



Multi-Family Home Energy Savings Program

GPY4 Evaluation Report

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

FINAL

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TABLE OF CONTENTS

E. Executive Summary	1
E.1. Program Savings	2
E.2. Impact Estimate Parameters	3
E.3. Participation Information	4
E.4. Finding and Recommendations	5
1. Introduction	7
1.1 Program Description	7
1.2 Evaluation Objectives	7
2. Evaluation Approach	9
2.1 Overview of Data Collection Activities	9
2.2 Verified Savings Parameters	9
2.3 Verified Gross Program Savings Analysis Approach	11
2.4 Verified Net Program Savings Analysis Approach	11
2.5 Process Evaluation	11
3. Gross Impact Evaluation	12
3.1 Tracking System Review	12
3.2 Program Volumetric Findings	14
3.3 Gross Program Impact Parameter Estimates	16
3.4 Development of the Verified Gross Realization Rate	17
3.5 Verified Gross Program Impact Results	18
4. Net Impact Evaluation	20
5. Process Evaluation	21
6. Findings and Recommendations	22
7. Appendix	24
7.1 Fall 2014 MCEEP Program NTG Results Final	24
7.2 Fall 2014 MCEEP Program Process Survey Results	31

LIST OF FIGURES AND TABLES

Figures

Figure 3-1. GPY4 MFHES Program Measure End-use Category: Installations..... 15

Tables

Table E-1. GPY4 Program Results..... 2

Table E-2. GPY4 Program Results by Measure..... 3

Table E-3. Impact Estimate Parameters 4

Table E-4. GPY4 Primary Participation Detail..... 4

Table 2-1. Data Collection Activities..... 9

Table 2-2. Verified Gross and Net Savings Parameters 10

Table 3-1. GPY4 Primary Participation Detail 14

Table 3-2. GPY4 Multi-Family Program Installed Measures by Rebate Unit 16

Table 3-3. Verified Gross Savings Parameters 17

Table 3-4. GPY4 Verified Gross Savings by Measure 18

Table 3-5. GPY4 Verified Gross Impact Savings Estimates 19

Table 4-1. GPY4 Verified Net Impact Savings Estimates 20

Table 7-1. Program Net-to-Gross Ratio and Components 25

Table 7-2. Primary Data Sources 26

Table 7-3. Net-to-Gross Estimate Parameters 30

Table 7-4. MCEEP Decision-Maker Process Results 32

Table 7-5. Primary Data Sources 32

Table 7-6. Participant Perspective on Multi-Family Program Improvement..... 34

Table 7-7. Summary of Findings and Recommendations 35

E. EXECUTIVE SUMMARY

This report presents a summary of the findings and results from the impact and process evaluation of the Nicor Gas Multi-Family Home Energy Savings Program (MFHES Program or Multi-Family Program) (formerly Multi-Family Comprehensive Energy Efficiency Program), which is electric program year seven (EPY7) and gas program year four (GPY4).¹ The EPY7/GPY4 program year was jointly implemented with Commonwealth Edison Company (ComEd). The program achieves electric energy and demand savings for ComEd customers and natural gas energy savings for customers of Nicor Gas Company (Nicor Gas). This evaluation report includes total Nicor Gas impacts from the jointly implemented program. CLEAResult is the implementation contractor of the Multi-Family Program.

The Multi-Family Program was delivered through three channels in GPY4:

- i. Direct installation of measures in residential multi-family buildings (5 or more living units),
- ii. Prescriptive and custom incentives offered to multi-family decision-makers to install energy savings measures in common areas of multi-family buildings,
- iii. Assessment of multi-family buildings to provide property owners of buildings attic air sealing, attic insulation and combustion safety testing. Air sealing and insulation qualify for custom incentives.

During GPY4, the MFHES Program continued to offer direct installation of low-flow water-saving devices, including kitchen and bath aerators and showerheads, as well as programmable thermostats, hot water pipe wraps, and turning-down the temperature of water heaters, where applicable. The comprehensive common area measures included upgrades or improvements to central plant and heating, ventilating, and air-conditioning (HVAC) systems and controls, interior and exterior lighting systems, and building shell improvements. The implementation contractor works with installation contractors as an integral part of promoting the comprehensive component of the program.

The GPY4 evaluation involved verifying the compliance of the MFHES Program savings to the Illinois Technical Reference Manual (TRM)² or applying necessary research adjustments to non-deemed savings in the tracking database and calculating verified net impact savings using the net-to-gross (NTG) ratio approved through the Illinois Stakeholder Advisory Group (SAG) consensus process.³ Navigant interviewed program staff and the implementation contractor staff to verify information about the tracking system.

In fall of 2014, Navigant conducted GPY4 NTG and process evaluation research on 78 customers that participated in the Nicor Gas Multi-Family Program. The results of this research were used to inform the NTG values deemed for GPY5 and provided feedback on a limited number of process questions. The results were summarized in memos⁴ to Nicor Gas that are attached to the Appendix of this report.

¹ The EPY7/GPY4 program year began June 1, 2014 and ended May 31, 2015.

² Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

³ http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

⁴ Nicor Gas Fall 2014 MCEEP NTG Results, and Nicor Gas Fall 2014 MCEEP Process Survey Results

E.1. Program Savings

The following two tables summarize the total program savings and program savings by measure. Table E-1 shows the GPY4 MFHES Program achieved net energy savings of 954,386 therms.

Table E-1. GPY4 Program Results

Savings Category	Nicor Gas
Ex Ante Gross Savings ⁵ (Therms)	1,054,277
Verified Gross Realization Rate (RR)	0.97 ‡
Verified Gross Savings (Therms)	1,022,676
Net to Gross Ratio (NTGR)	IU=0.96, CA=0.93 †
Verified Net Savings (Therms)	954,386

Source: Utility tracking data and Navigant analysis.

IU= dwelling unit, CA= common areas

‡ Based on evaluation research findings

† 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 MFHES Program by measure. The direct install residential unit measures contributed 11 percent of the GPY4 verified net savings, and the comprehensive measures contributed 89 percent of the verified net savings (86 percent from prescriptive projects and 3 percent from custom projects).

⁵ From Program Tracking System

Table E-2. GPY4 Program Results by Measure

Research Category	Measure	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate‡	Verified Gross Savings (Therms)	NTGR †	Verified Net Savings (Therms)
Direct Install (dwelling units)	Bath Aerator	1,656	100%	1,656	0.96	1,590
	Pipe Insulation	1,233	100%	1,233	0.96	1,183
	Showerhead	25,565	100%	25,574	0.96	24,551
	Kitchen Aerator	6,505	100%	6,505	0.96	6,245
	Programmable Thermostat	74,115	100%	74,115	0.96	71,150
	WH Set Back	826	100%	826	0.96	793
<i>DI Subtotal</i>		<i>109,899</i>	<i>100%</i>	<i>109,908</i>	<i>0.96</i>	<i>105,512</i>
Prescriptive/ Custom Incentives (common areas)	Boiler Tune Up, Space Heat	31,834	100%	31,834	0.93	29,606
	Boiler Tune Up, Process	7,017	100%	7,017	0.93	6,526
	Pipe Insulation	692,137	99%	683,402	0.93	635,564
	Efficient Boiler	50,385	100%	50,386	0.93	46,859
	Efficient Furnace	28,114	100%	28,114	0.93	26,146
	Outdoor Pool Covers	29,973	39%	11,599	0.93	10,787
	Programmable Thermostat	15,398	109%	16,848	0.93	15,668
	Storage Water Heater	10,009	100%	10,009	0.93	9,308
	Boiler Reset Controls	9,832	55%	5,404	0.93	5,026
	Ozone Laundry	35,389	100%	35,391	0.93	32,914
	Steam Trap, Commercial	1,978	100%	1,978	0.93	1,840
Custom Measures	32,312	95%	30,786	0.93	28,631	
<i>Common Area Subtotal</i>		<i>944,378</i>	<i>97%</i>	<i>912,768</i>	<i>0.93</i>	<i>848,874</i>
GPY4 Total		1,054,277	97%	1,022,676	n/a	954,386

Source: Program tracking data and Navigant analysis.

