendations). Navigant recommends that the implementer develop a process that allows both Nicor Gas and Navigant to review the results of the quality assurance inspections over the course of the program year. Navigant also recommends that the implementer develop quality control and quality assurance procedures for the ASI component of HES. Navigant also recommends that Nicor Gas continue to implement the recommendations regarding the ex ante calculations described in the findings and recommendations section.

[7] From the Home Energy Assessments PY4/7 Operations Manual, dated December 15, 2014- Final Appendix B, Home Energy Assessments Quality Assurance and Quality Control" dated December 7, 2014, page 3.

6. FINDINGS AND RECOMMENDATIONS

This section summarizes the key impact findings and recommendations.

Program Savings Achievement

Finding 1. Navigant verified gross savings of 418,819 therms and net savings of 360,184 therms, resulting a realization rate (RR) of 99.7 percent compared to the ex-ante gross savings of 420,041 therms. Navigant utilized the SAG deemed program NTGR of 0.86 to calculate the verified net savings. The program achieved 116 percent of their net therm goal of 311,000[8].

Gross Realization Rates

Finding 2. Navigant reports an overall gross realization rate of 99.7 percent for therms savings—virtually 100 percent. Most of the measures have a realization rate of 100 percent. The realization rate for showerheads is 97.2 percent due to the tracking database using a per unit savings of 14.40 therms while TRM v3.0 uses 14.04 therms for the per unit savings.

Recommendation 1. Navigant recommends updating ex-ante calculations for showerheads and thermostats.

Tracking System Review

Finding 3. For both the showerhead and handheld showerhead measure, Navigant found several calculation parameters in the tracking database that need to be updated based on the Illinois TRM v3.0. The single family household factor used in the tracking database is 2.1 while the Illinois TRM v3.0 shows this value as 2.56. Showers per capita per day (SPCD) are 0.6 in the Illinois TRM v3.0 instead of 1.79 used in the tracking database. The value 1.79 is actually the deemed value for showerheads per household (SPH) from the Illinois TRM v3.0. For the showerhead measure, the “faucets per household” data label in the current tracking database needs to be updated to “showerheads per household”. In addition, project PRJ-323391 listed 12 handheld showerheads installed in a single family house which may be not reasonable. Nicor Gas attempted to confirm the actual number of showerheads in this residence, however the customer was unreachable. According to the Illinois TRM v3.0, there are 1.79 showerheads per single-family household. Navigant assumed two handheld showerheads were installed for this project.

Recommendation 2. Navigant recommends updating the parameters in the tracking database for both showerhead measures. In addition, Navigant recommends adding a QC procedure for verifying the actual number of showerheads in a single-family residence if four or more are reported.

Program Improvement

Finding 4. The program’s quality assurance activities include inspecting a randomized sample of all home assessments which ensures that each energy assessor’s home energy assessments are checked for quality. The QA/QC documentation states that the results of the inspections are available to Nicor Gas, however there is no mention of a proactive step to present the results of

[8] Email from Nicor Gas on 4/21/2016.

the inspections to Nicor Gas. Also, the QA/QC documentation provided to Navigant did not include the ASI measures.

Recommendation 3. Navigant recommends that the implementation contractor provide the results of the quality assurance inspections to both Nicor Gas and Navigant for review. In addition, Navigant recommends that the implementation contractor develop quality assurance and quality control procedures for the ASI measures installed by the approved contractors.

Finding 5. For the kitchen aerator and bathroom aerator measure, Navigant verified that the TRM v3.0 value for the single family household factor is 2.56 instead of 2.1 used in the tracking database. Also, the TRM v3.0 value for faucets per household is one for kitchens and 2.83 for bathrooms instead of two for both measures used in the tracking database. The average flow rate of the low-flow faucet aerator in the TRM v3.0 is 0.94 gpm instead of 1.5 gpm for kitchens and 1.0 gpm for bathrooms used in the tracking system, and the energy per gallon of hot water supplied by gas for bathrooms is 0.00341 therms per gallon in the TRM v3.0 instead of 0.004 therms per gallon in the tracking database. In addition, in project PRJ-353812, nine kitchen faucet aerators were reported installed in a single family house which did not appear reasonable. This single family house has 1,233 square feet in total. Nicor Gas was able to reach the customer for this project and confirmed there were only two kitchen aerators. Also, Navigant found three projects where nine bathroom faucet aerators were reported installed in single family homes (PRJ-361561, PRJ-361567, and PRJ-361581). For these three projects, the customers were unreachable. Navigant assumed three bath aerators were installed for each project because the Illinois TRM v3.0 uses a value of 2.83 bathroom faucets per single-family home.

Recommendation 4. Navigant recommends updating these parameters in the tracking database for the kitchen and bathroom aerator measures. In addition, Navigant recommends adding a QC procedure for verifying the actual number of faucets in a single-family residence if four or more are reported.

Finding 6. Navigant found 999 ASI participants, however the tracking database does not show any measures installed for project PRJ-266563. The tracking data reported there were costs incurred and incentives received for this ASI project.

Recommendation 5. Navigant recommends checking the tracking database for project PRJ-266563.

Program Participation

Finding 7. The GPY4 HES Program resulted in 4,380 participants, including 3,382 assessment participants and 998 ASI participants with energy savings.

Recommendation 6. If increasing ASI participants is a goal of the program, Navigant recommends increasing marketing so that more potential participants are aware of the program.