



# Home Energy Efficiency Rebate Program

## GPY5 Evaluation Report

**Energy Efficiency Plan:  
Gas Plan Year 5  
(6/1/2015-5/31/2016)**

**FINAL**

**Prepared for:  
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 GPY5<sup>1</sup> Home Energy Efficiency Rebate (Home EER) Program.

### E.1 Program Savings

Table E-1 summarizes the natural gas savings from the Nicor Gas Home Energy Efficiency Rebate Program.

**Table E-1. Nicor Gas GPY5 Home EER Program Natural Gas Savings**

| Savings Category                | Nicor Gas |
|---------------------------------|-----------|
| Ex Ante Gross Savings           | 4,323,603 |
| Ex Ante Net Savings (Therms)    | 3,415,646 |
| Verified Gross RR               | 1.01      |
| Verified Gross Savings (Therms) | 4,361,868 |
| NTGR                            | 0.79      |
| Verified Net Savings            | 3,445,876 |

*Source: Evaluation analysis of GPY5 program tracking data (September 9, 2016 data extract) and Illinois Statewide Technical Reference Manuals.<sup>2</sup>*

### E.2 Program Savings by Measure

Table E-2 summarizes the natural gas savings from the Nicor Gas Home Energy Efficiency Rebate Program by measure.

<sup>1</sup> The GPY5 program year began June 1, 2015 and ended May 31, 2016

<sup>2</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM). The effective TRM for GPY5 is Version 4.0, available from the Illinois Energy Efficiency Stakeholder Advisory Group web site: [http://www.ilsag.info/il\\_trm\\_version\\_4.html](http://www.ilsag.info/il_trm_version_4.html). The list of TRM Version 4.0 errata in effect for GPY5 is provided in TRM Version 5.0, available at: [http://www.ilsag.info/il\\_trm\\_version\\_5.html](http://www.ilsag.info/il_trm_version_5.html)

**Table E-2. Nicor Gas GPY5 Home EER Program Natural Gas Savings**

| Measure                  | Ex Ante Gross Savings (Therms) | Ex Ante Net Savings (Therms) | Verified Gross RR | Verified Gross Savings (Therms) | NTGR   | Verified Net Savings (Therms) |
|--------------------------|--------------------------------|------------------------------|-------------------|---------------------------------|--------|-------------------------------|
| Boilers                  | 37,119                         | 29,324                       | 1.00              | 37,126                          | 0.79 † | 29,330                        |
| Furnace                  | 3,371,922                      | 2,663,818                    | 0.96              | 3,242,526                       | 0.79 † | 2,561,596                     |
| Programmable Thermostat  | 914,468                        | 722,429                      | 1.18              | 1,082,121                       | 0.79 † | 854,875                       |
| Storage Hot Water Heater | 94                             | 74                           | 1.00              | 94                              | 0.79 † | 74                            |
| Total                    | 4,323,603                      | 3,415,646                    | 1.01              | 4,361,868                       | 0.79 † | 3,445,876                     |

Source: Evaluation analysis of GPY5 program tracking data (September 9, 2016 data extract).

† A deemed value. Source:

[http://ilsagfiles.org/SAG\\_files/NTG/2015\\_NTG\\_Meetings/Final\\_2015\\_Documents/Nicor\\_Gas\\_Final\\_GPY5\\_Consensus\\_NTG\\_Values\\_2015-03-01.pdf](http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_Final_GPY5_Consensus_NTG_Values_2015-03-01.pdf) which can be found on the IL SAG website here: <http://ilsag.info/net-to-gross-framework.html>.

### E.3 Impact Estimate Parameters for Future Use

In 2016, Navigant conducted net-to-gross (NTG) and process evaluation research through a telephone survey with 100 customers and 35 trade allies who participated in the HEER Program<sup>3</sup>. The results of this research were used to develop free ridership and spillover estimates for future use and provided feedback on process questions. The NTG research methods and results are provided in the Appendix.

<sup>3</sup> Participating customers and trade allies from GPY4 were sampled for the NTG surveys as complete GPY5 participation data were not available at the time of the research.

## E.4 Program Volumetric Detail

Table E-3 below presents GPY5 program participation reported by Nicor Gas. The most common measure is the programmable thermostat with 68.5% of participants installing this measure. Detailed volumetric breakdown of the measure type and savings quantity are provided in the program-level analysis in Section 3.

**Table E-3. Nicor Gas GPY5 Home EER Program Primary Participation Detail**

| Measure                  | Number of Measures Incented | Percent of Participants Installing Measure |
|--------------------------|-----------------------------|--|
| Boilers                  | 125                         | 0.5%                                       |
| Furnace                  | 15,359                      | 59.5%                                      |
| Programmable Thermostat  | 17,681                      | 68.5%                                      |
| Storage Hot Water Heater | 221                         | 0.9%                                       |

*Source: Navigant analysis of GPY5 program tracking data (September 9, 2016 data extract).*

## E.5 Findings and Recommendations

The following provides insight into key program findings and recommendations.<sup>4</sup>

### Verified Gross Savings and Realization Rate.

**Finding 1.** When a participant did not report the condition of their existing furnace (i.e., working/non-working), the implementer assumed early replacement conditions.

Approximately 4% of participants did not report a baseline condition.

**Recommendation 1.** When furnace condition is unknown, the implementer should assume the conservative time of sale condition, or use a weighting based on the condition of furnaces incented through the program (e.g., in GPY5 17% of furnaces were confirmed early replacement and 83% were time of sale, Nicor Gas could assume 17% of furnaces with unknown conditions are early replacement). The IC has implemented this approach for PY6.

**Finding 2.** Some (7,386, 42% of programmable thermostats) of the programmable thermostats are listed with a manufacturer of “Ecobee” or “Nest”, indicating they may be smart thermostats.

**Recommendation 2.** In GPY6, Nicor Gas should separately track and claim savings for smart thermostats rebated through the program.<sup>5</sup> Smart thermostats have higher per unit savings than basic programmable thermostats, and because the deemed measure savings provided in TRM version 5 are net, a program-level net-to-gross value is not applied.

<sup>4</sup> The Executive Summary presents the most important of the Section 6 Findings and Recommendations. Findings and Recommendations in the Executive Summary are numbered to match Section 6 for consistent reference to individual findings and recommendations. Therefore, gaps in numbering may occur in the Executive Summary.

<sup>5</sup> Nicor Gas has taken action on this recommendation for GPY6. Navigant will verify correct adoption during GPY6.



**Finding 3.** The ex ante gross savings for programmable thermostats were consistently slightly lower than the verified gross savings for the measure. This is because the ex ante savings estimates used (1) the gas heating consumption values from Illinois TRM v2.0 and (2) the time of sale in-service rate (ISR) for thermostats reported installed by a contractor.

**Recommendation 3.** The IC should use inputs as defined by the applicable version of the TRM when calculating ex ante savings estimates. This will make evaluation savings adjustments less likely.<sup>6</sup>

**Finding 4.** High Efficiency Furnaces show the most savings for the program. Programmable Thermostats have the most participation and second most savings for the Home EER Program.

### Program Volumetric Findings.

**Finding 5.** The Nicor Gas Home Energy Efficiency Rebates Program reported 25,795 projects in GPY5 and distributed 33,386 measures. This translates to 1.3 measures per project.

### Process Evaluation.

**Finding 6.** Overall, participants reported high levels of satisfaction with all aspects of the program, including the contractors that they worked with through their program experience. Participating trade allies also reported high levels of satisfaction. The program appears to be functioning well and successfully implementing all of its program plans, including its marketing plan.

**Finding 7.** There is some evidence that participation in the HEER Program or the Home Energy Assessment Program can have a positive influence on a participant's decision to participate in the other energySMART program. Additionally, receiving Nicor Gas' Home Energy Report<sup>7</sup> appears to have had a small effect on HEER Program participation. The effect was greatest on participants who received a rebate for thermostats only.

**Recommendation 4.** Nicor Gas should continue its cross promotional activities between the Home Energy Assessment Program and the HEER Program, and Navigant acknowledges that the program intends on doing so.

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<sup>6</sup> Nicor Gas has taken action on this recommendation for GPY6. Navigant will verify correct adoption during GPY6.

<sup>7</sup> The survey sampled GPY4 participants, and Nicor Gas' Home Energy Report program was active in GPY4 (it spanned GPY3 and GPY4 running October 1, 2013 to September 30, 2013).

## 1. INTRODUCTION

### 1.1 Program Description

The Nicor Gas energySMART Home Energy Efficiency Rebate Program provides Nicor Gas customers with rebate incentives for purchasing high-efficiency furnaces, programmable thermostats, and other energy efficient measures. Participants may apply for the rebates themselves, or contractors may assist them in the rebate application process. Rebates are processed and submitted to residential customers after installation of qualified measures.

### 1.2 Evaluation Objectives

The evaluation team identified the following key researchable questions for GPY5:

#### *1.2.1 Impact Evaluation*

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)?

#### *1.2.2 Process Evaluation and Other Research Topics*

1. How satisfied are customers with the program and major program components?
2. How successful have cross-promotional efforts with the Home Energy Assessment Program been in increasing participant awareness of and participation in both programs?
3. What opportunities exist for program improvement in terms of program administration and implementation?

## 2. EVALUATION APPROACH

This section provides an overview of the data collection methods, gross and net impact evaluation approaches, and process evaluation approaches that occurred for the GPY5 evaluation.

### 2.1 Overview of Data Collection Activities

The core data collection activities included in-depth interviews with program managers, engineering and project file reviews and telephone interviews with participating customers and trade allies. The primary data collection activities are shown in the following table and trade allies.

**Table 2-1. Core Data Collection Activities and Samples in GPY5**

| What                                 | Who                         | Completions Achieved |                  | Comments                                |
|--------------------------------------|-----------------------------|----------------------|------------------|---|
| In Depth Interviews                  | Program Management          | 2                    | Mar – April 2016 | Interview program staff and IC staff    |
| Tracking System & Engineering Review | Participating Customers     | All                  | Sept - Dec 2016  | Gross savings verification using IL-TRM |
| Telephone Survey                     | Participating Customers*    | 100                  | February 2016    | FR, SO, Process                         |
| Telephone Survey                     | Participating Trade Allies* | 35                   | March 2016       | FR, SO, Process                         |

Source: Navigant.

\* GPY4 participating customers and trade allies were sampled because complete GPY5 participation data were not available at the time of the NTG research.

### 2.2 Verified Savings Parameters

Navigant calculated verified gross and net program impacts for four types of measures with deemed savings values: furnaces, boilers, programmable thermostats and hot water heaters. These measures account for all quantifiable GPY5 gas savings.

#### 2.2.1 Verified Gross Program Savings Analysis Approach

Navigant estimated verified per-unit savings for each program measure using impact algorithms and input assumptions defined by the Illinois TRM for deemed measures and evaluation research for non-deemed measures. Table 2-2 below presents the sources for parameters that were used in verified gross savings analysis, indicating which were examined through GPY5 evaluation research and which were deemed.

In GPY5, smart thermostats were not deemed in TRM v4.0 as a measure separate from basic programmable thermostats. In 2015, Navigant performed a billing analysis with Illinois residences to develop a custom measure savings estimate specifically for smart thermostats that was later adopted as

a deemed smart (advanced) thermostat measure in TRM v5.0.<sup>8</sup> For the GPY5 HEER Program, Navigant observed that smart thermostats were being tracked and the gross savings claimed as deemed programmable thermostats under TRM v4.0 Section 5.3.11, although tracked make and model information indicated many were smart thermostats. Navigant assigned verified gross savings deemed under TRM v4.0 Section 5.3.11 to all programmable thermostats in the HEER Program.<sup>9</sup>

**Table 2-2. GPY5 Verified Gross Savings Parameter Data Sources**

| Parameter  | Data Source                                | Deemed or Evaluated? |
|--|--|----------------------|
| Measure Quantity Installed                                       | Program tracking system                    | Evaluated            |
| Verified Gross Realization Rate                                  | Program tracking data, TRM, Navigant       | Evaluated            |
| Residential furnace measure savings assumptions                  | Illinois TRM, version 4.0, section 5.3.7‡  | Deemed               |
| Residential boiler measure savings assumptions                   | Illinois TRM, version 4.0, section 5.3.6‡  | Deemed               |
| Residential programmable thermostat measure savings assumptions  | Illinois TRM, version 4.0, section 5.3.11‡ | Deemed               |
| Residential storage hot water heater measure savings assumptions | Illinois TRM, version 4.0, section 5.4.2‡  | Deemed               |

Source: *Evaluation analysis of programs data and Illinois TRM documents.*

‡ Source: State of Illinois Technical Reference Manuals, <http://www.ilsag.info/technical-reference-manual.html>.

## 2.2.2 Verified Net Program Savings Analysis Approach

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a deemed net-to-gross ratio (NTGR). In GPY5, the NTGR estimates used to calculate the verified net savings were based on past evaluation research and approved through a consensus process managed through the Illinois Energy Efficiency Stakeholder Advisory Group (SAG)<sup>10</sup>. Table 2-3 presents the deemed NTGR.

Smart thermostat savings deemed in TRM v5.0 are based on a billing analysis which yields net savings values, however, that was not established or agreed to when GPY5 NTG values were approved for deeming. Although smart thermostats were rebated through the HEER Program in GPY5, the gross

<sup>8</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency Version 5.0 Effective June 1, 2016.

[http://ilsagfiles.org/SAG\\_files/Technical\\_Reference\\_Manual/Version\\_5/Final/IL-TRM\\_Effective\\_060116\\_v5.0\\_Vol\\_3\\_Res\\_021116\\_Final.pdf](http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_5/Final/IL-TRM_Effective_060116_v5.0_Vol_3_Res_021116_Final.pdf). See measure 5.3.16.

<sup>9</sup> The TRM policy document states that for the duration of a program year, once a measure savings calculation path is chosen—either on a customized or a prescriptive basis within a particular program—all instances of the measure within that program must be treated consistently. See Section 3.2 in the TRM Policy document:

[http://ilsagfiles.org/SAG\\_files/Technical\\_Reference\\_Manual/Policy%20Document%20for%20IL%20TRM%2010-25-12.pdf](http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Policy%20Document%20for%20IL%20TRM%2010-25-12.pdf)

<sup>10</sup> Source: Deemed NTGR values are available on the Illinois Energy Efficiency Stakeholder Advisory Group web site: [http://ilsagfiles.org/SAG\\_files/NTG/2015\\_NTG\\_Meetings/Final\\_2015\\_Documents/Nicor\\_Gas\\_Final\\_GPY5\\_Consensus\\_NTG\\_Values\\_2015-03-01.pdf](http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_Final_GPY5_Consensus_NTG_Values_2015-03-01.pdf)

savings were claimed and verified as basic programmable thermostats. For GPY5, program-level NTG values are applied to smart thermostats similar to all other measures in the HEER Program.

**Table 2-3. Net-to-Gross Ratio for Evaluation of the GPY5 Home Energy Efficiency Rebate Program**

| Program Path/Measure | GPY5 Deemed NTG Value |
|----------------------|-----------------------|
| Program              | 0.79                  |

Source:

[http://ilsagfiles.org/SAG\\_files/NTG/2015\\_NTG\\_Meetings/Final\\_2015\\_Documents/Nicor\\_Gas\\_Final\\_GPY5\\_Consensus\\_NTG\\_Values\\_2015-03-01.pdf](http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_Final_GPY5_Consensus_NTG_Values_2015-03-01.pdf) which can be found on the IL SAG website here: <http://ilsag.info/net-to-gross-framework.html>.