‡ Based on evaluation research findings.

† 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

Table E-3 shows the key parameters used in the GPY4 impact analysis. Navigant used impact parameters as defined by the Illinois Technical Reference Manual (TRM v3.0) to evaluate the savings for most program measures. Navigant evaluated and verified savings input parameters for custom measures

installed through the program, and custom efficiency input values used to estimate ex ante savings for space heating equipment. The evaluation team did not conduct research on impact savings parameters for deeming in future versions of the Illinois TRM as a part of the GPY4 Multi-Family Program evaluation.

For the calculation of net savings, Navigant used a NTGR values deemed by the Stakeholder Advisory Group (SAG) for Nicor Gas GPY4 MFHES Program savings. This report provides further overview of impact parameters in Section 2.2.

Table E-3. Impact Estimate Parameters

Parameter	Data Source	Deemed or Evaluated?
Net to Gross Ratio	SAG Document †	Deemed
Verified Gross Realization Rate	Program Tracking Data, Illinois TRM (v3.0) or custom evaluation	Evaluated
Space Heating Efficiency Inputs	Nicor Gas custom values	Evaluated
Custom measures inputs	Nicor Gas custom values	Evaluated

Source: Navigant analysis

† Deemed values. 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 participation. Navigant identified 347 participants (business names)⁶ in the GPY4 MFHES Program including 293 participants who received prescriptive or custom incentives, and 126 participants who completed an assessment, 54 of which received no-cost direct install products or services. A total of 695 projects⁷ were completed through the GPY4 program, including the installation of 7,119 measures.

Table E-4. GPY4 Primary Participation Detail

Participation	Direct Install (residential units)	Prescriptive/Custom (common areas)	Program Total
Participants	54*	293	347
Completed Projects	105	590	695
Installed Measures ⁸	6,236	883	7,119

Source: Program tracking data and Navigant analysis.

* Note: a total of 126 assessment participants were identified and 54 of them received DI measures with realized savings.

⁶ Participants refer to multi-family property owners/managers (account names or business names) that participated in the Multi-Family program in GPY4.

⁷ Projects refer to unique applications submitted to the program by multi-family owners and managers. Projects include DI, prescriptive, and custom applications as well as assessments.

⁸ For evaluation reporting purpose, if a measure quantity is reported in the tracking system in linear feet, MBH, or square feet, Navigant treated each row entry of such measure as one measure quantity in this table.

E.4. Finding and Recommendations

This section summarizes the key findings and recommendations.

Program Savings Achievement

Finding 1. Navigant verified net savings of 954,386 therms for the GPY4 MFHES Program, based on the SAG approved NTG ratio of 0.96 for direct install measures and 0.93 for common area measures. The verified net savings is 91 percent of the program net savings goal of 1,049,000 therms.⁹ Pipe insulation measures contributed 67 percent of the GPY4 verified net savings, space heating and process application measures contributed 25 percent, water efficiency measures had four percent, and the remaining measures contributed four percent.

Gross Realization Rates

Finding 2. Navigant reports an overall gross savings realization rate of 97 percent for the MFHES Program, based on verified gross savings of 1,022,676 therms compared with the ex ante 1,054,277 therms. Direct install measures in residential units had a 100 percent gross savings realization rate. Savings from prescriptive common area measures were adjusted with a 97 percent gross realization rate. Prescriptive measures with lower verified gross savings were outdoor pool covers, pipe insulation, storage water heaters and a boiler reset control project. Programmable thermostats installed in common areas had a 109 percent gross realization rate. The Custom component of the MFHES Program had a 95 percent gross realization rate after Navigant performed an engineering review of the projects documentation. Two of the four custom projects completed in GPY4 had 100 percent realization and two had less than 100 percent realization rate.

Recommendation 1. Nicor Gas should review the savings calculations for certain common area prescriptive measures. Nicor Gas has indicated that the savings calculation methodology for pool covers is corrected and the tracking system is updated accordingly for subsequent program years. For programmable thermostats, Nicor Gas should consider calculating savings using actual heating equipment output capacities as collected from the applications.

Tracking System Review

Finding 3. Navigant reviewed the tracking database of the MFHES Program and compared the savings input parameters with the TRM deemed inputs or custom inputs. When the program tracking data contained custom inputs, Navigant analysis considered those; when not provided, we used the TRM values. Navigant found that, in most cases, projects that used a custom input to determine the ex ante savings value did not include the custom input in the tracking data or, when available, the custom input parameters did not produce the claimed savings. Follow up supplemental data with default lookup values provided by CLEAResult enabled Navigant to verify correct estimation of the claimed savings for some measures and to make adjustments for others.

Recommendation 2. Nicor Gas should regularly update the tracking system with the most current TRM approved input data. Consider updating the tracking system to accommodate the supplemental data lookup custom input variables collected from customer applications.

⁹ Nicor Gas Energy Efficiency Plan, June 2014 - May 2017

Supplemental data supporting ex ante savings analysis should accompany the tracking database submitted for evaluation. This may save time and cost involved in repeating the savings verification process and minimize delays in evaluation reporting timeline.

Finding 4. The tracking system description of furnace measures suggests they were installed in residential units, but the ex ante savings were estimated for common areas of multi-family buildings. Verified savings based on residential units should produce lower savings, but, upon further review of supplemental data provided by Nicor Gas, Navigant determined that these measures were installed in common areas and that the ex ante savings were reasonable. In the case for pipe insulation, some projects which were originally described in the tracking system as hot water pipe insulation were actually verified to be space heating low or high pressure pipe insulations. For some pipe insulation projects, the total size of pipes insulated and reported in the tracking system were revised after reviewing the supplemental data. Navigant adjusted the savings accordingly for pipe insulation projects.

Recommendation 3: Nicor Gas should ensure that the description of program measures in the tracking system are consistent with deemed and custom input parameters used to generate measure savings.

Recommendation 4: Nicor Gas should provide additional information in the tracking system for pipe insulation measures. Specify pipe location (indoor/outdoor, conditioned or unconditioned space) and the primary piping use (hot water, space heating non-circulation or recirculation and the period of use). This information was provided in the supplemental data, and should be mapped into the tracking system.

Program Participation

Finding 5. The GPY4 MFHES Program realized participation of 347 property owners or decision makers of multi-family properties who completed an assessment. This included 293 participants who received prescriptive or custom incentives, 54 participants that received no-cost direct install products or services, and 72 participants that only completed an assessment. A total of 695 projects were completed through the GPY4 program, including the installation of 7,119 measures.

1. INTRODUCTION

1.1 Program Description

This evaluation report covers the Nicor Gas Multi-Family Home Energy Savings Program (formerly Multi-Family Comprehensive Energy Efficiency Program), which is electric program year seven (EPY7) and gas program year four (GPY4).¹⁰ The EPY7/GPY4 program year was jointly implemented with Commonwealth Edison Company (ComEd). The program achieves electric energy and demand savings for ComEd customers and natural gas energy savings for customers of Nicor Gas Company (Nicor Gas). CLEAResult is the implementation contractor of the Multi-Family Program.

The Multi-Family Program was delivered through three channels in GPY4: direct installation of measures in residential living units, comprehensive component involving the provision of prescriptive and custom incentives to commercial contractors and multi-family decision-makers to install energy savings measures in common areas of multi-family buildings. The third program component targeted multi-family buildings to provide property owners of small multi-family buildings attic air sealing, attic insulation and combustion safety testing.

During GPY4, the MFHES Program continued to offer direct installation of low-flow water-saving devices, including kitchen and bath aerators and showerheads, as well as programmable thermostats, hot water pipe wraps, and turning-down the temperature of water heaters, where applicable. The comprehensive common area measures include upgrades or improvements to central plant and heating, ventilating, and air-conditioning (HVAC) systems and controls, interior and exterior lighting systems, and building shell improvements. The implementation contractor works with installation contractors as an integral part of promoting the comprehensive component of the program.

During GPY4, program tracking data showed that 347 multi-family property owners or decision makers participated in the MFHES Program and installed 7,119 measures. The majority of the savings from the measures installed in GPY4 are derived from deemed values contained in the Illinois Technical Reference Manual (TRM).¹¹

1.2 Evaluation Objectives

As planned, the Nicor Gas MFHES 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)?

¹⁰ The EPY7/GPY4 program year began June 1, 2014 and ended May 31, 2015.

¹¹ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

Process Questions:

As part of the fall 2014 Multi-Family Program net-to-gross research, participant multi-family decision-makers were asked through computer assisted telephone interviews (CATI) to answer questions related to their overall satisfaction with the Multi-Family Program, perspective about program improvement, source of program awareness and the reason for participation. Analyses of the satisfaction and awareness responses are summarized in a memo presented to Nicor Gas and shown in Appendix of this report.

The remaining GPY4 process evaluation activities for the Multi-Family Program was limited to interviews with program staff and the implementation contractor staff to verify information about the tracking system.

2. EVALUATION APPROACH

This evaluation of the MFHES Program reflects the fourth full-scale year of program operation (June 1, 2014 through May 31, 2015). To determine verified gross savings, the evaluation team verified per unit savings for each program measure using the Illinois Technical Reference Manual (TRM v3.0) for deemed input parameters or through evaluation research to verify custom inputs applied by Nicor Gas in the ex ante calculations. Navigant multiplied measure quantities reported in the program tracking system data by the verified per unit savings values. The verified net savings was calculated using a net-to-gross ratio (NTGR) that was deemed for GPY4. Navigant interviewed program staff and the implementation contractor staff to verify information about the tracking system.

In fall of 2014, Navigant conducted GPY4 NTG and process evaluation research with 78 decision makers including multi-family property managers and owners that participated in the Nicor Gas Multi-Family Program. The results of this research were used to inform the NTG values deemed for GPY5, and provided feedback on a limited number of process questions. The results were summarized in memos¹² to Nicor Gas that are attached to the Appendix of this report.

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
Telephone Interviews	GPY3 Participating Customers	78	78	Fall 2014
In Depth Interviews	PM/IC	2	2	May 2015
Tracking System & Engineering Review	GPY4 Projects using IL-TRM or through research	All	All	April-June 2016
Project File Reviews	GPY4 Projects with custom inputs	All	All	April-June 2016

Source: Navigant analysis

2.2 Verified Savings Parameters

Table 2-2 below presents the sources for parameters that were used in verified gross savings analysis indicating which were examined through GPY4 evaluation research and which were deemed.

¹² Nicor Gas Fall 2014 MCEEP NTG Results, and Nicor Gas Fall 2014 MCEEP Process Survey Results

Table 2-2. Verified Gross and Net Savings Parameters

Measure	Input Parameter Source	Deemed or Evaluated?
NTGR	SAG Agreement†	Deemed
Gross Realization Rate	Tracking data and evaluation research	Evaluated
Bath/Kitchen Faucet Aerators	Illinois TRM, v3.0, section 5.4.4‡	Deemed
Showerhead	Illinois TRM, v3.0, section 5.4.5‡	Deemed
DHW Pipe Insulation	Illinois TRM, v3.0, section 5.4.1‡	Deemed
Boiler Tune Up, Heating	Illinois TRM, v3.0, section 4.4.2‡	Deemed
Boiler Tune Up, Process	Illinois TRM, v3.0, section 4.4.3‡	Deemed
Boiler Cutout/Reset Control	Illinois TRM, v3.0, section 4.4.4‡	Deemed
High Efficiency Boiler	Illinois TRM, v3.0, section 4.4.10‡ & custom input	Evaluated
High Efficiency Furnace	Illinois TRM, v3.0, section 4.4.11‡ & custom input	Evaluated
Commercial Pool Covers	Illinois TRM, v3.0, section 4.3.4‡	Deemed
Ozone Laundry	Illinois TRM, v3.0, section 4.3.6‡	Deemed
HW/Steam Pipe Insulation	Illinois TRM, v3.0, section 4.4.14‡	Deemed
Steam Traps	Illinois TRM, v3.0, section 4.4.16‡	Deemed
WH Temperature Setback	Illinois TRM, v3.0, section 5.4.6‡	Deemed
Programmable Thermostat	Illinois TRM, v3.0, section 5.3.11‡ & 4.4.18‡	Deemed
Custom Measures	Custom Inputs	Evaluated
Programmable Thermostat	Illinois TRM, v3.0, section 4.4.18‡	Deemed
Storage Water Heater	Illinois TRM, v3.0, section 4.3.1‡	Deemed

Source: Navigant analysis

†

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

‡ Illinois Statewide Technical Reference Manual for Energy Efficiency Version 3.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

2.3 Verified Gross Program Savings Analysis Approach

Navigant used the Illinois TRM Version 3.0 methodology to calculate verified gross savings for measures with deemed savings. The Illinois TRM allows for some custom values to be used in the algorithms as well. CLEAResult used custom input variables collected from customer applications alongside TRM deemed inputs to estimate ex ante savings for some measures. Navigant reviewed the custom assumptions in the tracking database and supplemental data provided by CLEAResult to verify the reasonableness of the custom inputs.

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 NTGR values that were deemed: 0.96 for direct install residential measures and 0.93 for common area measures.

2.5 Process Evaluation

As part of the GPY4 process evaluation, Navigant performed a review of the program materials and conducted an interview with program staff and the implementation contractor staff to verify information about the tracking system.

3. GROSS IMPACT EVALUATION

Navigant performed a verification of the MFHES Program tracking database to determine the accuracy and reasonableness of the data gathered and required to calculate program savings and verify the quantity of measures installed through the program. Navigant used measure quantities, tracking data, and supplemental data of equipment specifications supplied by Nicor Gas as inputs to Illinois TRM algorithms to determine verified gross savings. Navigant estimated that the GPY4 MFHES Program achieved verified gross savings of 1,023,524 therms and a verified gross realization rate of 97 percent at the program level.

3.1 Tracking System Review

The purpose of the tracking system review was to ensure the system accurately gathers the required data to calculate program savings. Nicor Gas and CLEAResult delivered the data in April 2016. Navigant's initial analysis of the tracking data savings assumptions revealed that several of the input parameters did not produce the claimed savings for some measures. Nicor Gas provided supplemental data upon request from Navigant to back up the assumptions behind the ex ante savings to resolve the discrepancies. These delays affected the GPY4 evaluation reporting timeline relative to the original evaluation plan.

From Navigant's initial review, it appeared that CLEAResult used custom inputs for some measures and projects and deemed inputs for others. CLEAResult explained that when provided in the application, custom inputs were used to determine savings, otherwise TRM values were applied. However, Navigant found that in many instances, projects that used a custom input to determine the ex ante savings value did not include the custom input in the tracking data or even when available the custom input did not produce the claimed savings. Measures with custom inputs were boilers, furnaces, programmable thermostats and pipe insulation. Navigant's savings verification approach was that when the program tracking data contained custom inputs, our analysis considered those; when not provided, we defaulted to the TRM values unless Nicor Gas provided supplemental custom input data to support the ex ante savings calculation.¹³

Key measure specific findings from the tracking system review are provided below.