## 2.3 Process Evaluation

The process evaluation included an examination of participant program awareness channels, the interaction between the Home Energy Assessment and the Home Energy Efficiency Rebate programs, and participant and trade ally satisfaction.

### 3. GROSS IMPACT EVALUATION

This evaluation of the Nicor Gas Home EER Program reflects the fifth full-scale year of program operation. During GPY5, 25,795 residential customers participated in the program. Navigant performed a tracking system review to determine ex ante gross savings by measure. To determine verified gross savings by measure, the evaluation team performed a measure verification for measures included in the Illinois TRM. These were compared to find the measure and program level realization rates for the Home EER Program.

#### 3.1 Program Tracking Data Review

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

Key findings include:

1. When a participant did not report the condition of their furnace (i.e., working/non-working), the implementer assumed early replacement baseline conditions. Navigant assumed a baseline of a weighted average between the number of early replacement and time of sale conditions reported in the database. Approximately 4% of participants did not report a baseline.
2. Some (7,386, 42% of all programmable thermostats) of the programmable thermostats are listed with a manufacturer of “Ecobee” or “Nest”, indicating they may be smart thermostats. The IC did not claim smart thermostat savings because this measure was not included in the TRM v4.0.
3. High Efficiency Furnaces show the most savings for the program. Programmable Thermostats have the most participation and second most savings for the Home EER Program.

#### 3.2 Program Volumetric Findings

As shown in Table 3-1, the Nicor Gas Home Energy Efficiency Rebates Program reported 25,795 projects in GPY5 and distributed 33,386 measures. This translates to 1.3 measures per project

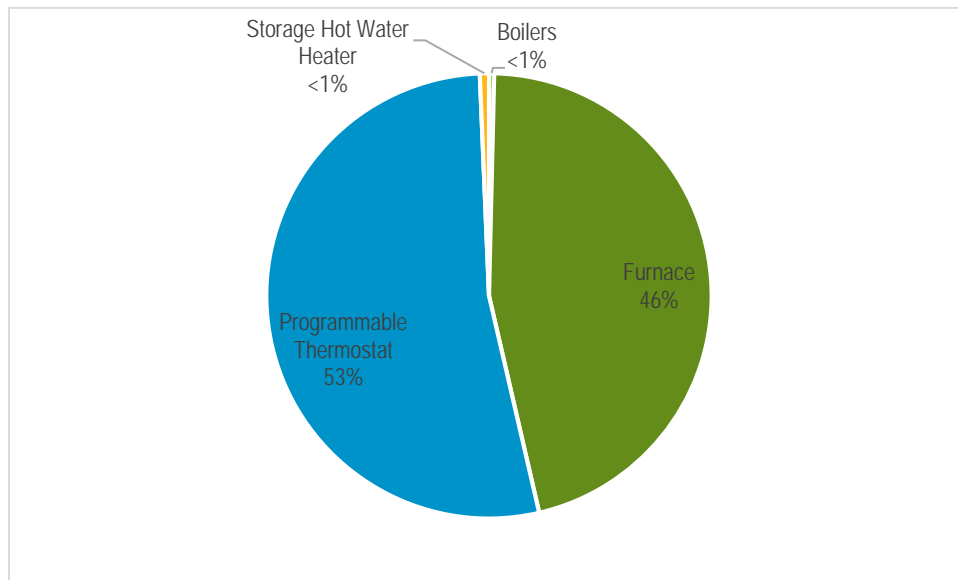
**Table 3-1. Nicor Gas GPY5 Home EER Program Primary Participation Detail**

| Measure                  | Number of Measures Incented | Percent of Participants Installing Measure |
|--------------------------|-----------------------------|--|
| Boilers                  | 125                         | 0.5%                                       |
| Furnace                  | 15,359                      | 59.5%                                      |
| Programmable Thermostat  | 17,681                      | 68.5%                                      |
| Storage Hot Water Heater | 221                         | 0.9%                                       |

Source: Navigant analysis of GPY5 program tracking data (September 9, 2016 data extract).

Figure 3-1 disaggregates the measure mix by type. For Nicor Gas overall, furnaces accounted for 46% of measures incented and programmable thermostats accounted for 53% of measures incented.

**Figure 3-1. Measures Installed by Type**



Source: Navigant Analysis

**Table 3-2. Nicor Gas GPY5 Home EER Program Measure Count**

| Measure                  | Unit | Install Type | Ex Ante Measure Count | Verified Measure Count |
|--------------------------|------|--------------|-----------------------|------------------------|
| Boilers                  | Each | In-unit      | 125                   | 125                    |
| Furnace                  | Each | In-unit      | 15,359                | 15,359                 |
| Programmable Thermostat  | Each | In-unit      | 17,681                | 17,681                 |
| Storage Hot Water Heater | Each | In-unit      | 221                   | 221                    |
| <b>Total</b>             |      |              | <b>33,386</b>         | <b>33,386</b>          |

Source: Navigant analysis of program tracking data.

### 3.3 Gross Program Impact Parameter Estimates

As described in Section 2, Navigant estimated verified per unit savings for each program measure using impact algorithms and input assumptions defined in the Illinois TRM and documentation of TRM compliance provided by CLEAResult. Table 3-3 presents the key parameters and the references used in the verified gross savings calculations.

**Table 3-3. GPY5 Home EER Program Ex Ante and Verified Gross Savings Parameters**

| Measure                  | Ex Ante Gross Savings (Therms/Unit) | Verified Gross Savings (Therms/Unit) | Method | Data Source                               |
|--------------------------|-------------------------------------|--------------------------------------|--------|---|
| Boilers                  | Varies                              | Varies                               | Deemed | Illinois TRM, version 4.0, section 5.3.7  |
| Furnace                  | Varies                              | Varies                               | Deemed | Illinois TRM, version 4.0, section 5.3.6  |
| Programmable Thermostat  | Varies                              | Varies                               | Deemed | Illinois TRM, version 4.0, section 5.3.11 |
| Storage Hot Water Heater | Varies                              | Varies                               | Deemed | Illinois TRM, version 4.0, sections 5.4.2 |

Source: Navigant analysis of program tracking data and CLEAResult documents. The effective TRM for GPY5 is Version 4.0, available from the Illinois Energy Efficiency Stakeholder Advisory Group web site: [http://www.ilsag.info/il\\_trm\\_version\\_4.html](http://www.ilsag.info/il_trm_version_4.html). The list of TRM Version 4.0 errata in effect for GPY5 is provided in TRM Version 5.0, available at: [http://www.ilsag.info/il\\_trm\\_version\\_5.html](http://www.ilsag.info/il_trm_version_5.html)

### 3.4 Verified Gross Program Impact Results

As shown in Table 3-4, the Nicor Gas GPY5 Home Energy Efficiency Rebates Program reported ex ante gross energy savings of 4,323,603 therms. Evaluation adjustments resulted in verified gross energy savings of 4,361,868 therms, reflecting the program’s gross realization rate of 101 percent.



**Table 3-4. Nicor Gas GPY5 Home EER Program Impact Results**

| Measure Category         | Quantity Unit | Verified Measure Quantity | Ex Ante Gross Savings (therms) | Verified Gross Realization Rate | Verified Gross Savings (therms) |
|--------------------------|---------------|---------------------------|--------------------------------|---------------------------------|---------------------------------|
| Boilers                  | Each          | 125                       | 37,119                         | 1.00                            | 37,126                          |
| Furnace                  | Each          | 15,359                    | 3,371,922                      | 0.96                            | 3,242,526                       |
| Programmable Thermostat  | Each          | 17,681                    | 914,468                        | 1.18                            | 1,082,121                       |
| Storage Hot Water Heater | Each          | 221                       | 94                             | 1.00                            | 94                              |
| <b>Total</b>             |               | <b>33,386</b>             | <b>4,323,603</b>               | <b>1.01</b>                     | <b>4,361,868</b>                |

*Sources: Program tracking data and Navigant analysis*

The largest relative savings discrepancy was in programmable thermostat measures which received a realization rate of 1.18. Navigant believes this is due to the ex ante estimates using (1) the gas heating consumption values from Illinois TRM v2.0 and (2) the time of sale ISR for thermostats reported installed by a contractor.

Additionally, the furnace measure had a downwards evaluation adjustment of four percent due to the difference in baseline assumptions for furnaces which had unknown conditions. Nicor Gas assumed those with unknown conditions to be early replacement; Navigant assumed a weighted average of furnaces reported to be time of sale and early replacement.

## 4. NET IMPACT EVALUATION

Verified net energy savings were calculated by multiplying the verified gross savings estimates by a net-to-gross ratio. As noted in Section 2, the NTGR used to calculate the net verified savings for the GPY5 Home Energy Efficiency Rebates Program was deemed through a consensus process managed by the Illinois SAG. Table 4-1 below presents the NTGR used to calculate the program-level net savings.

**Table 4-1. Nicor Gas GPY5 Program NTGR Values**

|               | GPY5 Deemed NTGR | NTGR Source |
|---------------|------------------|-------------|
| Whole Program | 0.79             | SAG‡        |

‡ Deemed NTGR values are available on the Illinois Energy Efficiency Stakeholder Advisory Group web site: [http://ilsagfiles.org/SAG\\_files/NTG/2015\\_NTG\\_Meetings/Final\\_2015\\_Documents/Nicor\\_Gas\\_Final\\_GPY5\\_Consensus\\_NTG\\_Values\\_2015-03-01.pdf](http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_Final_GPY5_Consensus_NTG_Values_2015-03-01.pdf)

Table 4-2 summarizes the natural gas savings from the GPY5 Nicor Gas Home Energy Efficiency Rebates Program by measure.

**Table 4-2. Nicor Gas GPY5 Home EER Program Natural Gas Savings**

| Measure                  | Ex Ante Gross Savings (Therms) | Ex Ante Net Savings (Therms) | Verified Gross RR | Verified Gross Savings (Therms) | NTGR        | Verified Net Savings (Therms) |
|--------------------------|--------------------------------|------------------------------|-------------------|---------------------------------|-------------|-------------------------------|
| Boilers                  | 37,119                         | 29,324                       | 1.00              | 37,126                          | 0.79        | 29,330                        |
| Furnace                  | 3,371,922                      | 2,663,818                    | 0.96              | 3,242,526                       | 0.79        | 2,561,596                     |
| Programmable Thermostat  | 914,468                        | 722,429                      | 1.18              | 1,082,121                       | 0.79        | 854,875                       |
| Storage Hot Water Heater | 94                             | 74                           | 1.00              | 94                              | 0.79        | 74                            |
| <b>Total</b>             | <b>4,323,603</b>               | <b>3,415,646</b>             | <b>1.01</b>       | <b>4,361,868</b>                | <b>0.79</b> | <b>3,445,876</b>              |

Source: Evaluation analysis of GPY5 program tracking data (September 9, 2016 data extract).

## 5. PROCESS EVALUATION

EnergySMART program participants were asked several questions intended to inform the program process evaluation, including questions about program awareness, the impact of the Home Energy Report<sup>11</sup> on energySMART Home EER Program participation, and any synergy between the energySMART Home Assessment participation and Home EER Program participation. The participants were also asked questions designed to assess their level of satisfaction with the program.

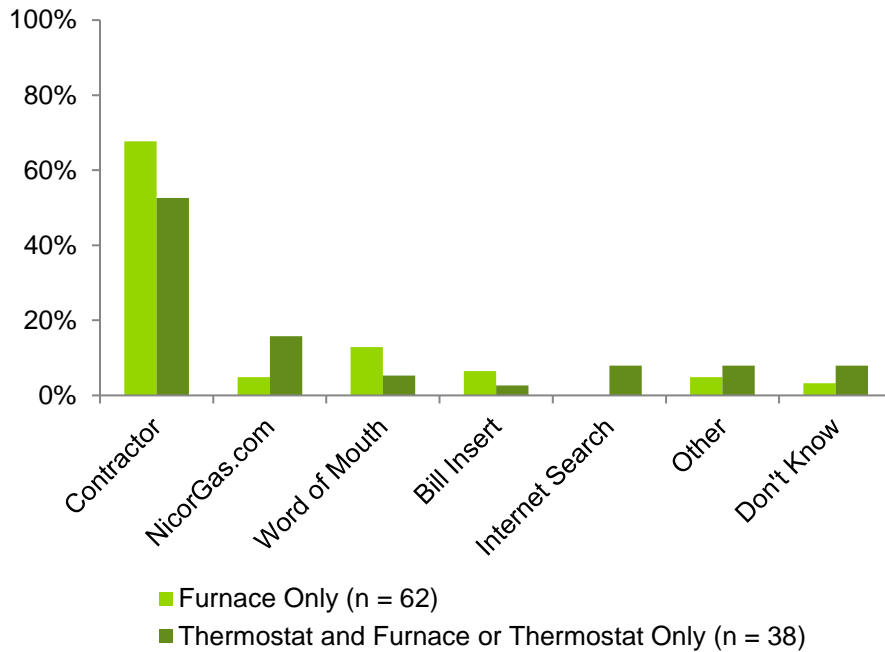
### 5.1 Program Awareness

Program participants were asked how they first became aware of the program. The most commonly cited program awareness channel for both furnace and thermostat participants was their contractor, as shown in Figure 5-1 below. This result is consistent with the program logic and previous program evaluations. In contrast, participants who installed thermostats were more likely to have learned about the program online, from either the Nicor Gas website or a general internet search. Among the least frequent responses, for furnace only participants, home energy reports, print advertisements and billboards each received one mention (and are included in the “other” category below). For participants who received a rebate for a thermostat, Nicor Gas emails, retailer promotional materials, and a Nicor Gas mailing were included in the “other” category, each receiving one mention.

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<sup>11</sup> GPY4 Home EER participants were asked about Nicor Gas’ Home Energy Report program which was active during part of GPY4 and which stopped sending reports in September 2014.

Figure 5-1. Participant Program Awareness Channel

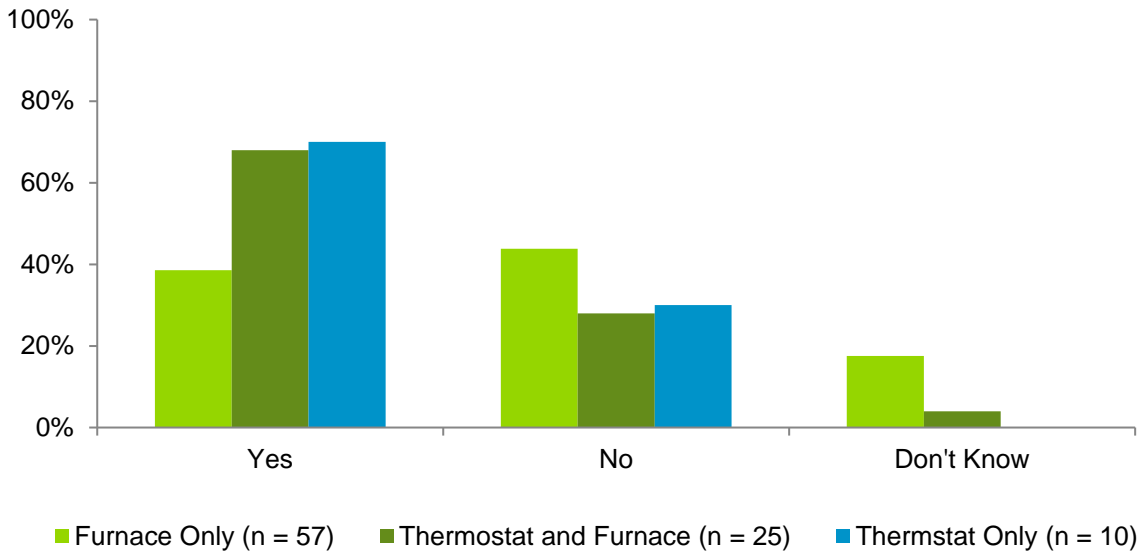


Source: Navigant Analysis

## 5.2 Home Energy Reports

The participating survey respondents were asked if they received a Home Energy Report from Nicor Gas. More participants who received a rebate for a programmable thermostat (either alone or with a high efficiency furnace) reported that they received a Home Energy Report than participants who received a rebate for only a high efficiency furnace. The responses are presented in Figure 5-2 for each set of participants.