1. **Pipe Insulation: 99% RR, 67% of Program Net Savings.** Navigant found inconsistencies in the tracking system input parameters and the claimed savings for domestic hot water and space heating pipe insulation. Upon reviewing supplemental data provided by Nicor Gas, we adjusted the savings for some projects which were initially described in the tracking system as hot water pipes but were verified to be space heating low or high pressure pipe insulations (e.g. projects PRJ-396722, PRJ-410451). For some projects the total size of pipe insulated were revised after reviewing the supplemental data (e.g. PRJ-294563). The verified gross realization rate for pipe insulation measures was 99 percent.
2. **Programmable Thermostats: 102% RR, 9% of Program Net Savings.** Programmable thermostats installed in residential units had a 100 percent verified gross realization rate.

¹³ Navigant's retrospective verification of custom inputs was not constrained to using values provided on the application form or supplemental program tracking data provided by Nicor Gas.

Navigant adjusted the savings for programmable thermostats installed in common areas of multi-family buildings. The adjustments increased the verified savings for thermostats installed in common areas, resulting in a gross realization rate of 109 percent (overall measure realization rate is 102 percent). The tracking database shows a default heating capacity of 104,000 Btu/hr as an input variable for heating equipment for common area programmable thermostat savings. Navigant verified this value is inconsistent with the claimed savings; rather the ex ante used a default of approximately 84,600 Btu/hr input heating capacity. Navigant did not adjust the savings based on the default heating capacities. The ex ante calculation also used a custom default average savings factor for all building locations which we found to be inconsistent with the TRM. The TRM (v4.0) input assumptions for programmable thermostats have changed for GPY5. We acknowledge that Nicor Gas will make the necessary changes to the savings calculation and the tracking system inputs.

3. **Boilers and Furnaces: 100% RR, 8% of Program Net Savings.** Navigant reviewed the post installation custom efficiency values, heating capacities and other deemed inputs used to calculate the ex ante savings for efficient boilers and furnaces. The gross realization rates for both measures were estimated to be 100 percent. Navigant found that the tracking system description of the furnace measure suggests they were installed in residential units, but the ex ante savings were estimated for common areas of multi-family buildings. Verified savings based on residential units produced lower savings. However, upon further review of supplemental data provided by Nicor Gas, Navigant determined that these measures were installed in common areas and that the claimed savings were reasonable.
4. **Custom Projects: 95% RR, 3% of Program Net Savings.** The custom component of the Multi-Family Program realized installation of four custom projects in GPY4. Navigant requested documentation for the projects and performed engineering file reviews of the energy savings inputs and assumptions. Two projects were verified with 100 percent gross realization rates. For project PRJ-360183, savings were adjusted based on analysis of 12 months of pre-post billing data, which resulted in a 74 percent verified gross realization rate. For the attic insulation project PRJ-360222, the project scope of work does not mention specifically adding wraps or material to tight joints or vents to prevent air leakage. We were unable to verify the 15 percent savings for air infiltration and 15 percent savings for insulation near frames. Our adjustment led to a 90 percent gross realization rate for the project.
5. **Storage Water Heaters and Boiler Reset Controls: 99% RR and 65% RR respectively, total 2% of Program Net Savings.** The gross savings for storage water heaters was verified with a 100 percent realization rate. We observed that project (PRJ-470942) installed a high efficiency water heater with a capacity of 120,000 Btu/hr that saves 251 therms. Navigant did not adjust the savings although the measure name was incorrectly tracked as a standard water heater (EF>67%) which has a lower savings. We also adjusted the savings for one boiler reset control project (PRJ-408875), which with a heating capacity of 300,000 Btu/hr should save 492 therms not 4,920 therms as reported. The verified gross realization rate was 55 percent for boiler reset controls.
6. **Outdoor Pool Covers: 39% RR, 1% of Program Net Savings.** Nicor Gas used an incorrect TRM savings adjustment factor to calculate savings for common area outdoor pool covers, resulting in the measure gross realization rate of 39 percent. The deemed savings factor for outdoor pool covers should be 1.01 but it was interchanged with 2.61, a value deemed for indoor pool covers. Navigant observed that the tracking system erroneous application of the TRM

savings adjustment factor for indoor and outdoor pool covers also occur in other Nicor Gas incentive programs such as the Small Business and BEER programs. We acknowledge that Nicor Gas is making the necessary corrections for subsequent program years.

3.2 Program Volumetric Findings

Table 3-1 provides a breakdown of the GPY4 participants by program category. Navigant identified 347 participants in the GPY4 MFHES Program who completed an assessment. This included 293 participants who received prescriptive or custom incentives, 54 participants that received no-cost direct install products or services and 72 participants that only completed an assessment. A total of 695 projects were completed through the GPY4 program, including the installation of 7,119 measures.

Table 3-1. GPY4 Primary Participation Detail

Participation	Direct Install (residential units)	Prescriptive/Custom (common areas)	Program Total
Participants ¹⁴	54*	293	347
Completed Projects ¹⁵	105	590	695
Installed Measures ¹⁶	6,236	883	7,119

Source: Program tracking data and Navigant analysis.

* Note a total of 126 assessment participants were identified and 54 of these received DI measures with realized savings

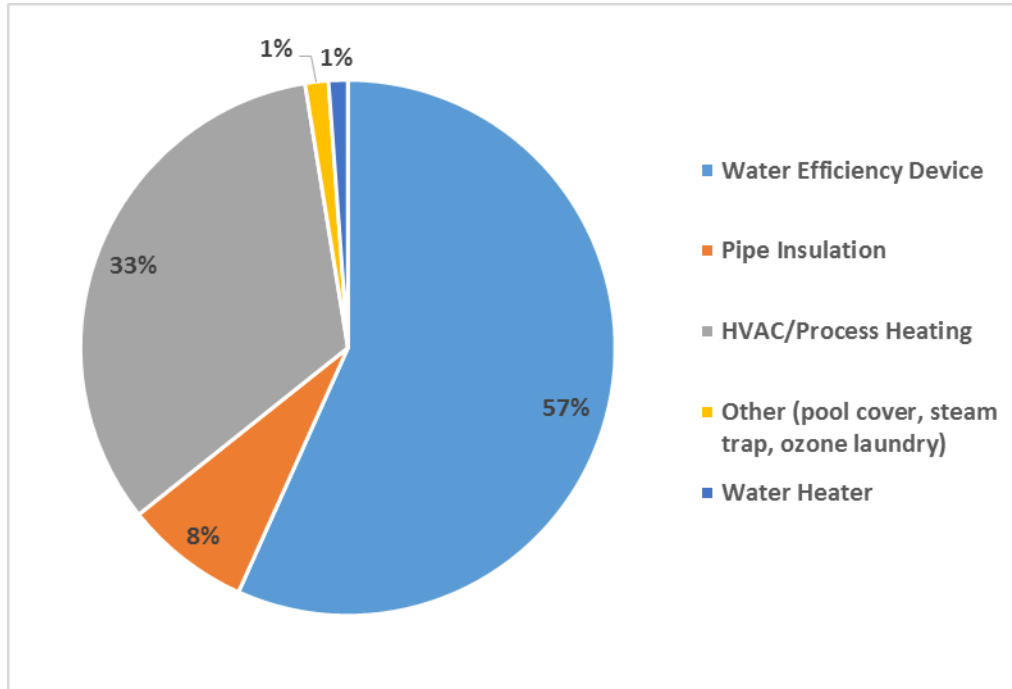
Figure 3-1 depicts the GPY4 volumetric measure counts by end-use category. Direct install water efficiency measures accounted for 57 percent of the measure count followed by the HVAC/process heating equipment with 33 percent. More detail breakdown of the GPY4 participants by program rebate units is provided in Table 3-2 below.

¹⁴ Participants are defined based on the project business name and number of accounts.

¹⁵ Projects refer to unique applications submitted through the program by multi-family owners and managers.

¹⁶ For evaluation reporting purpose, if a measure quantity is reported in the tracking system in linear feet, MBH, or square feet, Navigant treated each row entry of such measure as one measure quantity in this table.

Figure 3-1. GPY4 MFHES Program Measure End-use Category: Installations



Source: Program tracking data and Navigant analysis.