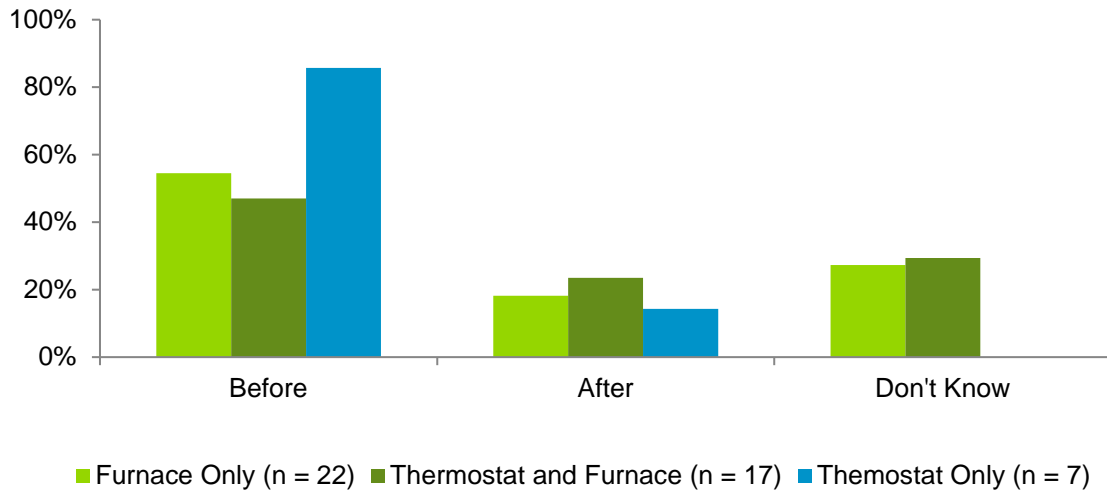
Figure 5-2. Do you receive a Home Energy Report?



Source: Navigant Analysis

In order to estimate any influence that the Home Energy Report may have had on the decision to participate in the program, the survey respondents who reported that they did receive a Home Energy Report were first asked if they had begun receiving the Home Energy Report before or after they purchased the rebated measure. Figure 5-3 shows the results. Of the different types of participants, those who received a rebate for only a thermostat had the highest percentage of participants who reported they received a Home Energy Report. This may be partially due to the small number of respondents (seven thermostat-only respondents).

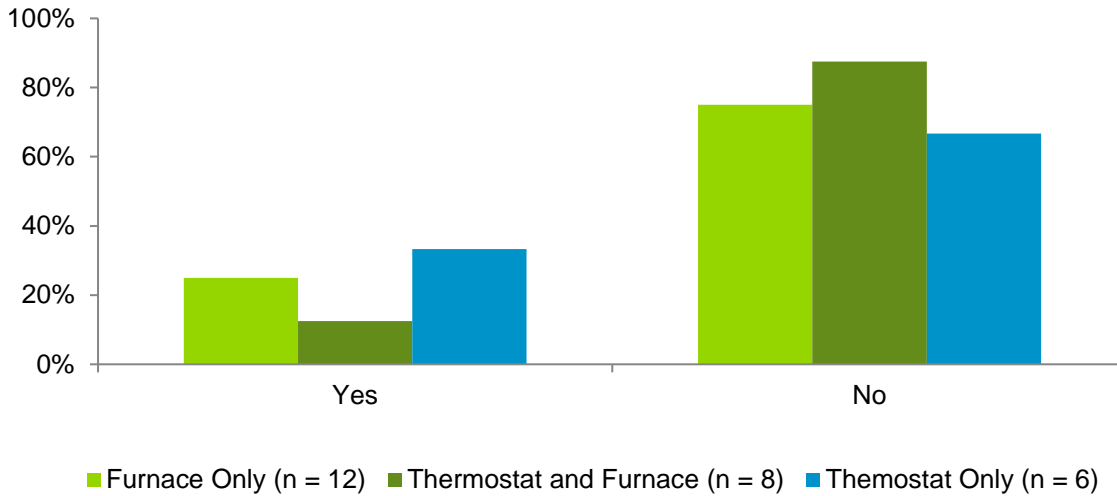
**Figure 5-3. Among 46 respondents who reported receiving a Home Energy Report, did you start receiving your Home Energy Report before or after you purchased your [rebated measure(s)]?**



Source: Navigant Analysis

The participants who indicated that they began receiving their Home Energy Reports before they purchased the rebated measure were asked two questions to estimate how influential, if at all, the Home Energy Report was on their decision to purchase the rebated measure. First, the participants were asked if the Home Energy Report had any influence on their decision. The majority of participants for all measures reported that the Home Energy Report did not influence their decision. However, more thermostat only participants reported that the Home Energy Report was influential than the participants who only purchased a furnace, or who purchased a thermostat and a furnace. The results are presented in Figure 5-4.

**Figure 5-4. Among 26 respondents that recalled receiving a report prior to participation did the Home Energy Report influence your decision to purchase the [rebated measure(s)]?**



Source: Navigant Analysis

The program participants who responded that the Home Energy Report had influenced their decision to participate were then asked to rate how influential the Home Energy Report was, using a zero to ten scale, where zero meant not at all influential and ten meant very influential. One participant, who purchased a furnace only, reported that the Home Energy Report was “very influential”, giving it a rating of ten. The other eight participants gave the Home Energy Report an influence rate of between three and seven, indicating some influence, but at a lower level.

While some respondents report low influence of the Home Energy Report on their decision to participate, the greater incidence of Home Energy Report recipients among thermostat participants suggests that the Home Energy Report has a greater influence on thermostat participants than on furnace participants. This is in line with expectations that the condition of a customer’s furnace is a greater driver of participation than is whether they receive a Home Energy Report.

### 5.3 Home Energy Assessments

Navigant asked the survey respondents if they had participated in the energySMART Home Energy Assessment. Eight of the 100 respondents said that they had received a Home Energy Assessment, and of those eight, six received the assessment before participating in the rebate program, and two received the assessment after participating in the rebate program.

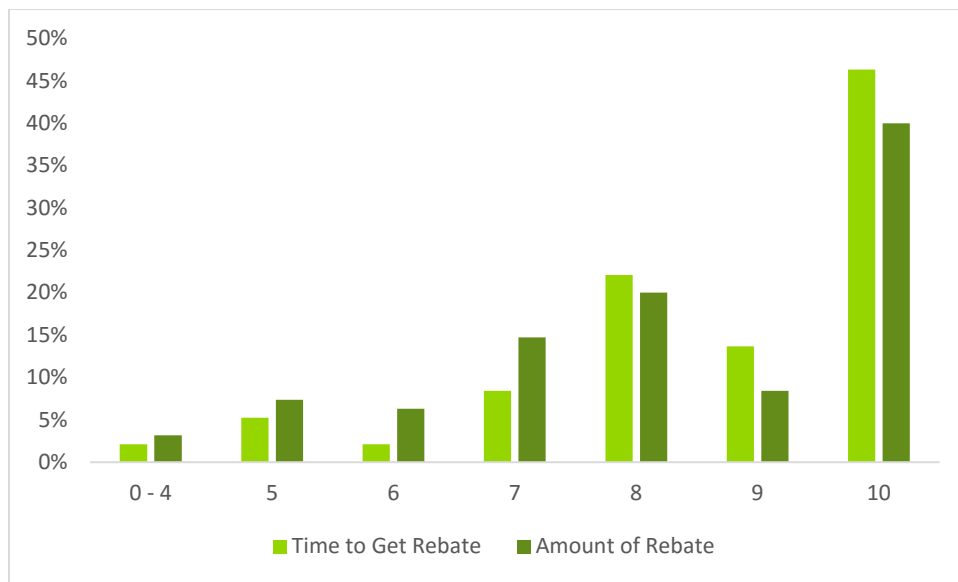
Two of the six participants who had a Home Energy Assessment before participating in the rebate program reported that they learned about the rebate program during the assessment. Both of these participants reported the Home Energy Assessment influenced their decision to participate in the rebate program. The two participants who reported that they learned about the energy assessment after

participating in the rebate program both reported that the Home EER Program influenced their decision to participate in the Home Energy Assessment program. While based on a small sample, these results suggest that participating in either of the energySMART Home programs can influence participants to also participate in the other energySMART Home program.

### 5.4 Participant Satisfaction

The energySMART Home EER Program participants were asked questions designed to gauge their level of satisfaction with various program aspects. The participants were first asked about their level of satisfaction with the program rebate, specifically the amount of time it took for them to receive their rebate and the amount of the rebate. The participants were asked to rate their satisfaction on a scale from zero to ten, where zero is not at all satisfied and ten means very satisfied. As can be seen in Figure 5-5, the participants reported high levels of satisfaction with both the dollar amount of the rebate and the amount of time it took for them to receive their rebate.

**Figure 5-5. How do you rate your overall level of satisfaction with...? (n = 95)**

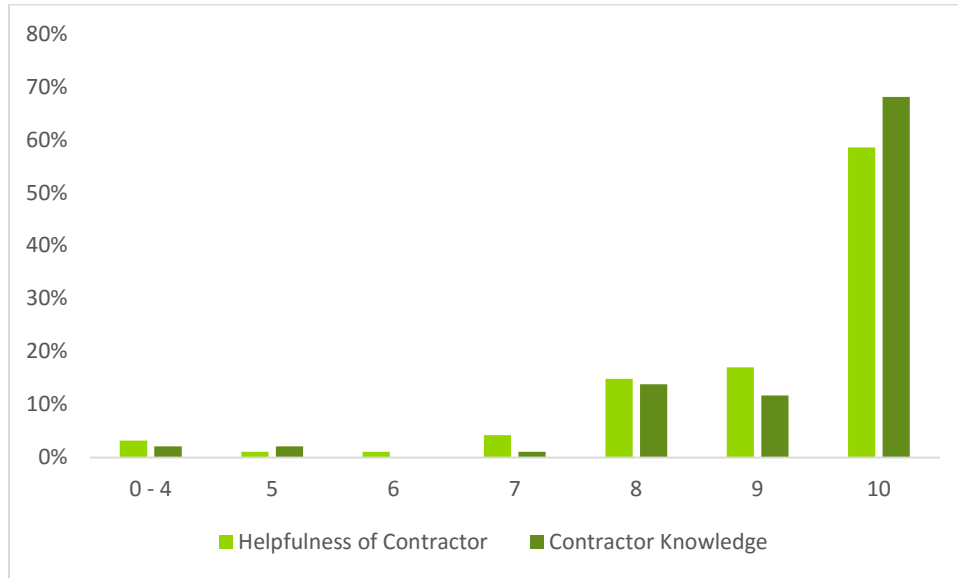


Source: Navigant Analysis

The program participants were also asked about their level of satisfaction with their contractors. Overall, the program participants reported very high levels of satisfaction both with the helpfulness of their contractor and the level of knowledge they thought their contractor possessed. The distribution of values is presented in Figure 5-6.



Figure 5-6. How do you rate your overall level of satisfaction with...? (n = 94)

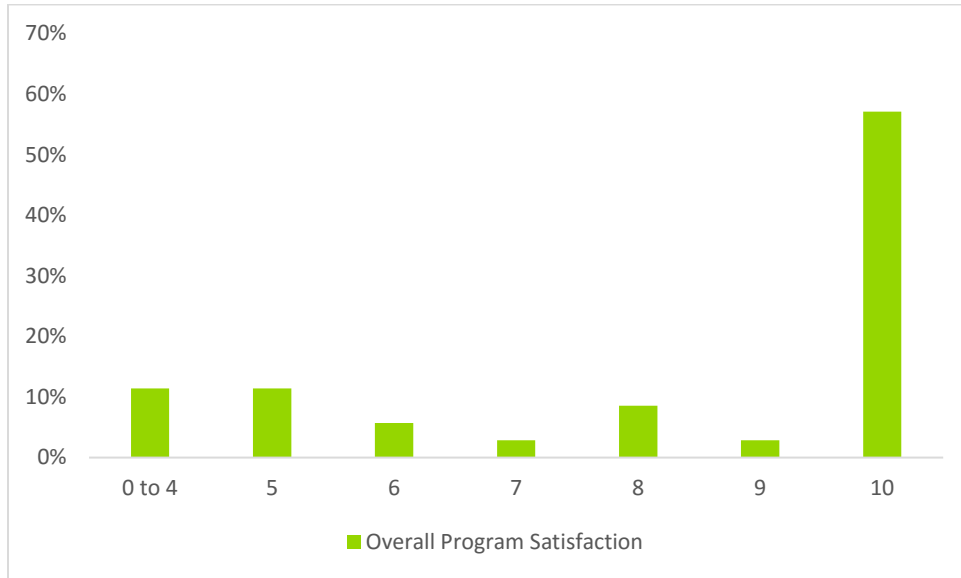


Source: Navigant Analysis

### 5.5 Trade Ally Satisfaction

The evaluation team conducted surveys with 35 trade allies who participated in the energySMART Home EER Program in GPY4. Trade allies were asked questions designed to gauge their level of satisfaction with various program aspects. Overall, participating trade allies reported a high level of satisfaction with the program, as shown in Figure 5-7.

Figure 5-7. Overall, how satisfied have you been with the program? (n = 35)

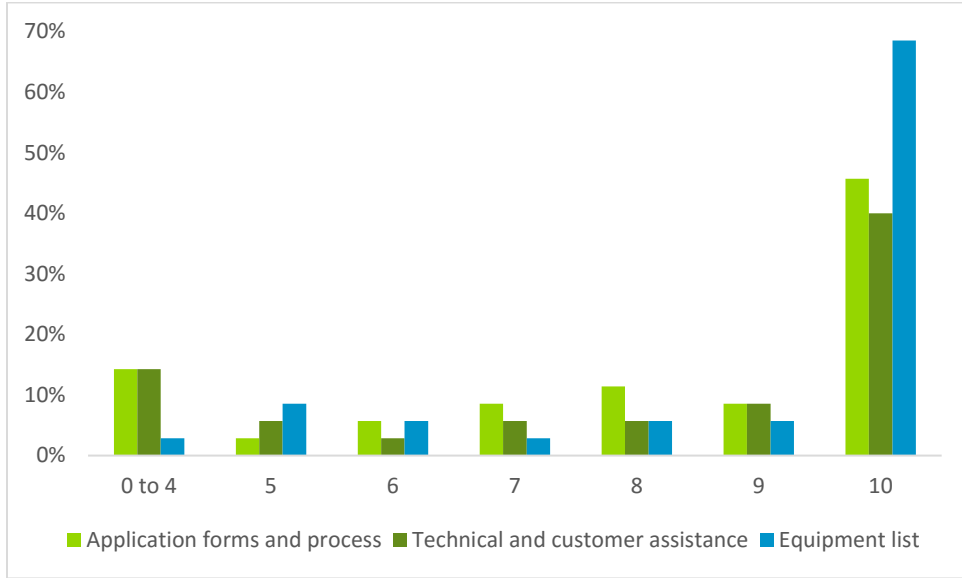


Source: Navigant Analysis

The few trade allies who reported low satisfaction with the program cited the application paperwork, referring to the previous application process which the program streamlined. In contrast, the improved application process was cited by the majority of trade allies, who reported high satisfaction. As one highly satisfied trade ally put it, “When the program first started there was a lot of paperwork, and it was redundant. Since then Nicor has made it a lot smoother for the contractor to fill out all the paperwork, and they streamlined the application very well.”