Table 3-2. GPY4 Multi-Family Program Installed Measures by Rebate Unit

Measure Category	Unit of Rebate	Ex Ante Quantity	Verified Quantity
Bath Aerator	unit	1,325	1,325
HW Pipe Insulation (in-unit)	Ln.ft	1,087	1,087
Showerhead	unit	1,429	1,429
Kitchen Aerator	unit	1,268	1,268
Programmable Thermostat (in unit)	unit	1,830	1,830
WH Set Back	unit	129	129
Boiler Tune Up, Space Heat	unit	126	126
Boiler Tune Up, Process	unit	2	2
DHW/Space Heat Pipe Insulation (common area)	Ln.ft	115,841	115,841
Efficient Boiler	unit	47	47
Efficient Furnace	unit	112	112
Outdoor Pool Covers	Sq.ft	11,484	11,484
Programmable Thermostat (common area)	unit	113	113
Storage Water Heater	unit	83	83
Boiler Reset Controls	unit	7	7
Ozone Laundry	unit	72	72
Steam Trap, Commercial	unit	23	23
Custom Attic Insulation	unit	1	1
Custom HVAC Measures	unit	3	3

Source: Program tracking data and Navigant analysis.

3.3 Gross Program Impact Parameter Estimates

Navigant verified the ex ante savings using the assumptions and algorithms specified in the TRM (v3.0) or through engineering analysis for non-deemed measures. Table 3-3 summarizes the input parameters and unit of savings used to estimate program verified gross savings.

Table 3-3. Verified Gross Savings Parameters

Input Parameter	Value	Unit	Deemed or Evaluated?
Verified Gross Realization Rate	1.00		Evaluated
Bathroom Faucet Aerator	1.25	therms/unit	Deemed
Kitchen Faucet Aerator	5.13	therms/unit	Deemed
Showerhead	17.90	therms/unit	Deemed
WH Set Back	6.4	therms/unit	Deemed
Boiler Tune Up, Heating	Vary. Acceptable as is	therms/unit	Deemed
Boiler Tune Up, Process	Vary. Acceptable as is	therms/unit	Deemed
Efficient Boiler	Vary. Acceptable as is	therms/unit	Deemed
Efficient Furnace	Vary. Acceptable as is	therms/unit	Deemed
Commercial Pool Cover	2.61 for indoor, 1.01 for outdoor	therms/Sq.ft	Deemed
Ozone Laundry	30.72	therms/lb-capacity	Deemed
Pipe Insulation	Vary. Acceptable with adjustments due to pipe description and location	therms/Ln.ft	Deemed
Steam Trap, Commercial	86.0	therms/unit	Deemed
Custom	Vary	therms/unit	Evaluated
Programmable Thermostat	Vary. Acceptable for DI, adjusted for common areas using deemed savings factor	therms/unit	Deemed
Storage Water Heater (EF>67%)	119 for standard, 251 therms for high efficiency	therms/unit	Deemed

Source: Navigant analysis

3.4 Development of the Verified Gross Realization Rate

Navigant determined the verified gross realization rates by comparing the ex ante gross savings with the verified gross savings. The overall program verified gross realization rate is 97 percent. Results by measure are summarized in Table 3-4 below. Domestic and low and high pressure pipe insulation contributed 68 percent of the GPY4 verified gross savings. The space heating and process application measures contributed 24 percent (including thermostats and custom HVAC measures), water efficiency measures 4 percent, and the remaining measures contributed 4 percent.

Table 3-4. GPY4 Verified Gross Savings by Measure

Research Category	Measure	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate‡	Verified Gross Savings (Therms)
Direct Install (dwelling units)	Bath Aerator	1,656	100%	1,656
	Pipe Insulation	1,233	100%	1,233
	Showerhead	25,565	100%	25,574
	Kitchen Aerator	6,505	100%	6,505
	Programmable Thermostat	74,115	100%	74,115
	WH Set Back	826	100%	826
<i>DI Subtotal</i>		<i>109,899</i>	<i>100%</i>	<i>109,908</i>
Prescriptive/Custom Incentives (common areas)	Boiler Tune Up, Space Heat	31,834	100%	31,834
	Boiler Tune Up, Process	7,017	100%	7,017
	Pipe Insulation	692,137	99%	683,402
	Efficient Boiler	50,385	100%	50,386
	Efficient Furnace	28,114	100%	28,114
	Outdoor Pool Covers	29,973	39%	11,599
	Programmable Thermostat	15,398	109%	16,848
	Storage Water Heater	10,009	100%	10,009
	Boiler Reset Controls	9,832	55%	5,404
	Ozone Laundry	35,389	100%	35,391
	Steam Trap, Commercial	1,978	100%	1,978
Custom Measures	32,312	95%	30,786	
<i>Common Area Subtotal</i>		<i>944,378</i>	<i>97%</i>	<i>912,768</i>
GPY4 Total		1,054,277	97%	1,022,676

Source: Program tracking data and Navigant analysis.

‡ Based on evaluation research findings.

3.5 Verified Gross Program Impact Results

As shown in Table 3-5 below, the savings adjustments affected the verified savings, and resulted in a difference of 31,601 therms between the ex ante gross savings and the verified gross savings, producing a verified gross realization rate of 97 percent at the program level. Of the total program verified gross savings of 1,022,676 therms, direct install measures accounted for approximately 11 percent; the prescriptive component, 86 percent; and, the custom component, 3 percent.

Table 3-5. GPY4 Verified Gross Impact Savings Estimates

Program Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate‡	Verified Gross Savings (Therms)
Direct Install (residential units)	109,899	100%	109,908
Prescriptive Incentives (common areas)	912,066	97%	881,982
Custom Incentives (common areas)	32,312	95%	30,786
GPY4 Total	1,054,277	97%	1,022,676

Source: Program tracking data and Navigant analysis.

4. NET IMPACT EVALUATION

For GPY4, Navigant used the Illinois SAG approved deemed NTG values of 0.96 for direct install residential measures and 0.93 for common area measures to calculate the GPY4 net savings for the MFHES Program. To calculate the verified net savings, Navigant multiplied the verified gross savings by the deemed NTG ratio. Table 4-1 presents the program net savings.

Table 4-1. GPY4 Verified Net Impact Savings Estimates

Program Category	Verified Gross Savings (Therms)	Net-to-Gross Ratio†	Verified Net Savings (Therms)
Direct Install (residential units)	109,908	0.96	105,512
Prescriptive Incentives (common areas)	881,982	0.93	820,243
Custom Incentives (common areas)	30,786	0.93	28,631
GPY4 Total	1,022,676	n/a	954,386

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 activities for the MFHES Program were limited to interviews with program and implementation contractor staff to verify information about the tracking system.

As part of the fall 2014 MFHES Program net-to-gross research, participant property owners or decision makers were asked through computer assisted telephone interviews (CATI) to answer questions related to their overall satisfaction with the program and how the program can be improved. Participants were also asked of their awareness of the MFHES Program and the reason for participation. Analyses of the satisfaction and awareness responses are summarized in a memo presented to Nicor Gas and shown in the Appendix of this report.

6. FINDINGS AND RECOMMENDATIONS

This section summarizes the key findings and recommendations.

Program Savings Achievement

Finding 1. Navigant verified net savings of 954,386 therms for the GPY4 MFHES Program, based on the SAG approved NTG ratio of 0.96 for direct install measures and 0.93 for common area measures. The verified net savings is 91 percent of the program net savings goal of 1,049,000 therms.¹⁷ Pipe insulation measures contributed 67 percent of the GPY4 verified net savings, space heating and process application measures contributed 25 percent, water efficiency measures had four percent, and the remaining measures contributed four percent.