Trade allies reported high satisfaction with the program’s equipment list, and most reported high satisfaction with the application form and technical support, as shown in Figure 5-8 below. In particular, most trade allies reported that the current application form and process were quick and easy. The few trade allies who reported low satisfaction with the application form and process cited lengthy and cumbersome paperwork and referenced the older application process.

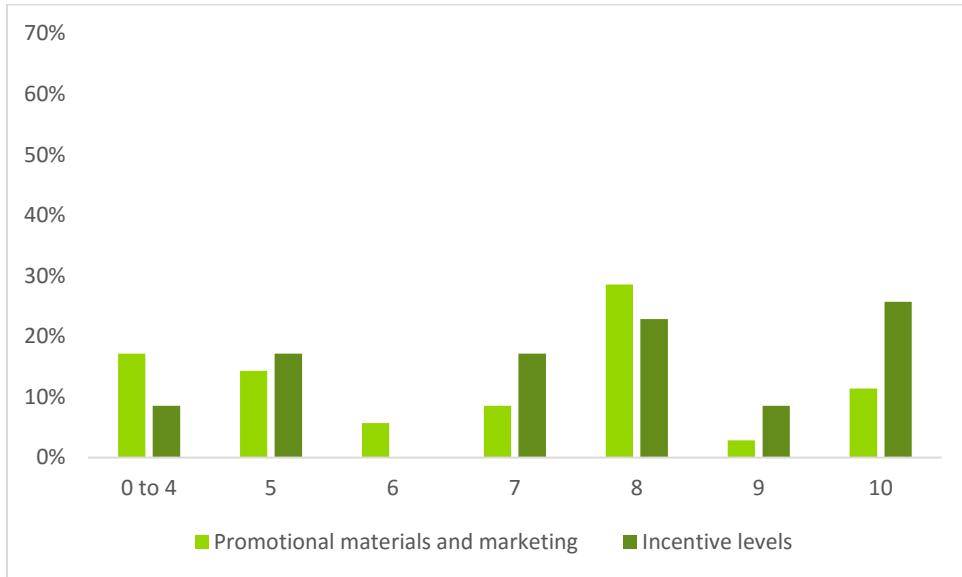
Figure 5-8. How do you rate your satisfaction with the program's ...? (n=35)



Source: Navigant Analysis

There is some opportunity to improve trade ally satisfaction levels of promotional materials and of incentive levels, both shown below in Figure 5-9. About a 30% (10 of 35) of the trade allies reported wanting to see more marketing and promotional efforts targeting residential customers. A similar number (nine of 35) expressed the need for higher incentives to make it worth the effort for residential customers, citing higher incentive levels of previous program years.

Figure 5-9. How do you rate your satisfaction with the program's...? (n=35)



Source: Navigant Analysis

## 6. FINDINGS AND RECOMMENDATIONS

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

### Verified Gross Savings and Realization Rate.

**Finding 1.** When a participant did not report the condition of their existing furnace (i.e., working/non-working), the implementer assumed early replacement conditions. Approximately 4% of participants did not report a baseline condition.

**Recommendation 1.** When furnace condition is unknown, the implementer should assume the conservative time of sale condition, or use a weighting based on the condition of furnaces incented through the program (e.g., in PY5 17% of furnaces were confirmed early replacement and 83% were time of sale, Nicor Gas could assume 17% of furnaces with unknown conditions are early replacement). The IC has implemented this approach for GPY6.

**Finding 2.** Some (7,386, 42% of programmable thermostats) of the programmable thermostats are listed with a manufacturer of “Ecobee” or “Nest”, indicating they may be smart thermostats.

**Recommendation 2.** In GPY6, Nicor Gas should separately track and claim savings for smart thermostats rebated through the program.<sup>12</sup> Smart thermostats have higher per unit savings than basic programmable thermostats, and because the deemed measure savings provided in TRM version 5 are net, a program-level net-to-gross value is not applied.

**Finding 3.** The ex ante gross savings for programmable thermostats were consistently slightly lower than the verified gross savings for the measure. This is because the ex ante savings estimates used (1) the gas heating consumption values from Illinois TRM v2.0 and (2) the time of sale in-service rate (ISR) for thermostats reported installed by a contractor.

**Recommendation 3.** The IC should use inputs as defined by the applicable version of the TRM when calculating ex ante savings estimates. This will make evaluation savings adjustments less likely.<sup>13</sup>

**Finding 4.** High Efficiency Furnaces show the most savings for the program. Programmable Thermostats have the most participation and second most savings for the Home EER Program.

### Program Volumetric Findings.

**Finding 5.** The Nicor Gas Home Energy Efficiency Rebates Program reported 25,795 projects in GPY5 and distributed 33,386 measures. This translates to 1.3 measures per project.

### Process Evaluation.

**Finding 6.** Overall, participants reported high levels of satisfaction with all aspects of the program, including the contractors that they worked with through their program experience.

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<sup>12</sup> Nicor Gas has taken action on this recommendation for GPY6. Navigant will verify correct adoption during GPY6.

<sup>13</sup> Nicor Gas has taken action on this recommendation for GPY6. Navigant will verify correct adoption during GPY6.

Participating trade allies also reported high levels of satisfaction. The program appears to be functioning well and successfully implementing all of its program plans, including its marketing plan.

**Finding 7.** There is some evidence that participation in the HEER Program or the Home Energy Assessment Program can have a positive influence on a participant's decision to participate in the other energySMART program. Additionally, receiving Nicor Gas' Home Energy Report<sup>14</sup> appears to have had a small effect on HEER Program participation. The effect was greatest on participants who received a rebate for thermostats only.

**Recommendation 2.** Nicor Gas should continue its cross promotional activities between the Home Energy Assessment Program and the HEER Program, and Navigant acknowledges the program intends on doing so.

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<sup>14</sup> The survey sampled GPY4 participants, and Nicor Gas' Home Energy Report program was active in GPY4.

## 7. APPENDIX

In 2016, Navigant conducted net-to-gross (NTG) and process evaluation research through a telephone survey with 100 customers and 35 trade allies who participated in the GPY5 Home EER Program. The results of this research were used to develop free ridership and spillover estimates for future use and provided feedback on process questions. The NTG research methods and results were presented in a set of memos from Navigant that were distributed in 2016. The memos are included in Section 7.1, as follows:

- Section 7.1.1 Participant Free Ridership Results Memo, August 23, 2016.
- Section 7.1.2 Trade Ally Research NTG Results Memo, September 9, 2016.
- Section 7.1.3 Participant Spillover Research Results Memo, December 16, 2016.
- Section 7.1.4 Free Ridership Results Memo, December 22, 2016.

Navigant’s recommendation for free ridership based on the GPY5 research is provided in the table below and in the December 22, 2016 Free Ridership Results Memo, while Navigant’s recommendation for participant spillover is presented in the table below and in the December 16, 2016 results memo.

**Table 7-1. Free Ridership and Spillover from GPY5 Research**

| Measure                  | Free Ridership | Participant Spillover |
|--------------------------|----------------|-----------------------|
| 95% AFUE Furnace         | 40%            |                       |
| 97% AFUE Furnace         | 44%            |                       |
| Programmable Thermostat† | 68%            |                       |
| Overall HEER Program‡    | 45%            | 2%‡‡                  |

*Source: Navigant analysis of data from a survey conducted in GPY5 with 100 GPY4 HEER Program participants.*

† These were basic programmable thermostats installed by GPY4 participants. In GPY5, Nicor Gas offered rebates for basic and advanced programmable thermostats.

‡ Overall HEER Program result uses GPY4 HEER Program verified gross savings to weight measure category free ridership. The value of 45 percent free ridership applies to all program measures including programmable thermostats, but does not apply to duct sealing, air sealing, or insulation measures.

‡‡ The 2 percent PSO value is recommended for the HEER Program as a whole and for the category of residential furnace measures.

Navigant does not recommend the HEER Program free ridership results presented in this report for duct sealing, air sealing, or insulation measures should they be included in the HEER Program as rebated measures. When programmable thermostats are excluded from the weighting of survey results, the free ridership estimate is 41 percent rather than 45 percent.

The participant and trade ally survey research instruments are provided in Section 7.2.

## 7.1 Net-to-Gross Research Methodologies and Findings

### 7.1.1 Participant Free Ridership Results Memo, August 23, 2016

**To:** Jim Jerozal, John Madziarczyk, Steve Grzenia, Bridgid Lutz, Hammad Chaudhry, Nicor Gas; Scott Dimetrosky, Apex Analytics; Ted Weaver, First Tracks Consulting; Jennifer Morris, David Brightwell, ICC Staff; NTG Working Group; Annette Beitel, Celia Johnson, Future Energy Enterprises/EE SAG

**From:** Katherine Wolf and Jane Hummer, Navigant

**CC:** Randy Gunn, Kevin Grabner, Laura Agapay-Read, Jeff Erickson, Navigant

**Date:** August 23, 2016

**Re:** Free Ridership Research Results from GPY5 for the Nicor Gas Residential energySMART Rebate Program

This memo presents results from Navigant’s GPY5 residential free ridership evaluation activity. Our free ridership research will later support our recommendation of Net-to-Gross (NTG) values for deeming in GPY7 and beyond for the energySMART Rebate Program, also known as the Home Energy Efficiency Rebate Program (HEER). Participant spillover and trade ally research and analysis activities are ongoing for GPY5.

### **NET-TO-GROSS ESTIMATION FOR THE energySMART REBATE PROGRAM**

Nicor Gas energySMART residential rebates provide Nicor Gas customers with rebate incentives for purchasing high-efficiency furnaces, programmable thermostats, and other energy efficient measures. Participants may apply for the rebates themselves, or contractors may assist them in the rebate application process. Rebates are processed and submitted to residential customers after installation of qualified measures.

#### **Data Collection for Net-to-Gross Estimates**

Table 1 below summarizes primary data sources that Navigant used to estimate the free ridership rate for the program. The participant survey also included questions about spillover, and the program also interviewed trade allies, but only the results for the participant free ridership are presented in this memo. The results from the spillover calculations and trade ally survey will be presented in a separate memo, along with the final net-to-gross recommendations.

Table 2. Primary Data Sources

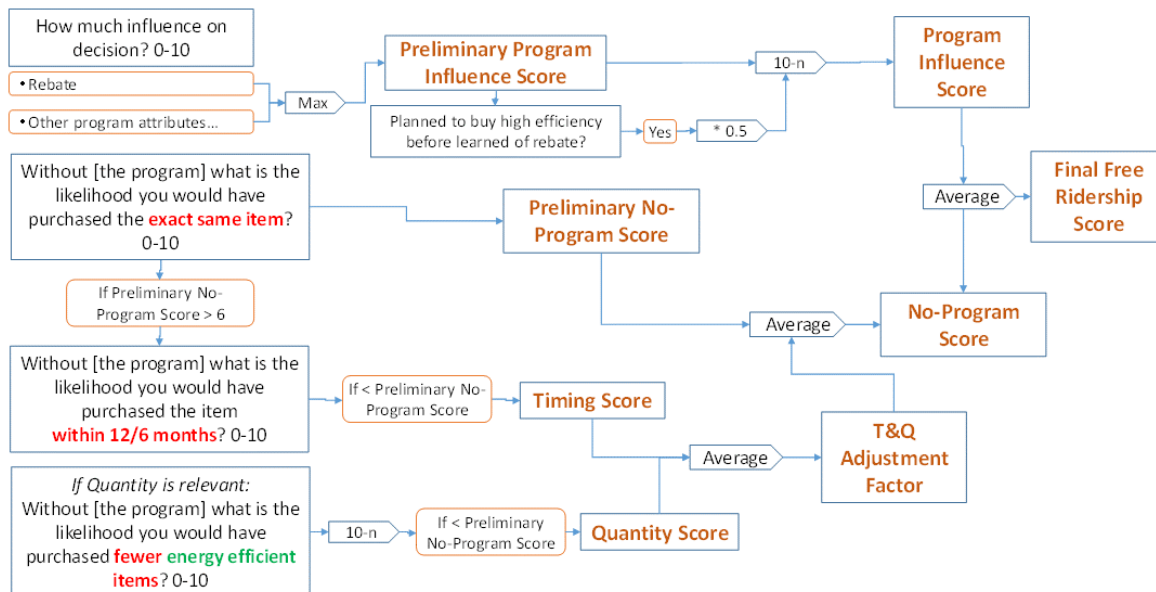
| Method                               | Subject                      | Target Completes | Actual Completes |
|--------------------------------------|------------------------------|------------------|------------------|
| Program Participant Telephone Survey | GPY4 Participating Customers | 100              | 100              |

Source: Evaluation Analysis

### Free Ridership Estimates Using Algorithms in the TRM

Initially, Navigant used the Illinois TRM version 5.0<sup>15</sup> free ridership algorithm to estimate free ridership for the program. The following diagrams describe the TRM free ridership algorithms for Replace on Burnout (ROB) and Early Replacement (ER):

Figure 10. Residential Prescriptive Rebate (With No Audit) Free Ridership (Replace on Burnout)

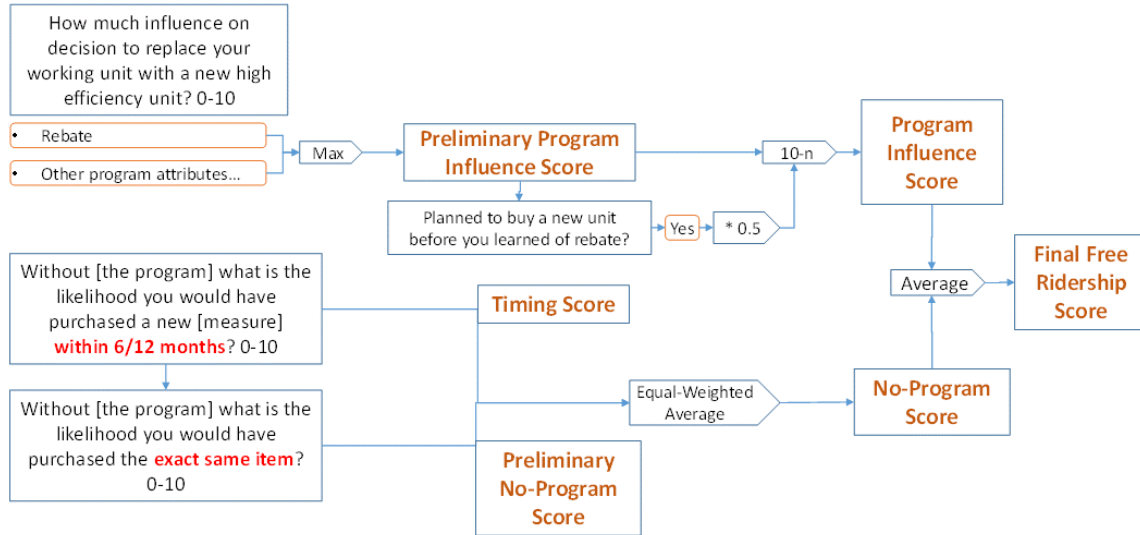


Source: Illinois TRM Version 5.0

<sup>15</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM) Version 5.0 (effective 6/1/2016). Available here: <http://www.ilsag.info/technical-reference-manual.html>. See *Volume 4: Cross-Cutting Measures and Attachment*.



Figure 11. Residential Prescriptive Rebate (With No Audit) Free Ridership (Early Replacement)



Source: Illinois TRM Version 5.0

Navigant applied the algorithms indicated by the TRM flow diagrams to the data collected from HEER participants, resulting in the following estimates of free ridership.

Table 3. Program Free ridership Estimates Using TRM Algorithm†

|  | 95% AFUE Furnace (n=64) | 97% AFUE Furnace (n=26) | Programmable Thermostat (n=10)†† |
|--|-------------------------|-------------------------|----------------------------------|
| Assuming all projects are early replacement  | 57%                     | 56%                     | 79%                              |
| Assuming all projects are replace-on-burnout | 57%                     | 55%                     | 78%                              |
| Using early replacement status from database | 57%                     | 55%                     | 78%                              |

Source: Navigant analysis

† Free ridership results for the Programmable Thermostats are not statistically significant due to the small number of responses.

†† These were basic programmable thermostats installed by GPY4 participants. In GPY5, Nicor Gas is offering rebates for basic and advanced programmable thermostats.

For context, the deemed NTG ratio (NTGR) and component values for the GPY6 HEER Program are NTGR (0.79); Free ridership (0.37); and Participant Spillover and Non-Participant Spillover (0.16).

## SENSITIVITY ANALYSES

Navigant conducted a number of sensitivity analyses to explore the impacts of adjustments to the TRM algorithm on the free ridership results. The results of the sensitivity analyses are presented only for the two measures with the largest sample sizes: 95% AFUE furnaces and 97% AFUE furnaces. For the purposes of the sensitivity analyses, all participants are assumed to have completed replace-on-burnout rather than early replacement projects.

**Table 4. Nicor Gas Sensitivity Results from Individual Adjustments to TRM Algorithm**

| Modification to Algorithm   | 95% AFUE Furnace (n=64) |             | 97% AFUE Furnace (n=26) |            |
|---|-------------------------|-------------|-------------------------|------------|
|   | FR Result               | Difference* | FR Result               | Difference |
| <b>TRM Algorithm Unadjusted</b>   | 57%                     | n/a         | 55%                     | n/a        |
| Using minimum of Timing and Preliminary No-Program as No-Program score (instead of average)   | 53%                     | -3%         | 54%                     | -2%        |
| Removing very inconsistent responses from analysis**  | 52%                     | -5%         | 51%                     | -4%        |
| Balancing Prior Plans adjustment so a “No” answer reduces Preliminary No-Program score by 50% | 52%                     | -5%         | 48%                     | -7%        |
| Balancing Prior Plans adjustment so a “No” answer reduces No-Program score by 50%             | 51%                     | -6%         | 46%                     | -9%        |
| Removing Prior Plans adjustment from algorithm  | 44%                     | -12%        | 46%                     | -9%        |

Source: Navigant analysis

\* The difference is measured from the results in Table 2, assuming that all participants completed replace-on-burnout rather than early replacement projects. A negative number indicates that the adjustment to the TRM algorithm reduced the free ridership estimate; a positive number indicates the adjustment increased the free ridership estimate. Differences may look inconsistent due to rounding.

\*\* “Very inconsistent responses” are defined as respondents who answered that the program had both high program influence (>7) and they had a high likelihood (>7) of installing the same measure without the program, or respondents who indicated very low program influence (<3) and low likelihood (<3). Removal reduces the sample size significantly.

## Discussion of Possible Modifications to Algorithm

This section discusses the various modifications to the TRM algorithm which Navigant tested in the sensitivity analyses.

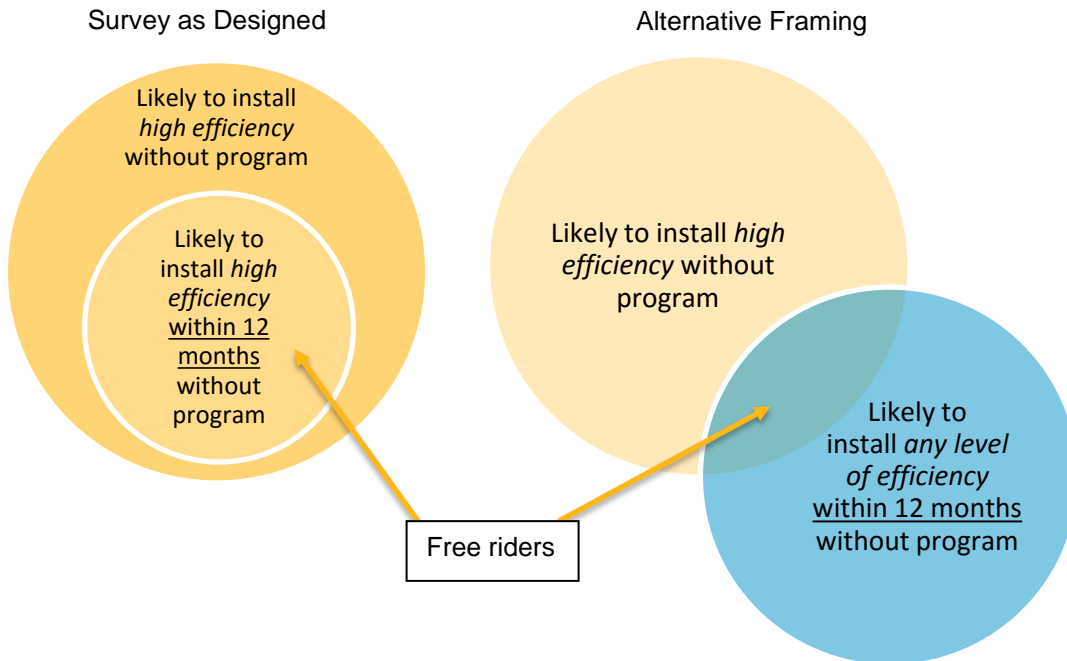
### Changes to Treatment of the Timing Question

Navigant identified one potential change to the treatment of the timing question:

1. Using the minimum (rather than average) of the Preliminary No-Program and Timing scores as the No-Program score

One rationale for changing the treatment of the Timing question is that there is a possibility that some participants mistakenly answer the Timing question thinking about the likelihood of purchasing *any* equipment within a year, not necessarily *high efficiency* equipment. In fact, it is likely that some participants are making that mistake; 16 out of 100 Nicor Gas survey respondents gave a higher score for Timing than they did Preliminary No-Program, which should be logically impossible if they understood the question correctly. The Timing score should be less than or equal to the Preliminary No-Program score because the Timing score is a narrower case of the Preliminary No-Program score – both scores refer to purchasing the exact same furnace except the Timing score adds the restriction of making the purchase within 12 month. Figure 3 demonstrates how participants with a high Timing score should be a subset of the population of possible free riders based on the survey as designed in accordance with the TRM (left Venn diagram). The right Venn diagram shows an alternative way to frame the questions (which may be consistent with how some participants interpreted the question). It separates the questions of likely to install high efficiency and likely to install within 12 months without regard to efficiency level.

**Figure 12. Relationship between the Preliminary No-Program Score and the Timing Score**



Using the minimum, rather than the average, of the Timing and Preliminary No-Program score would reflect the survey’s intentions and correct for any participants who mistakenly interpreted the timing question to be asking about purchasing a furnace or other measure of *any* efficiency rather than high efficiency.<sup>16</sup>

<sup>16</sup> Note that the survey instrument does ask participants about their likelihood of purchasing “the exact same item”

Free ridership batteries often ask about the timing of an efficiency purchase if the program did not exist because participants have a hard time predicting major purchases far in advance. If a respondent says that they were very likely to install a high efficiency measure at some point (e.g., a Preliminary No-Program score of 7 or higher), but less likely to install the measure within one year (e.g., a lower Timing score), the No-Program score should reflect that lower score because of the uncertainty in participants' ability to predict future purchase decisions under hypothetical circumstances. If a respondent indicated a very low likelihood of making the purchase within one year, it is very difficult for them to accurately predict whether they would have ever made the purchase; personal finances and market conditions can change dramatically within a year.

### Changes to Treatment of Prior Planning Question

The TRM algorithm is particularly sensitive to the response to the question about whether participants had planned to purchase high efficiency prior to learning about the program's rebate. A "yes" answer to the prior planning question results in a minimum free ridership score of 25% regardless of the responses to other questions.

Navigant identified three mutually exclusive potential changes to the treatment of the prior planning question:

1. Removing Prior Plans adjustment from the algorithm
2. Balancing the Prior Plans adjustment so a "No" answer reduces Preliminary No-Program score by 50%
3. Balancing the Prior Plans adjustment so a "No" answer reduces No-Program score by 50%

One rationale for changing the treatment of the prior planning question is respondents may be assuming that *any* new furnace, boiler, or water heater would be higher efficiency than the one they were replacing.<sup>17</sup> Thus, they could honestly answer "yes, I was planning to buy a high efficiency [measure] before I learned about the rebate" while still being unlikely to have purchased the same high level of efficiency incented through the program. The 50% reduction to the program influence (resulting from a "yes" answer to the prior planning question) as specified in the TRM algorithm has a significant impact on the resulting free ridership estimate; simply removing that adjustment had the biggest impact of all the sensitivity analyses Navigant tried.

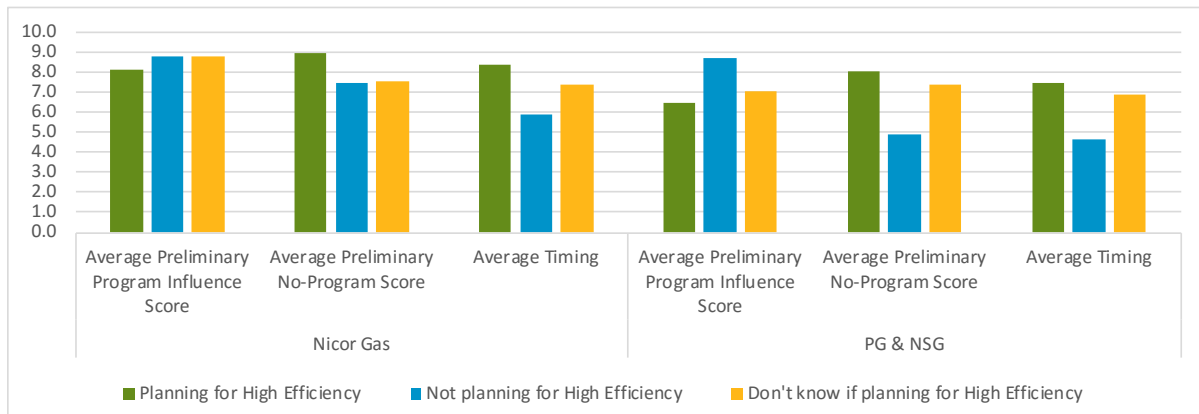
Another rationale is that participants themselves may already be accounting for their prior plans when answering the other questions which factor into the algorithm. On average, both Nicor Gas and PG & NSG participants who said they were planning for high efficiency before they learned about the program gave lower Program Influence scores and higher Preliminary No-Program and Timing scores than participants who said they were not planning for high efficiency prior to learning of the program, as shown in the figure below. Thus, even without the Prior Planning adjustment, participants who said they were planning for high efficiency receive higher free ridership estimates than those who were not. Further adjustment on the basis of prior plans may not be necessary, and may be inconsistent with the principle of allowing participants to speak for themselves without evaluators building arbitrary evaluation constructs

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<sup>17</sup> The survey instrument specifically referenced "95% AFUE furnaces" or "97% AFUE furnaces", however, it is possible that some customers still mistakenly think of all new furnaces as "high efficiency."

into the algorithm. Thus, Navigant tried a sensitivity analysis in which the prior plans question does not factor into the algorithm.

**Figure 13. Correlation of Prior Plans with Other Scores**



Source: Navigant analysis

If it is believed that prior plans indicate that free ridership is likely *higher* than participants would otherwise describe, it would be logical to believe that the lack of prior plans would similarly indicate *lower* free ridership than participants would otherwise describe. Navigant tried sensitivity analyses in which a “no prior plans” answer resulted in cutting the Preliminary No-Program or the entire No-Program score in half, in parallel to a “yes” answer cutting the Preliminary Program Influence score in half.

### Other Sensitivity Analyses and Changes to the TRM Algorithms

There are numerous possible adjustments to the TRM algorithms that may be considered and analyzed through sensitivity tests. The adjustments could be analyzed individually or in combinations. For example, one possible change to the algorithm would remove very inconsistent responses from the analysis to address inconsistencies in participants’ answers. This change could be implemented in any combination with the other adjustments to the treatment of timing and prior plans discussed in the previous sections. Removing very inconsistent responses would have less effect if certain adjustments are made to the timing or prior plans treatments, because those possible changes would serve to reduce the number of inconsistent responses.

### Navigant’s Suggested Modification to the TRM Algorithm

One combination of modifications to the algorithm that Navigant believes would be defensible and improve the analysis is:

1. Using the minimum (rather than average) of the Preliminary No-Program and Timing scores as the No-Program score, and
2. Removing the Prior Plans adjustment from the algorithm.

The results of this combination are presented in the table below.

**Table 5. Nicor Gas Sensitivity Results from Combined Adjustments to TRM Algorithm**

| Modifications to Algorithm  | 95% AFUE Furnace (n=64) |            | 97% AFUE Furnace (n=26) |            | Programmable Thermostat (n=10) |            |
|---|-------------------------|------------|-------------------------|------------|--------------------------------|------------|
|   | FR Result t             | Difference | FR Result t             | Difference | FR Result t                    | Difference |
| TRM Algorithm Unadjusted  | 57%                     | n/a        | 55%                     | n/a        | 78%                            | n/a        |
| Using minimum of Timing and Preliminary No-Program scores as No-Program score and removal of the Prior Plans adjustment | 41%                     | -16%       | 45%                     | -11%       | 65%                            | -13%       |

Source: Navigant analysis

The following figure demonstrates how this change in algorithm affects the distribution of free ridership values for Nicor Gas furnace participants. The TRM algorithm results in free ridership scores between 20% and 100%, with the plurality of results ranging from 70% to 80%. The modified algorithm results in a more normal distribution of scores using the full range of 0% to 100, with the central tendency at 50-60% free ridership.

**Figure 14. Effect of Treatment of Prior Plans in Algorithm on Free Ridership**



Source: Navigant analysis

**7.1.2 Trade Ally Research NTG Results Memo, September 9, 2016**

**To:** Bridgid Lutz, Jim Jerozal, John Madziarczyk, Steve Grzenia, Hammad Chaudhry, Nicor Gas; Scott Dimetrosky, Apex Analytics; Ted Weaver, First Tracks Consulting; Jennifer Morris, David Brightwell, ICC Staff; NTG Working Group; Annette Beitel, Celia Johnson, Future Energy Enterprises/EE SAG

**From:** Katherine Wolf, Molly Podolefsky, Navigant

**CC:** Randy Gunn, Kevin Grabner, Laura Agapay-Read, Jeff Erickson, Navigant

**Date:** September 9, 2016

**Re:** Trade Ally Net-to-Gross Research Results from GPY5 for the Nicor Gas Residential energySMART Rebate Program

This memo presents results from Navigant’s residential trade ally evaluation research conducted in GPY5. Our free ridership and spillover research will later support our recommendation of Net-to-Gross (NTG) values for deeming in GPY7 and beyond for the energySMART Rebate Program, also known as the Home Energy Efficiency Rebate Program (HEER).