Gross Realization Rates

Finding 2. Navigant reports an overall gross savings realization rate of 97 percent for the MFHES Program, based on verified gross savings of 1,022,676 therms compared with the ex ante 1,054,277 therms. Direct install measures in residential units had a 100 percent gross savings realization rate. Savings from prescriptive common area measures were adjusted with a 97 percent gross realization rate. Prescriptive measures with lower verified gross savings were outdoor pool covers, pipe insulation, storage water heaters and a boiler reset control project. Programmable thermostats installed in common areas had a 109 percent gross realization rate. The Custom component of the MFHES Program had a 95 percent gross realization rate after Navigant performed an engineering review of the projects documentation. Two of the four custom projects completed in GPY4 had 100 percent realization and two had less than 100 percent realization rate.

Recommendation 1. Nicor Gas should review the savings calculations for certain common area prescriptive measures. Nicor Gas has indicated that the savings calculation methodology for pool covers is corrected and the tracking system is updated accordingly for subsequent program years. For programmable thermostats, Nicor Gas should consider calculating savings using actual heating equipment output capacities as collected from the applications.

Tracking System Review

Finding 3. Navigant reviewed the tracking database of the MFHES Program and compared the savings input parameters with the TRM deemed inputs or custom inputs. When the program tracking data contained custom inputs, Navigant analysis considered those; when not provided, we used the TRM values. Navigant found that, in most cases, projects that used a custom input to determine the ex ante savings value did not include the custom input in the tracking data or, when available, the custom input parameters did not produce the claimed savings. Follow up supplemental data with default lookup values provided by CLEAResult enabled Navigant to verify correct estimation of the claimed savings for some measures and to make adjustments for others.

Recommendation 2. Nicor Gas should regularly update the tracking system with the most current TRM approved input data. Consider updating the tracking system to accommodate the supplemental data lookup custom input variables collected from customer applications.

¹⁷ Nicor Gas Energy Efficiency Plan, June 2014 - May 2017

Supplemental data supporting ex ante savings analysis should accompany the tracking database submitted for evaluation. This may save time and cost involved in repeating the savings verification process and minimize delays in evaluation reporting timeline.

Finding 4. The tracking system description of furnace measures suggests they were installed in residential units, but the ex ante savings were estimated for common areas of multi-family buildings. Verified savings based on residential units should produce lower savings, but, upon further review of supplemental data provided by Nicor Gas, Navigant determined that these measures were installed in common areas and that the ex ante savings were reasonable. In the case for pipe insulation, some projects which were originally described in the tracking system as hot water pipe insulation were actually verified to be space heating low or high pressure pipe insulations. For some pipe insulation projects, the total size of pipes insulated and reported in the tracking system were revised after reviewing the supplemental data. Navigant adjusted the savings accordingly for pipe insulation projects.

Recommendation 3: Nicor Gas should ensure that the description of program measures in the tracking system are consistent with deemed and custom input parameters used to generate measure savings.

Recommendation 4: Nicor Gas should provide additional information in the tracking system for pipe insulation measures. Specify pipe location (indoor/outdoor, conditioned or unconditioned space) and the primary piping use (hot water, space heating non-circulation or recirculation and the period of use). This information was provided in the supplemental data, and should be mapped into the tracking system.

Program Participation

Finding 5. The GPY4 MFHES Program realized participation of 347 property owners or decision makers of multi-family properties who completed an assessment. This included 293 participants who received prescriptive or custom incentives, 54 participants that received no-cost direct install products or services, and 72 participants that only completed an assessment. A total of 695 projects were completed through the GPY4 program, including the installation of 7,119 measures.

7. APPENDIX

7.1 Fall 2014 MCEEP Program NTG Results Final

To: Jim Jerozal, John Madziarczyk, Hammad Chaudhry, Mike King, Nicor Gas; Scott Dimetrosky, Apex Analytics; Ted Weaver, First Tracks Consulting; Jennifer Hinman Morris, David Brightwell, ICC Staff

From: Sandra Miranda, Charles Among and Latisha Younger-Canon, Navigant

CC: Randy Gunn, Charley Budd, Laura Agapay-Read, Kevin Grabner, Navigant

Date: January 22, 2015

Re: Fall 2014 Net-to-Gross Ratio Research Estimates for use in GPY5 for the Nicor Gas Multi-Family Comprehensive Energy Efficiency Program

This memo presents full draft results from Navigant's fall 2014 survey research that supports our evaluator recommended net-to-gross values for the GPY5 Multi-Family Comprehensive Energy Efficiency (MCEEP) program. Navigant will provide complete process evaluation results and gross impact results for GPY4 in the fall of 2015.

NET-TO-GROSS RATIO ESTIMATE

The evaluation team's free ridership estimates for each of the program measures in the sample are shown in Table 7-1. Measure-level free ridership values were combined into in-unit and comprehensive results by weighting with the ex ante gross annual therm savings sampled for each measure. Spillover results were calculated by dividing total quantified spillover therms identified from all survey respondents by their total ex ante gross participant therms covered by the survey.

Table 7-1. Program Net-to-Gross Ratio and Components

	Free Ridership	Spillover	NTGR
Direct Install In-Unit Measures			
Programmable Thermostats	0.09		
Showerheads	0.06		
Kitchen Aerators	0.06		
Bathroom Aerators	0.12		
<i>In-Unit</i>	<i>0.07</i>	<i>0.02</i>	<i>0.95</i>
Comprehensive Measures			
Boiler/Furnace Tune-up	0.32		
Boiler Replacement	0.00		
Steam Trap Repair/Replacement	0.00		
Pipe Insulation	0.02		
<i>Comprehensive</i>	<i>0.08</i>	<i>0.02</i>	<i>0.94</i>

Source: Evaluation analysis. Estimated confidence and relative precision for in-unit and comprehensive NTGR values: (90/2)

Multi-Family Comprehensive Energy Efficiency Program

The Nicor Gas MCEEP program provides incentives to Nicor Gas customers who are Multi-family property owners. Multi-family buildings are eligible for free assessments, energy efficiency products and incentives for improvements.

The GPY3 MCEEP program reported net savings of 4,091,946 therms, which is 35 percent more than the filed net savings goal of 3,034,125 therms.¹⁸ Furnace, boiler and steam trap replacements contributed to the program’s success, along with air sealing and insulation in smaller buildings.

¹⁸ Nicor Gas Energy Efficiency Program – Plan Year 3, Quarterly Report – Fourth Quarter, Order Docket 10-0562. <http://www.icc.illinois.gov/docket/files.aspx?no=10-0562&docId=216614>

DATA COLLECTION FOR NET TO GROSS ESTIMATES

Table 7-2 below summarizes primary data sources to estimate the net-to-gross ratio for the program.

Table 7-2. Primary Data Sources

Method	Subject	Target Completes	Actual Completes	Completed
Decision Maker Telephone Survey	GPY3 Program Participants	70	74	December 20, 2014

Source: Evaluation analysis

METHODOLOGY

The primary objective of this evaluation research was to estimate the MCEEP program’s net effect on customers’ energy usage. This includes an adjustment for free ridership (the portion of impact that would have occurred even without the program) and spillover (the portion of impact that occurred outside of the program, but would not have occurred in the absence of the program).

Navigant calculated free ridership for this evaluation using an algorithm approach based on survey self-report data. The analysis relied on interview results from participating multifamily decision-makers. Participant spillover was quantified using survey self-report data for measure description and quantities, while per unit savings values were drawn from the Illinois TRM and measure research.

Measure-level free ridership values were combined into in-unit and comprehensive results by weighting with the ex ante gross annual therm savings sampled for each measure. Spillover results were calculated by dividing total quantified spillover therms identified from all survey respondents by their total ex ante gross participant therms covered by the survey. The net-to-gross ratio (NTGR) for in-unit and comprehensive measures was calculated using the following algorithm, presented below.

Net-to-Gross Ratio Algorithm

$$NTGR = 1 - Free\ Ridership + Spillover$$

Where:

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

Free Ridership

For each measure installed, the following questions were posed to each decision-maker:

- FR1. At the time that the participant first heard about this program, had they already been thinking about purchasing the measure?
- FR4. Did the participant have specific plans to install the measure before learning about the program?¹⁹
- FR5/6. Did the program influence the participant to install the measures sooner than they otherwise would have, and if so, how much sooner?
- FR9. How likely was the participant to install the measure if they had not installed it through the program? (0-10 scale probability)
- FR10. How important was the program in the decision to install the measure? (0-10 scale)
- FR11. Would the participant have installed the same measure within a year of when they did if the program didn't exist? (0-10 scale probability)

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

1. If the customer had not considered the measure prior to participating in the program then the probability of free ridership is estimated to be zero (based on FR1 above).
2. Similarly, if the customer did not have specific plans to install the program measure prior to participation, and the self-reported probability of installing the measure was less than or equal to 3 (on a 0-10 scale) then the probability of free ridership is estimated to be zero (based on FR4 and FR9).
3. If the customer had plans to install the measures in the absence of the program, but indicated that the program accelerated installation by at least two years, then the probability of free ridership is estimated to be zero (based on FR6).

If none of the above three criteria holds, then the responses to questions FR9, FR10, and FR11 were used to calculate the probability of free ridership. There are separate algorithms for direct installation and comprehensive measures.

In the case of the direct install in-unit measures, where the customer demonstrates little initiative to install the measures, participant self-reported intentions to install these measures [FR9 and FR11] even without the program are discounted relative to the self-reported importance of the program to the installation [FR10], at a rate of 2 to 1. The corresponding formula for calculating free ridership is shown below:

¹⁹ Questions FR2 and FR3 do not factor directly into the free ridership scoring, but are used to improve the accuracy of the response to question FR4 by asking the respondent to recall specific steps they may have taken toward implementing the project.

Self-Report Free Ridership Algorithm for Direct Install Measure

$$\text{Free ridership} = [(FR9 + FR11)/2 * (1/3)] + (FR10) * (2/3)$$

For the in-unit measures, a measure count weight is applied to individual scores in calculating the overall result for free ridership for that measure type.²⁰ Free ridership estimates were developed separately for each measure type installed. The approach described above is largely consistent with the approach applied in the GPY1 Multi-Family evaluation.

For the comprehensive measures, Navigant averaged three components of free ridership: timing, program influence, and a no-program score, and then divided by ten to create the free ridership estimate as a percentage. The corresponding formula for calculating free ridership is shown below:

Self-Report Free Ridership Algorithm for Comprehensive Measures

$$\text{Free ridership} = \text{Average}(FR9, FR10, FR11)/10$$

For comprehensive measures, a measure count weight was applied to individual scores in calculating free ridership for pipe insulation, steam traps, and boiler replacement. Due to the large variation in per unit therm savings within the boiler/furnace tune-up measure category, we weighted those responses by ex ante gross therms.

Spillover

Navigant included questions to identify spillover candidates and measures, paraphrased below:

1. Since participating in the Multi-Family Comprehensive Energy Efficiency Program, have you taken any additional action to reduce the energy consumption at your property?
2. Did you receive a utility rebate for this additional action? (if yes, action is not spillover and skip to next section)
3. Please describe the energy efficiency upgrades at your property. Which types of additional energy efficiency upgrades did you install at your property? (NOTE TO INTERVIEWER: ASK FOR MAKE, MODEL AND EFFICIENCY RATING. IF RESPONSE IS GENERAL, E.G., "LIGHTING EQUIPMENT", PROBE FOR SPECIFIC MEASURE. PROBE FROM LIST, IF NECESSARY.)
4. What was the quantity of the new equipment installed?
5. What is the fuel source of the new equipment installed?

With the measures described and quantified, further questions are asked to learn why program participation was not pursued and the level of program influence, including:

"Was the Multi-Family Comprehensive Energy Efficiency Program a significant influence in encouraging you to implement efficiency improvements in your property's [potential spillover

²⁰ Each measure-level participant free ridership score is assigned a weight in accordance with the number of measures installed in the project. Measure counts were aggregated at the building account number level.

efficiency upgrade]? Please rate this on a 0-10 scale, where 0 means not at all significant and 10 means very significant.”

In general, the questions aimed to identify whether participants have purchased/installed additional energy-efficient measures and whether the program had any influence in the decision to purchase the un-incented measures (Program Influence score for spillover).²¹

Spillover savings was estimated using the following algorithm:

Spillover Savings Algorithm

Spillover savings

$$= (\text{Per unit savings of reported un – incented measures} * \text{reported quantity installed}) * \text{Program influence score}$$

Spillover results were calculated by dividing total quantified spillover therms identified from all survey respondents (4,851 therms) by their total ex ante gross participant therms covered by the survey (222,003 therms).

NTGR Sampling Approach

Navigant received from the program implementer (Franklin Energy Services) a list of 1,574 decision-makers who participated in the program and completed project installations and realized savings in GPY3. To develop the sample of unique project contacts, duplicate contact names were removed from the sample where a single person was involved in more than one project application. Of these unique project contacts, only 340 included unique telephone numbers and had associated gas measure savings. Navigant conducted a census call on all 340 unique participants with the aim to complete at least 70 interviews to ensure a NTG estimate at a 90/10 level of confidence and relative precision at the program level. Navigant was able to complete 74 interviews from participants who received direct install measures and/or installed comprehensive measures.

In an effort to encourage program decision-makers to participate in the survey, Navigant offered \$100 gift cards as an incentive to participate in the survey. Additionally, Navigant worked with the implementation contractor in coordinating the survey effort to increase participation by securing additional contact information and details to help complete additional interviews.

²¹ Evaluators only took into account purchases/installation of un-incented, energy-efficient measures that were highly influenced by the program (7-10 rating).

RESULTS

Navigant completed 74 decision maker interviews. From the analysis of the responses from the decision-makers, Navigant estimated free ridership and spillover values for in-unit direct install measures and for the comprehensive measures²². Measure-level and combined results are presented in Table 7-3 below:

Table 7-3. Net-to-Gross Estimate Parameters

	Sample Size (number of total measures installed)	Number of completed interviews	Free Ridership	Spillover	NTGR
<i>Direct Install In-Unit Measures</i>					
Programmable Thermostats	583	11	0.09		
Showerheads	1,498	38	0.06		
Kitchen Aerators	1,565	35	0.06		
Bathroom Aerators	1,490	30	0.12		
<i>In-Unit</i>			<i>0.07</i>	<i>0.02</i>	<i>0.95</i>
<i>Comprehensive Measures</i>					
Boiler/Furnace Tune-up	354	13	0.32		
Boiler Replacement	1	1	0.00		
Steam Trap Repair /Replacement	508	1	0.00		
Pipe Insulation (linear feet)	9,449	17	0.02		
<i>Comprehensive</i>			<i>0.08</i>	<i>0.02</i>	<i>0.94</i>

Source: Evaluation analysis. Estimated confidence and relative precision for in-unit and comprehensive NTGR values: (90/2).

²² Not all comprehensive measures installed by the population are represented in the sample.

7.2 Fall 2014 MCEEP Program Process Survey Results

To: Jim Jerozal, John Madziarczyk, Hammad Chaudhry, Mike King, Nicor Gas; Scott Dimetrosky, Apex Analytics; Ted Weaver, First Tracks Consulting; Jennifer Hinman Morris, David Brightwell, ICC Staff

From: Charles Ampong, Navigant

CC: Randy Gunn, Charley Budd, Laura Agapay-Read, Kevin Grabner, Navigant

Date: May 27, 2015

Re: Fall 2014 Process Survey Results for the Nicor Gas Multi-Family Comprehensive Energy Efficiency Program

This memo presents Navigant's process research findings drawn from decision maker responses gathered as part of the fall 2014 net-to-gross research with GPY3 participants conducted for the GPY4 Multi-Family Comprehensive Energy Efficiency (MCEEP) program. This memo provides early feedback of the process findings to inform GPY5 planning rather than presenting the results at the end of the GPY4 evaluation reporting period. A copy of this memo will be included in the Appendix of the GPY4 MCEEP evaluation report when it is completed at the end of 2015.