**TRADE ALLY NET-TO-GROSS ESTIMATION FOR THE energySMART REBATE PROGRAM**

Nicor Gas energySMART residential rebates provide Nicor Gas customers with rebate incentives for purchasing high-efficiency furnaces, programmable thermostats, and other energy efficient measures. Participants may apply for the rebates themselves, or contractors may assist them in the rebate application process. Rebates are processed and submitted to residential customers after installation of qualified measures.

***Data Collection for Net-to-Gross Estimates***

Table 1 below summarizes primary data sources that Navigant used to estimate the trade ally (TA) free ridership rate (FR) and spillover for the program. Navigant also interviewed participants, but only the results for the trade ally survey are presented in this memo. The free ridership results from the participant survey were presented in a separate August 23, 2016 memo. Navigant will present our final net-to-gross recommendations that incorporate all participant and trade ally research findings in January 2017.

**Table 6. Primary Data Sources**

| Method                              | Subject                         | Target Completes | Actual Completes |
|-------------------------------------|---------------------------------|------------------|------------------|
| Program Trade Ally Telephone Survey | GPY4 Participating Trade Allies | 35               | 35               |

Source: Evaluation Analysis

### **Trade Ally Perspective on Participant Free Ridership Estimates**

Navigant used a free ridership methodology internally developed and used in other evaluations using data obtained from the trade ally interviews. The methodology recommended in the Illinois TRM version 5.0<sup>18</sup>, was not in effect at the time that the survey was designed by Navigant and approved by Nicor Gas.

Using the Navigant methodology, the interviewer asked a series of program influence questions prior to direct questions regarding free ridership, to assist the trade ally in recalling the diversity of ways in which the program may have influenced their high efficiency projects. The program influence questions are asked generally, about all high efficiency measures. The direct free ridership questions focus specifically on program qualifying furnaces (those with 95% AFUE and above) and programmable thermostats.

For each measure, the interviewer first reminds the trade ally of the number of participating projects completed in GPY4 that included the high efficiency measure. Then the interviewer asks the trade ally for a direct estimate of what percentage of those projects would have been completed (with identical measures and quantities) in the absence of the programs (i.e., free ridership). The response to that question forms the TA Direct FR Estimate. Finally, the interviewer asks an open-ended question about what measures their customers would have installed (instead of the rebated high efficiency measure) if the programs had not been available.

**Trade Ally Perspective on Participant Free Ridership Results.** Table 2 presents the results from the trade ally perspective on participant free ridership analysis. Not all participating trade allies sold both measures, which is why the number of trade allies varies by measure. As can be seen, the free ridership rates appear to be high, which is why Navigant also calculated a “Program Influence on Trade Allies” score, as described below.

**Table 7. Trade Ally Direct Perspective on Participant Free Ridership Results**

| Measure                    | FR Rate | N  |
|----------------------------|---------|----|
| Program Qualified Furnaces | 0.56    | 30 |
| Programmable Thermostats   | 0.82    | 24 |

Source: Navigant analysis

<sup>18</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM) Version 5.0 (effective 6/1/2016). Available here: <http://www.ilsag.info/technical-reference-manual.html>. See *Volume 4: Cross-Cutting Measures and Attachment*.



### ***Program Influence on Trade Ally (PITA)***

The analysis used the responses to the program influence on trade ally (PITA) questions in three ways:

- To qualitatively provide insight and context for the net-to-gross analysis.
- To ensure that trade allies' responses to direct measure-level free ridership questions are consistent with their account of the program's influence.
- To form part of an "attribution factor" to determine what share of non-incented high efficiency project savings should be attributed to the program as spillover.

The analysis assigns a Project Volume Influence Score to each trade ally. The trade allies first answer a series of questions designed to "prime" them to more accurately recall the program's influence on their high efficiency early replacement project volume. These questions focus on the number of high efficiency units they typically sold prior to the program, their typical efficiency recommendations, and the share of customers who opted for high efficiency before they began participating in the program. Finally, trade allies are asked the following question, designed to directly rate the program's influence on their high efficiency unit sales volume.

$$\text{Project Volume Influence Score} = \text{PITA4H Response}$$

PITA4H. On a scale of 0 to 10, how much influence has the Program had on your total number of high efficiency unit sales in the past twelve months (including any done outside the Program), relative to other factors? Zero is not at all influential and ten is very influential.

Next, the trade allies were asked the question about the likelihood that they would have recommended the same high efficiency units in the absence of the program. That response is converted into a program influence score by subtracting the response from 10.

$$\text{Program Influence Score} = 10 - \text{PITA4I Response}$$

PITA4I. If the Program and rebate had never been available, what is the likelihood that you would be installing high efficiency units at your past twelve-month volume, using a scale of 0 to 10 where zero is not at all likely and ten is very likely.

We calculated the overall Program Influence on Trade Ally (PITA) Score as the maximum of the two scores, the Project Volume Influence Score and the Program Influence Score.

$$\text{Program Influence on Trade Ally} = \text{Max}(\text{Project Volume Influence Score}, \text{Program Influence Score})$$

### ***Free Ridership Consistency Check***

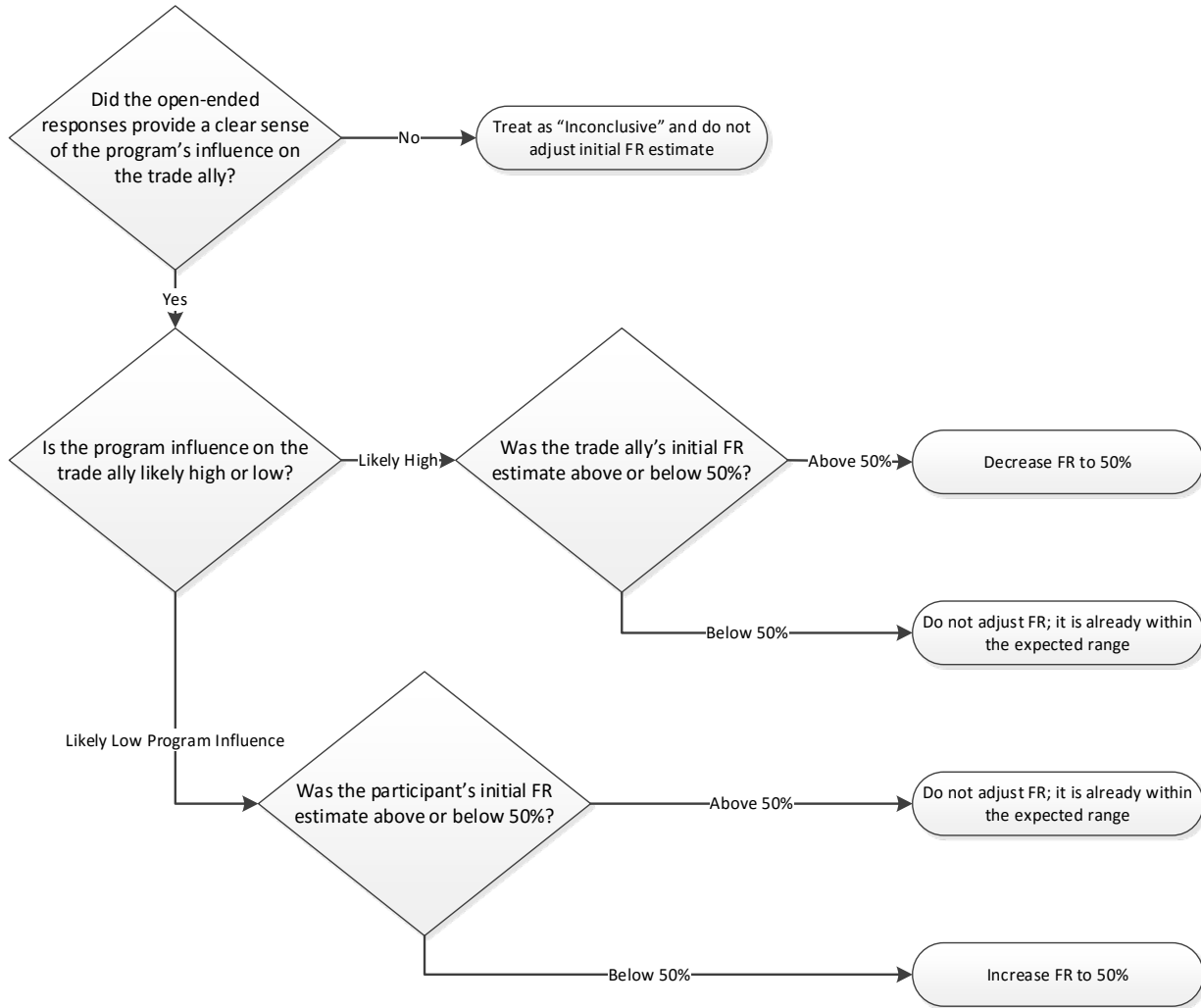
We implemented a consistency check procedure if the trade ally provides 1) a high Direct FR Estimate of greater than 50% *and* a high PITA Score of greater than 50% (meaning high program influence) or 2) a low Direct FR Estimate of less than 50% *and* a low PITA Score of less than 50%. If a trade ally reports high program influence, we expect to see free ridership of 50% or less, and if a trade ally reports low

program influence, we expect to see free ridership of 50% or greater. The consistency check procedure includes the following steps:

1. Review the trade ally's open-ended responses to program influence and free ridership questions and classify the trade ally as either:
  - a. Likely High Program Influence/Low FR
  - b. Likely Low Program Influence/High FR
  - c. Inconclusive
2. If the trade ally is as "Inconclusive," no adjustment is made to the Direct FR Estimate. Otherwise:
  - a. If the respondent is classified as "Likely High Program Influence" and the Direct FR Estimate is greater than 50%, the Final FR Estimate is reduced to 50%.
  - b. If the respondent is classified as "Likely Low Program Influence" and the Direct FR Estimate is less than 50%, the Final FR Estimate is increased to 50%.
  - c. Else, the Final FR Estimate is identical to the original Direct FR Estimate.

Figure 1 presents the consistency check procedure in graphical form.

Figure 15. Consistency Check Procedure



Ten trade allies provided inconsistent responses and their results fed into the consistency check. Of these ten trade allies, two were Likely High Program Influence/Low FR for both thermostats and furnaces, and two were Likely High Program Influence/Low FR for furnaces only. We reduced the free ridership rate for these trade allies to 50%. The free ridership rates after adjusting for inconsistency are shown in Table 3.

**Table 8. Modified Trade Ally Perspective on Participant Free ridership Results**

| Measure                    | FR Rate | N  |
|----------------------------|---------|----|
| Program Qualified Furnaces | 0.44    | 30 |
| Programmable Thermostats   | 0.76    | 24 |

Source: Navigant analysis

### **Additional Evidence of Program Influence**

Participating trade allies were also asked about the AFUE level they had recommended to their customers before they participated in the program and the AFUE level they recommend to their customers since they began participating in the program.

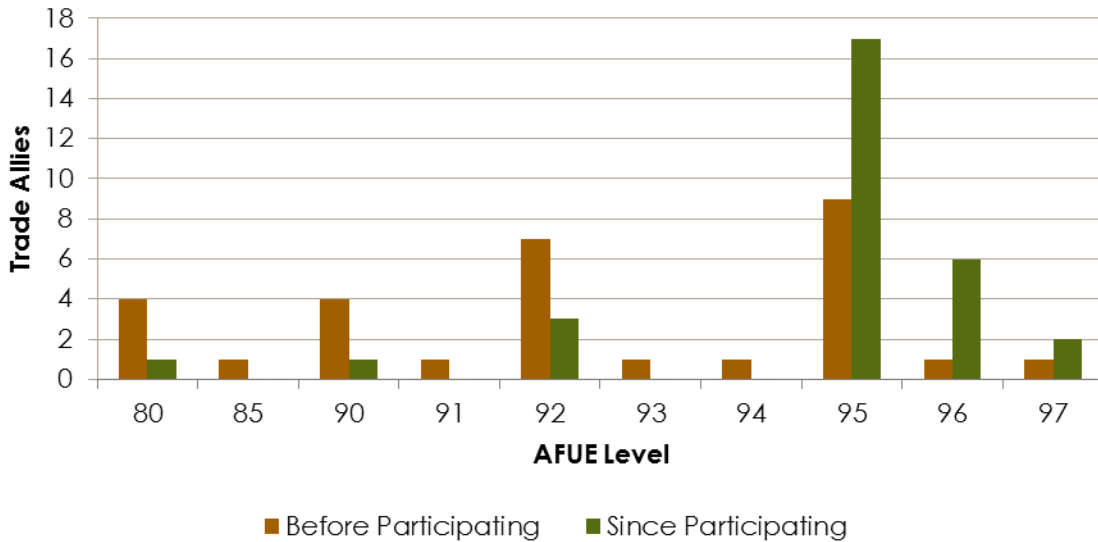
As can be seen in Table 4 and Figure 2, the number of trade allies recommending program qualifying furnaces with an AFUE of 95% or greater increased substantially after they began participating in the program. Nineteen of the trade allies surveyed did not recommend a unit with an AFUE of 95% or greater before participating in the program (as shown in the top row of Table 4, 30 minus 11 equals 19). After participating in the program, 74 percent (14 trade allies) of those 19 trade allies began recommending program qualifying furnaces to their customers (as shown by the bottom row of the table, 11 plus 14 equals 25).

**Table 9. Contractors Offering 95% AFUE as the Baseline to Consumers**

|  | 95% AFUE Recommended | % TAs Recommending 95% AFUE | N  |
|--|----------------------|-----------------------------|----|
| <b>Before Participating in energySMART Program</b> | 11                   | 37%                         | 30 |
| <b>Since Participating in energySMART Program</b>  | 25                   | 83%                         | 30 |

Source: Navigant analysis

Figure 16. Trade Allies Recommending each AFUE Level (n = 30)



Source: Navigant analysis

Because of these results, Navigant thinks that it is possible that the program is having additional influence on the trade ally that is not reflected in the responses given by the trade allies when asked the free ridership questions. It is highly possible that trade allies are underestimating the effect that the program is having on their own behavior, and therefore are underestimating the effect that the program is having on their customers' behavior.

**Trade Ally Spillover**

The interviewed trade allies answered a series of questions to establish the possible existence of spillover for their top two highest saving measures.

**Estimating the Number of Non-incented High Efficiency Projects.** For each measure, the interviewer reminded trade allies of the number of program-incented projects they completed in GPY4 involving that measure, and asked the trade ally to estimate how many (if any) additional projects were completed without rebates.

**Attributing Non-incented Projects to the Program.** For each spillover measure, Navigant calculated the number of spillover projects by multiplying each trade ally's total number of non-incented projects by an "attribution factor" based on the trade ally's responses to program influence questions. If the trade ally said that the program did not have any influence on the non-incented early replacement measures, the attribution factor is automatically 0% (meaning that no spillover is assigned to the program for those measures for that trade ally). Otherwise, the attribution factor is based on the trade ally's response to the following question on program influence:

*“How influential was the program on those sales of high efficiency units that did not receive rebates, using a scale of 0 to 10 where zero is not at all influential and ten is very influential?”*

**Trade Ally Spillover Results.** Based on the responses collected during the trade ally surveys, Navigant was unable to find any demonstrable evidence of spillover. While four trade allies did report that they installed high efficiency units outside of the program, three of these trade allies reported that it was either very likely these units were either installed outside of Nicor Gas territory, or they were unable to recall if the units were installed in Nicor Gas territory. Another trade ally reported that the program had no influence on the sale of the additional units installed outside of the program.