GPY4 MCEEP Program Early Process Research Results

As part of the fall 2014 MCEEP net-to-gross research, participant multi-family decision-makers were asked through computer assisted telephone interviews (CATI) to answer questions related to their overall satisfaction with the Multi-Family program, perspective about program improvement, source of program awareness and the reason for participation. Analyses of the responses are summarized in Table 7-4.

Participants highly rate their satisfaction with the Multi-Family program. Program offering of free direct install measures and assessment recommendations for common area comprehensive measures are key to customer participation. Program outreach strategies of technician visits, direct call to property staff, and use of mass media are the driving forces to program awareness and should be continued.

Table 7-4. MCEEP Decision-Maker Process Results

Topic	Respondents (n=78)	Percent	Evaluation Comments
Satisfaction Score(0-10 scale)			
8-10 (most satisfied)	56	72%	Overall participant satisfaction with the program is strong. Participants also provided their views on how to improve the program. Details are presented in Table 3.
6-7	13	17%	
3-5 (less satisfied)	6	8%	
None	3	3%	
Program Awareness			
Field technician visit	18	23%	Program outreach strategies of technician visits, direct call to property staff, and use of mass media are the driving forces to program awareness.
Phone call to property	18	23%	
Mass media (newspaper, internet, TV/Radio)	10	13%	
Trade organization and events	8	10%	
Part of larger corporate decision	7	9%	
Home owners' association/neighbor	3	4%	
Other/Don't Know	14	18%	
Reason for Participation			
Free energy efficiency products for dwelling units	40	51%	Program offering of free direct install measures and assessment recommendations for common area comprehensive measures are key to customer participation.
Corporate decision	15	19%	
Common area energy efficiency recommendations	13	17%	
Marketing	1	1%	
Other/Don't Know	9	12%	

Source: Evaluation analysis of participant decision-maker process survey conducted in fall 2014 of GPY3 participants.

Data Collection and Survey Methodology

Table 7-5 below summarizes primary data source for the GPY3 participant survey. Navigant conducted a census call on 340 multifamily participant decision makers (those with unique telephone numbers, completed project installations, and realized gas savings in GPY3). Process question respondents were those who answered the net-to-gross research questions, which were the primary purpose for the survey. A total of 78 interviews were completed that provided process results.

Table 7-5. Primary Data Sources

Method	Subject	Target Completes	Actual Completes	Completed
Decision Maker Telephone Survey	GPY3 Program Participants	70	78	December 20, 2014

Source: Evaluation analysis.

The process battery asked participants to rank their experience or satisfaction with the program in general on a scale from 0 to 10, where 10 is a high rating and 0 is a low rating. Participants who gave a satisfaction rating below 3 were asked to give reasons for their low score.²³

Participants were also given the chance to provide their perspective on what changes could be made to improve the Multi-Family program. An additional set of questions asked participants about the source of awareness of the program and their decision process to participate in the program.

Customer Participant Perspective on Program Improvement

In addition to the responses from participants on program satisfaction, awareness and reason for participation as presented in Table 7-4, participants also provided insights to how the Multi-Family program can be improved. Table 7-6 summarizes the themes drawn from participant responses on program improvement, including complaints raised by some individuals. The Nicor Gas program manager indicated that their internal quality control process discovered some performance issues in early November and they engaged their contractors and held a retraining in December and January to address complaints related to technical services.²⁴ In several cases raised below, suggestions for improvements or complaints were paired with complements on another element of the program.

²³ Only one participant gave a score of zero, who was dissatisfied with a lighting measure, which is unrelated to the Nicor Gas program.

²⁴ Navigant conversation with Nicor Gas Program Manager (phone discussion on 3/27/2015)

Table 7-6. Participant Perspective on Multi-Family Program Improvement

# of Response (n=39)	Theme	Decision Maker Perspective on Program Improvement (Drawn from Open Ended Responses)
12	Rebates	<p>Program should provide more funds and installation services for attic and pipe insulation, including providing insulation for hot water heaters.</p> <p>Plans to install attic insulation were abandoned due to limited program funds. Program should provide rebates for steam pipe insulations, and should offset the cost of insulation or new windows.</p> <p>Program should provide more grants or rebates for boilers/furnace and water heaters. Boilers and furnaces are a lot more expensive to allow landlords to change heating system.</p>
12	Technician Training & Coordination	<p>Program technicians and contractors should be qualified and certified and must make sure to properly install equipment -- faucet fittings weren't the best operationally, leakages of installed aerators, improper installation of thermostats.</p> <p>Coordination and better communication with technicians and contractors -- lagging in scheduled timing and dates. Technicians seemed to be in hurry. There could have been more positive feedback about savings on energy.</p>
5	Follow-up Visits	<p>Provide follow-up visit or call back for services that weren't provided to everyone (apartments that weren't available the first time for service).</p>
4	Education	<p>Some education on how to use the automated thermostat system with the boiler, coordinated with the whole heating system.</p> <p>Tenant education on how to use programmable thermostats to prevent them from cranking it up to the highest, and then open windows or walk away. Get a thermostat that has a high limit on it so that tenants can't turn it up more than 72-75 degrees.</p>
2	Referrals	<p>Program needs a better referral network for contractors. Unable to reach contractors for recommended measure upgrades after assessment.</p> <p>Additional resources for larger cost savings would be helpful -- for example, having names of companies that do perhaps roofing insulation, or windows, or appliances, who, when called could provide information about window upgrades or insulation for roofing.</p>
3	Outreach & Marketing	<p>Provide advance notice or expand program duration to enable completion of projects. Short timeframe prevented more buildings from being scheduled.</p> <p>Provide more straightforward information about what the rebates are to make it easier to understand. Sometimes it can be a little confusing.</p>
1	Other Suggestions	<p>Provide the products and allow property maintenance staff to install on their schedule. Going with technician to do the installation is inconvenient.</p>

Source: Evaluation analysis of participant responses on program improvement.

Table 7-7 provides overall evaluation summary of the findings and recommendations to improve the Multi-Family program processes.

Table 7-7. Summary of Findings and Recommendations

Findings		Recommendations
1 Participants highly rate their satisfaction with the Multi-Family program.	→	None. The program is producing high levels of satisfaction.
2 Though participants highly rate their satisfaction with the program, some have expressed concerns including (1) some delays in the application processing and scheduling time and (2) lack of communication about availability of program funds or rebates for some program measures (e.g. pipe insulation and shell improvement measures).	→	<ul style="list-style-type: none"> ▪ Nicor Gas and the IC should provide advanced notice of changes to program funds or rebate amounts, qualifications, and ensure funds are available as applications are approved, ▪ Nicor Gas and the IC should improve awareness of incentive offering for program measures across other paths within the Multi-Family program, ▪ Nicor Gas and the IC should also conduct training for the new or transitioned IC staff to ensure all are knowledgeable of program details and how to deal with customer complaints about program rebates, ▪ The IC should improve follow up visits to complete scheduled work orders even if program meets its goals to maintain participant confidence and reliability on program delivery.
3 Some participants expressed concern about lack of performance of technicians and contractors in the provision of technical and direct installation services.	→	<ul style="list-style-type: none"> ▪ The IC should improve training for technical staff and contractors and increase post inspection QC visits to verify installations (Nicor Gas/IC is commended for dealing with complaints and retraining of contractors). ▪ The IC should solicit prompt or regular feedback from participants regarding technician/contractor performance and engagements during site visits.
4 Some participants want improvement in referral networks for contractors or the provision of resources for easy collaboration with program contractors.	→	The IC should consider creating a list of program contractors and trade allies, their services offered and contact details. This could be accessible online by program participants upon referral after a technician visit.

Source: Navigant research