**7.1.3 Participant Spillover Research Results Memo, December 16, 2016**

**To:** Jim Jerozal, John Madziarczyk, Steve Grzenia, Bridgid Lutz, Hammad Chaudhry, Nicor Gas; Scott Dimetrosky, Apex Analytics; Ted Weaver, First Tracks Consulting; Jennifer Morris, David Brightwell, ICC Staff; Annette Beitel, Celia Johnson, Future Energy Enterprises/EE SAG

**From:** Katherine Wolf and Kevin Grabner, Navigant

**CC:** Randy Gunn, Laura Agapay-Read, Jane Hummer, Navigant

**Date:** December 16, 2016

**Re:** Participant Spillover Research Results from GPY5 for the Nicor Gas Residential energySMART Rebate Program

This memo presents results from Navigant’s GPY5 residential participant spillover evaluation activity. Our spillover research will support our recommendation of Net-to-Gross (NTG) values for deeming in GPY7 and beyond for the energySMART Rebate Program, also known as the Home Energy Efficiency Rebate Program (HEER). Participant free-ridership and trade ally free-ridership and spillover research has been completed, and the following estimate for participant spillover is the final field research component of the GPY5 NTG research effort.

**NET-TO-GROSS ESTIMATION FOR THE energySMART REBATE PROGRAM**

Nicor Gas energySMART residential rebates provide Nicor Gas customers with rebate incentives for purchasing high-efficiency furnaces, programmable thermostats, and other energy efficient measures. Participants may apply for the rebates themselves, or contractors may assist them in the rebate application process. Rebates are processed and submitted to residential customers after installation of qualified measures.

**Data Collection for Net-to-Gross Estimates**

Table 1 below summarizes primary data sources that Navigant used to estimate the participant free ridership and spillover rate for the program. Only the results for the participant spillover are presented in this memo.

**Table 10. Primary Data Sources**

| Method                               | Subject                      | Target Completes | Actual Completes |
|--------------------------------------|------------------------------|------------------|------------------|
| Program Participant Telephone Survey | GPY4 Participating Customers | 100              | 100              |

*Source: Evaluation Analysis*

### ***Spillover Estimates Using Algorithms in the TRM***

Navigant applied the Illinois TRM version 5.0<sup>19</sup> spillover methodology to estimate participant spillover for this residential program. In particular, we asked two close-ended questions to determine program influence on spillover actions. The two required questions are:

1. How important was your participation in the <PROGRAM ADMINISTRATOR’S> program on your decision to make additional energy efficiency improvements on your own? [Scale from 0-10 where 0 is “not at all important” and 10 is “extremely important”]
2. If you had not participated in the <PROGRAM ADMINISTRATOR’S> program, how likely is it that you would still have implemented this measure, using a 0 to 10, scale where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure?

The response to the first required question cited above is “Measure Attribution Score 1,” and the response to the second required question cited above is “Measure Attribution Score 2.” The specific measures referenced in the question are considered to be attributable to the program if the “Spillover Score” is greater than 7.0:

$$\text{Spillover Score} = (\text{Measure Attribution Score 1} + (10 - \text{Measure Attribution Score 2}))/2 > 7.0$$

If these conditions are met, the evaluator determines that the specific measures referenced in the question are attributable to the program. Depending on the measure type cited by the customer, an attempt is made to gather sufficient reasonable information to allow the evaluator to estimate the amount of natural gas energy savings using IL-TRM protocols. To develop the spillover rate, the total gas energy impacts from the sampled participants who installed additional measures due to participation in the program are summed, and then this sum is divided by the total sample ex post gas energy impacts:

*Participant Spillover Rate (PSO)*

$$= \frac{\text{Sum of Energy from Additional Measures Installed}}{\text{Sample Ex Post Gross Energy Impacts}}$$

### ***Participant Spillover Estimate***

Navigant applied the spillover methodology indicated by TRM v5.0 to the data collected from GPY4 HEER participants to identify spillover candidates, and found two participants that installed a combined three gas savings measures:

**Participant 1:** This participant had a spillover score of 7.5 for one gas saving measure: energy efficient water heater

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<sup>19</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM) Version 5.0 (effective 6/1/2016). Available here: <http://www.ilsag.info/technical-reference-manual.html>. See *Volume 4: Cross-Cutting Measures and Attachment, Section 4.1.2 Participant Spillover*.



**Participant 2:** This participant had a spillover score of 7.5 for two gas saving measures: air sealing and insulation.

Draft TRM version 6.0<sup>20</sup> participant spillover methodology advises using a more inclusive spillover threshold score of 5.0 rather than 7.0. Navigant re-examined our survey responses applying a threshold of 5.0, but no additional gas spillover was found.

## Measure-Level Energy Savings Estimates

### Participant 1: Energy Efficient Gas Water Heater

The participant is assumed to have chosen an efficient gas water heater to replace an existing water heater with little remaining useful life. The baseline efficiency represents a standard efficiency unit available in the market for GPY4 participants, defined by TRM v3.0<sup>21</sup>. The TRM v3.0 provides an example savings calculation for a Condensing Gas Storage Water Heater using recommended values for inputs when actual inputs are unknown:

*For example, a 40 gallon condensing gas storage water heater, with an energy factor of 0.80 in a single family house:*

$$\begin{aligned} \Delta \text{Therms} &= (1/0.594 - 1/0.8) * (17.6 * 2.56 * 365.25 * 8.33 * (125 - 54) * 1) / 100,000 \\ &= 42.2 \text{ therms} \end{aligned}$$

If the new efficient gas water heater was chimney-vented rather than condensing, TRM v3.0 recommends a default Energy Factor of 0.67 for the new unit, and the savings would be 18.6 therms.

We do not know whether the new unit purchased was chimney-vented or condensing. Applying a 50/50 weight to each scenario, the estimated spillover savings would be 30.4 therms.

### Participant 2: Air Sealing and Insulation.

We have no further input from the participant on the details of these two measures, such as square footage, insulation levels, blower door test results, etc. Two methods were considered for estimating the savings of these measures: 1) apply reasonable defaults from TRM v3.0, and 2) use energy savings results for these measures from the GPY4 Home Energy Savings (HES) program.

For Air Sealing, TRM v3.0 provides an example savings calculation using default inputs:

*For example, a well shielded, 2 story single family home in Chicago with a gas furnace with system Efficiency of 70%, has pre and post blower door test results of 3,400 and 2,250:*

<sup>20</sup> Draft Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM) Version 6.0, December 9, 2016 draft *Volume 4: Cross-Cutting Measures and Attachments*.

<sup>21</sup> TRM Version 3.0 was in effect for GPY4 participants. Available here: <http://www.ilsag.info/technical-reference-manual.html>.

$$\begin{aligned} \Delta \text{Therms} &= ((3,400 - 2,250)/17.8) * 60 * 24 * 6339 * 0.018 / (0.70 * 100,000) \\ &= 152 \text{ therms} \end{aligned}$$

Using the evaluation verified gross savings from the GPY4 HES program, we found the average savings for 940 air sealing projects was 136.8 therms.

For insulation, TRM v3.0 provides an example calculation of the savings algorithm that has many assumptions. We can reasonably assume that an attic insulation project was done without a rebate, because attics dominate the insulation measures installed through the GPY4 HES Program (attics are about 95% of the insulated square footage). The attic insulation measure in TRM v3.0 was subject to an errata, and the example calculation is taken from TRM v4.0 (the savings in the example calculation do not change between the two TRM versions):

*For example, a single family home in Chicago with 990 ft<sup>2</sup> of R-5 walls insulated to R-11 and 700 ft<sup>2</sup> of R-5 attic insulated to R-38, with a gas furnace with system efficiency of 66%:*

$$\begin{aligned} \Delta \text{Therms} &= (((1/5 - 1/11) * 990 * (1-0.25) * 0.63) + ((1/5 - 1/38) * 700 * (1-0.07) * 0.74)) * 24 * 5113 \\ &/ (0.66 * 100,067) \\ &= 250.3 \text{ therms} \end{aligned}$$

The GPY4 HES Program installed insulation described by three measure types: Attic Insulation, Wall Insulation, and Basement/Sidewall Insulation. The dominant measure was attic insulation, but some projects installed wall or basement/sidewall insulation. The average verified gross savings for 978 GPY4 HES projects was 129.4 therms.

The total spillover savings for this participant, using the example calculations from the TRM, are 402.3 therms (152 + 250.3).

The total spillover savings for this participant, assuming average verified results from the GPY4 HES Program are 266.2 therms (136.8 + 129.4).

### Program-Level Participant Spillover Estimate

To develop the spillover rate, the total energy impacts from the sampled participants who installed additional measures due to participation in the program are summed, and then this sum is divided by the total ex post energy impacts of claimed program measures installed by the sample of GPY4 HEER Program participants in our survey:

$$\text{Participant Spillover Rate (PSO)} = \frac{\text{Sum of Energy Impacts from Additional Measures Installed}}{\text{GPY4 Participant Sample Ex Post Gross Energy Impacts}}$$

The ex post savings for claimed program measures installed by the sample of 100 GPY4 HEER Program participants we interviewed was 18,818 verified gross therms.

The sum of spillover energy impacts from additional measures installed for this sample, using the example calculations from the TRM, are 432.7 therms (30.4 + 402.3).

The sum of spillover energy impacts from additional measures installed for this sample, assuming average verified results from the GPY4 HES Program are 296.6 therms (30.4 + 266.2).

The Nicor Gas Participant Spillover Rate for the HEER Program using example calculations from the TRM to estimate spillover savings are:

$$\text{Participant Spillover Rate (PSO)} = 2.3\% \text{ calculated from } \frac{432.7 \text{ therms}}{18,818 \text{ therms}}$$

The Nicor Gas Participant Spillover Rate for the HEER Program assuming average verified results from the GPY4 HES Program to estimate spillover savings are:

$$\text{Participant Spillover Rate (PSO)} = 1.6\% \text{ calculated from } \frac{296.6 \text{ therms}}{18,818 \text{ therms}}$$

### Evaluation Recommendation

Since evaluation NTG recommendations are presented as whole percentages, the spillover rates for both approaches round to 2 percent. Therefore, our evaluation recommendation is:

$$\text{HEER Program Participant Spillover Rate (PSO)} = 2\%, \text{ based on GPY5 evaluation research}$$

The 2 percent PSO value is recommended for the HEER Program as a whole and for the category of residential furnace measures.

**7.1.4 Free Ridership Results Memo, December 22, 2016**

**To:** Jim Jerozal, John Madziarczyk, Steve Grzenia, Bridgid Lutz, Hammad Chaudhry, Nicor Gas; Scott Dimetrosky, Apex Analytics; Ted Weaver, First Tracks Consulting; Jennifer Morris, David Brightwell, ICC Staff; NTG Working Group; Annette Beitel, Celia Johnson, Future Energy Enterprises/EE SAG

**From:** Katherine Wolf, Jane Hummer, and Kevin Grabner, Navigant

**CC:** Randy Gunn, Laura Agapay-Read, Jeff Erickson, Navigant

**Date:** December 22, 2016

**Re:** Free Ridership Research Results from GPY5 for the Nicor Gas Residential energySMART Rebate Program ***using Draft TRM Version 6.0 Methodology***

This memo compliments a memo we sent out on August 23, 2016 that presented results from Navigant’s GPY5 residential free ridership evaluation research. Our August 23 memo reported free ridership based on applying the Illinois TRM version 5.0<sup>22</sup> methodologies, and outlined our concerns with the algorithm. This memo presents our results using the draft Illinois TRM version 6.0<sup>23</sup> free ridership algorithm to estimate free ridership for the program, using the same set of participant responses and applying professional judgment to match our response data with the draft TRM v6.0 methodology. Navigant recommends the algorithm in the draft TRM v6.0 over the algorithm in TRM v5.0 to estimate free ridership for residential prescriptive rebate programs.

***Free Ridership Estimates Using Algorithms in the Draft TRM Version 6.0***

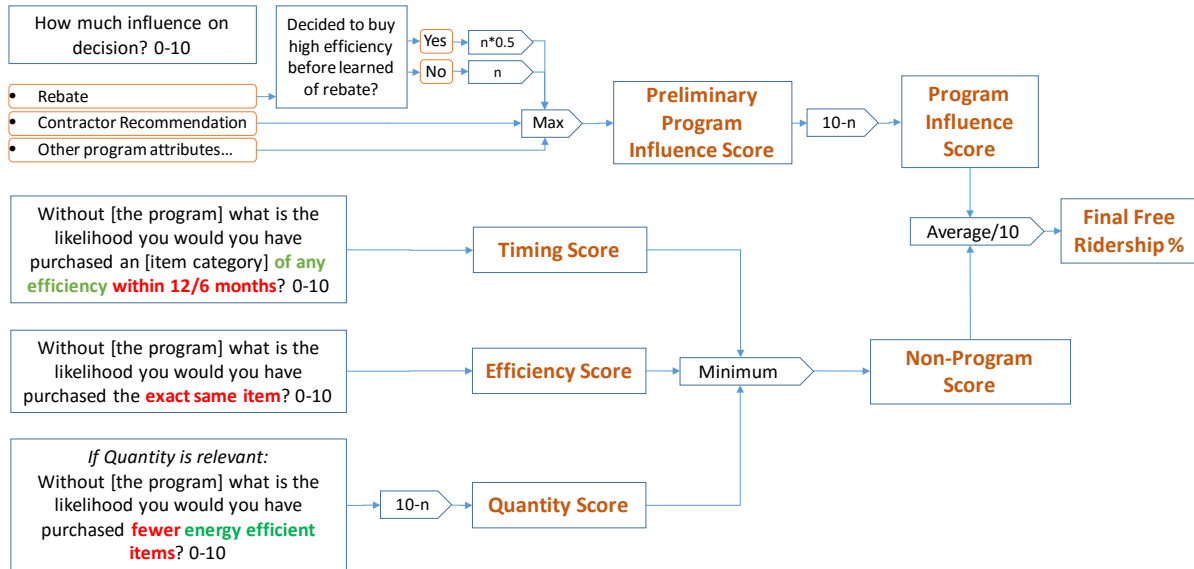
The following diagram describes the TRM free ridership algorithms for residential rebate programs.

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<sup>22</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM) Version 5.0 (effective 6/1/2016). Available here: <http://www.ilsag.info/technical-reference-manual.html>. See *Volume 4: Cross-Cutting Measures and Attachment*.

<sup>23</sup> Draft Illinois Statewide Technical Reference Manual for Energy Efficiency (TRM) Version 6.0, December 9, 2016 draft *Volume 4: Cross-Cutting Measures and Attachments*.

**Figure 17. Residential Prescriptive Rebate (With No Audit) Free Ridership**



Source: Illinois TRM Version 6 December 9, 2016 draft Volume 4.

Navigant applied the algorithm indicated by the TRM version 6.0 draft flow diagram to the data we collected from 100 GPY4 HEER participants, using professional judgment to match responses with the draft TRM v6.0 approach where some questions would be worded differently. Table 1 presents the resulting estimates of free ridership.

**Table 11. HEER Program Free Ridership Using the draft TRM v6.0 Algorithm**

| Measure Category          | Average FR | n   |
|---------------------------|------------|-----|
| 95% AFUE Furnace          | 40%        | 64  |
| 97% AFUE Furnace          | 44%        | 26  |
| Programmable Thermostat†† | †          | 10  |
| Overall HEER Program‡     | 45%        | 100 |

Source: Navigant analysis of data from a survey conducted in GPY5 with 100 GPY4 HEER Program participants.

† Free ridership results for the Programmable Thermostats are not statistically significant due to the small number of responses.

†† These were basic programmable thermostats installed by GPY4 participants. In GPY5, Nicor Gas offered rebates for basic and advanced programmable thermostats.

‡ Overall HEER Program result uses GPY4 HEER Program verified gross savings to weight measure category free ridership.

For context, the deemed NTG ratio (NTGR) and component values for the GPY6 HEER Program are NTGR (0.79); Free ridership (0.37); and Participant Spillover and Non-Participant Spillover (0.16).

### Free Ridership Comparison

For comparison, the free ridership results we reported in August using TRM version 5.0 are presented below.

**Table 12. HEER Program Free ridership Estimates Using the TRM v5.0 Algorithm†**

|   | <b>95% AFUE<br/>Furnace<br/>(n=64)</b> | <b>97% AFUE<br/>Furnace<br/>(n=26)</b> | <b>Programmable<br/>Thermostat<br/>(n=10)††</b> |
|---|--|--|---|
| <b>Using furnace early<br/>replacement status from<br/>database</b> | 57%                                    | 55%                                    | 78%   |

*Source: Navigant analysis of data from a survey conducted in GPY5 with 100 GPY4 HEER Program participants.*

† Free ridership results for the Programmable Thermostats are not statistically significant due to the small number of responses.

†† These were basic programmable thermostats installed by GPY4 participants. In GPY5, Nicor Gas offered rebates for basic and advanced programmable thermostats.

### Evaluation Recommendation

Navigant described our concerns with the TRM v5.0 algorithm and offered an alternative approach in our August 23, 2016 memo. Our alternative was not adopted for TRM v6.0, but the approach that did make it into the draft TRM v6.0 addresses what we believed were weaknesses of TRM v5.0 and produces results similar to our August recommended alternative.

Navigant recommends the algorithm in the December 9, 2016 draft of TRM v6.0 over the algorithm in TRM v5.0 to estimate free ridership for residential prescriptive rebate programs.

## 7.2 Survey Research Instruments

### 7.2.1 Participant Survey Instrument

] energySMART, a Nicor Gas Program  
**Participant Phone Survey Interview Guide**  
**Efficient Furnace and Programmable Thermostat Rebate Customers**

|   |  |
|---|--|
| <b>Date:</b>  |  |
| <b>Respondent name:</b>   |  |
| <b>Respondent phone number:</b>   |  |
| <b>Measure Rebated: [high efficiency furnace or programmable thermostat make, model, efficiency (efficiency only for furnace) and number installed (number only for thermostats).</b> |  |
| <b>Amount of rebate:</b>  |  |
| <b>Respondent email address:</b>  |  |

[Note: The interviewer should change the introduction to match his/her own interviewing style. Throughout the interview refer to the “measure” as either an “X% efficiency furnace” or a “programmable thermostat.” The interviewer will know either the efficiency of the furnace the respondent purchased or the make and model of the thermostat. The interviewer will also know the dollar amount of the incentive the customer received prior to starting the interview—record these for reference in the table above before the interview begins. Do not shorten the measure name—each time you see “<MEASURE>” in the text, say the full “X% efficiency furnace” rather than just “furnace” or “high efficiency furnace,” and “programmable thermostat” rather than just “thermostat” or “unit.”]

Hi, may I please speak with <program contact>?

Hello, this is \_\_\_\_\_ from Blackstone Group calling on behalf of Nicor Gas regarding it’s energySMART program. This is not a sales call. May I please speak with <PROGRAM CONTACT>? Our records show that you received a rebate of <\$X> for a new <MEASURE> from energySMART. Nicor Gas appreciates your participation in the program and your participation in surveys like this one that help evaluate the effectiveness of Nicor’s programs. Are you the person in your household I should be talking to about this purchase?

[IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME, NUMBER AND A GOOD TIME TO CALL.]

This survey will take 15 minutes or less of your time. May I continue?

[IF NOT, ASK TO MAKE AN APPOINTMENT.]

This interview is about your experience with the energySMART program.

### Intro and Warm-Up Question

**Intro1.** How did you first learn about the energySMART <MEASURE> program? [DO NOT READ—SELECT ONLY ONE]

- |    |   |            |
|----|---|------------|
| 1  | Through a contactor                                     | [CONTINUE] |
| 2  | Word of mouth (friend/family/co-worker/neighbor)        | [CONTINUE] |
| 3  | Bill insert   | [CONTINUE] |
| 4  | Home Energy Report                                      | [CONTINUE] |
| 5  | Email blast   | [CONTINUE] |
| 6  | TV or radio   | [CONTINUE] |
| 7  | Billboards  | [CONTINUE] |
| 8  | Magazine or newspaper ad                                | [CONTINUE] |
| 9  | Nicorgas.com Website (Nicor Gas Website)                | [CONTINUE] |
| 10 | Nicorgasrebates.com Website (Nicor Gas Rebates Website) | [CONTINUE] |
| 11 | Social Media  | [CONTINUE] |



- 12 Other [RECORD OPEN ENDED RESPONSE] [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

**Intro2.** Have you seen any advertising or educational materials for the energySMART program?

- 1 YES [CONTINUE]
- 2 NO [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

**Intro3.** What aspects of the energySMART program, if any, were helpful to you? [DO NOT READ— MULTIPLE ANSWERS ARE OK]

- 1 Information on EE equipment from contractor [CONTINUE]
- 2 Information on EE equipment from website [CONTINUE]
- 3 Information on EE equipment from brochure [CONTINUE]
- 4 Rebate [CONTINUE]
- 5 None [CONTINUE]
- 6 Other [RECORD OPEN ENDED RESPONSE] [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

### Free Ridership Questions

The following questions are about your decision making process in choosing to purchase a high efficiency furnace. As you answer the questions, think specifically not just about purchasing a furnace in general, but purchasing a high efficiency furnace.

NPIS1. Without the energySMART program and rebate, how likely is it on a scale of 0 to 10, where 0 is “not at all likely” and 10 is “very likely,” that you would have purchased the exact same <MEASURE> as you did?

- RECORD < 0-10 > [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

PIS1. Before you learned about the energySMART rebate, were you already planning to purchase a <MEASURE>?

- 1 Yes [CONTINUE]
- 2 No [CONTINUE]
- 98 (Don't Know) [CONTINUE]

99 (Refused) [CONTINUE]

PIS2. How influential was the energySMART rebate on your decision to purchase a <MEASURE>, on a scale of 0 to 10, where 0 is “not at all influential” and 10 is “very influential”?

RECORD < 0-10 > [CONTINUE]

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

PIS3. On a scale of 0 to 10, where 0 is “not at all influential” and 10 is “very influential,” how influential were each of the following Program components on your decision to purchase a <MEASURE>? [READ ALL CHOICES ALOUD TO RESPONDENT AND RECORD REPOSE FOR EACH, RANDOMIZE ORDER]

- A. Contractor recommendation
- B. Email blasts
- C. Bill inserts or brochures
- D. Program advertising

FOR EACH RECORD < 0-10 >

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

PIS3a. Where there any other energySMART program components that influenced your decision to purchase a <MEASURE>?

1 Yes, [OPEN END]

2 No

98 (DON'T KNOW)

99 (REFUSED)

[ASK PIS3b IF PIS3a=1]

PIS3b. On a scale of 0 to 10, where 0 is “not at all influential” and 10 is “very influential,” how influential did <PIS3a> have on your decision to purchase a <MEASURE>?

RECORD < 0-10 >

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

LIKE1. Without the energySMART program and rebate, how likely is it on a scale of 0 to 10, where 0 is “not at all likely” and 10 is “very likely,” that you would have purchased the exact same <MEASURE>?

- RECORD < 0-10 > [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

TIME2. Without the energySMART program and rebate, how likely is it on a scale of 0 to 10, where 0 is “not at all likely” and 10 is “very likely,” that you would have purchased the exact same <MEASURE> within 12 months of when you did?

- RECORD < 0-10 > [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

[For Programmable Thermostats Only]

[FREQ1 should only be read to customers who purchased more than one programmable thermostat through the program]

FREQ1. Without the energySMART program and rebate, how likely is it on a scale of 0 to 10, where 0 is “not at all likely” and 10 is “very likely,” that you would have purchased fewer programmable thermostats?

- RECORD < 0-10 > [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

### Spillover Questions

PRM1. Can you think of any way in which your participation in the energySMART program might have influenced you to make *other energy efficient purchases or installations* since the time when you installed your new <MEASURE>?

RECORD OPEN ENDED RESPONSE

SO1. Have you purchased any other energy-efficient items and installed them in your home since your purchase of the new <MEASURE> with the energySMART rebate? [IF NECESSARY PROVIDE EXAMPLES: EFFICIENT WATER HEATER, WEATHER STRIPPING, INSULATION, EFFICIENT AC SYSTEM, ETC.]

- 1 YES [CONTINUE]
- 2 NO [SKIP to PROCESS SECTION]
- 98 (DON'T KNOW) [SKIP to PROCESS SECTION]

99 (REFUSED) [SKIP to PROCESS SECTION]

SO2. Can you please list all the other energy-efficient items you've purchased and installed in your home between when you purchased your new <MEASURE> and now?

[3 OPEN END BOXES] [CONTINUE]

98 (DON'T KNOW) [SKIP to PROCESS SECTION]

99 (REFUSED) [SKIP to PROCESS SECTION]

SO2a. Just to make sure I am clear, you purchased and installed in your home [SO2 Responses] after you purchased the rebated <MEASURE>. Is this correct?

1 YES [CONTINUE]

2 NO [SAY "I'M SORRY, LET ME REPEAT THE QUESTION," REPEAT SO2]

SO3. Did you receive rebates from Nicor Gas or another utility for any of the energy efficient measures you just listed?

1 YES [CONTINUE]

2 NO [SKIP to SO3b]

98 (DON'T KNOW) [SKIP to PROCESS SECTION]

99 (REFUSED) [SKIP to PROCESS SECTION]

SO3a. Which of these measures did you receive utility rebates or incentives for?

[DISPLAY SO2 RESPONSES, MULTI-SELECT] [SKIP TO SO4]

[ASK SO3b IF SO3=2]

SO3b. Why did you not receive rebates for these energy efficient items? [IF THEY ANSWER BECAUSE THEY DID NOT APPLY FOR A REBATE, PROBE WHY THEY DID NOT APPLY.]

RECORD OPEN ENDED RESPONSE [CONTINUE]

SO4a-c. [ASK FOR EACH RESPONSE NOT SELECTED IN SO3a] On a scale of 0 to 10, where 0 is “not at all important” and 10 is “extremely important,” how important was your participation in the energySMART Home Rebate program on your decision to make additional energy efficiency improvements on your own? In other words, did your participation in the Program influence your purchase of the <SO3a>.

|                 |            |
|-----------------|------------|
| RECORD <0-10>   | [CONTINUE] |
| 98 (DON'T KNOW) | [CONTINUE] |
| 99 (REFUSED)    | [CONTINUE] |

SO5a-c. [ASK FOR EACH RESPONSE NOT SELECTED IN SO3a] On a scale of 0 to 10 where 0 means you definitely WOULD NOT have purchased the <MEASURE X> and 10 means you definitely WOULD have purchased the <SO3a>, how likely is it that you would have purchased the <SO3a> if you had NOT participated in the energySMART Home Rebate Program?

|                 |            |
|-----------------|------------|
| RECORD <0-10>   | [CONTINUE] |
| 98 (DON'T KNOW) | [CONTINUE] |
| 99 (REFUSED)    | [CONTINUE] |

**Process Questions**

P1. With regard to your participation in the energySMART Home Rebate Program, On a scale from 0 to 10, with 0 being not at all satisfied and 10 being very satisfied, how satisfied were you with the time it took to get your rebate?

|                 |            |
|-----------------|------------|
| RECORD <0-10>   | [CONTINUE] |
| 98 (DON'T KNOW) | [CONTINUE] |
| 99 (REFUSED)    | [CONTINUE] |

P2. On a scale from 0 to 10, with 0 being not at all satisfied and 10 being very satisfied, how satisfied were you with the amount of the rebate you received?

|                 |            |
|-----------------|------------|
| RECORD <0-10>   | [CONTINUE] |
| 98 (DON'T KNOW) | [CONTINUE] |
| 99 (REFUSED)    | [CONTINUE] |

P3. What was the name of the contractor or business through which you purchased your <MEASURE>?

|                            |            |
|----------------------------|------------|
| RECORD OPEN ENDED RESPONSE | [CONTINUE] |
| 98 (DON'T KNOW)            | [CONTINUE] |

99 (REFUSED) [CONTINUE]

P4. On a scale from 0 to 10, with 0 being not at all helpful and 10 being very helpful, how helpful was the contractor or sales representative you purchased your <MEASURE> through?

RECORD <0-10> [CONTINUE]

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

P5. On a scale from 0 to 10, with 0 being not at all knowledgeable and 10 being very knowledgeable, how knowledgeable was the contractor or sales representative you purchased your <MEASURE> through?

RECORD <0-10> [CONTINUE]

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

P6. Did your contractor file for a building permit?

1 YES [CONTINUE]

2 NO [CONTINUE]

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

P7. Was there an inspection from the city of the new furnace?

1 YES [CONTINUE]

2 NO [CONTINUE]

98 (DON'T KNOW) [CONTINUE]

99 (REFUSED) [CONTINUE]

P8. From your perspective, what changes could be made to improve the energySMART program?

RECORD OPEN ENDED RESPONSE [CONTINUE]

P9. Have you participated in the energySMART home assessment?

1 YES [CONTINUE]

2 NO [SKIP TO P10a]

98 (DON'T KNOW) [SKIP TO END]

99 (REFUSED) [SKIP TO END]

[IF YES]

P10. Which one of these did you get first: the rebate or the home assessment?

1 HOME PRODUCT REBATE [CONTINUE]

2 HOME ENERGY ASSESSMENT [CONTINUE]

98 (DON'T KNOW) [SKIP TO END]

99 (REFUSED) [SKIP TO END]

[IF P10 = 1]

P10a. Did you hear about the home assessment after getting a rebate?

- 1 YES [CONTINUE]
- 2 NO [CONTINUE]
- 98 (DON'T KNOW) [SKIP TO END]
- 99 (REFUSED) [SKIP TO END]

[IF P10 = 2]

P10b. Did you hear about the energySMART rebates when you got a home assessment?

- 1 YES [CONTINUE]
- 2 NO [CONTINUE]
- 98 (DON'T KNOW) [SKIP TO END]
- 99 (REFUSED) [SKIP TO END]

P11. Did the <NAME OF THE OFFERING THEY PARTICIPATED IN FIRST: rebate or assessment> influence you to participate in the <NAME OF THE OFFERING THEY PARTICIPATED IN SECOND: rebate or assessment>?

- 1 YES [CONTINUE]
- 2 NO [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

P12. The Home Energy Report is a report some customers receive in the mail comparing their gas usage to their neighbor's, and providing comparisons of their current use to past use. Do you receive a Home Energy Report from Nicor Gas?

- 1 YES
- 2 NO
- 98 (DON'T KNOW)
- 99 (REFUSED)

[ASK P12a IF P12=1]

P12a. Did you start receiving Home Energy Reports before or after you purchased your <MEASURE> and received an energySMART rebate?

- 1 Before
- 2 After
- 98 (DON'T KNOW)
- 99 (REFUSED)

[ASK P12b IF P12a=1]

P12b. Did the Home Energy Report influence your decision to purchase the <MEASURE>?

- 1 YES
- 2 NO
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

[IF P12a = YES]

P13. On a scale from 0 to 10, with 0 being not at all influential and 10 being very influential, how influential was the Home Energy Report on your decision to purchase the <MEASURE>?

- RECORD <0-10> [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]



[ONLY ASK FOR FURNACE PARTICIPANTS WHO DID NOT ALSO INSTSALL THERMOSTATS]

P14. Do you currently have a programmable thermostat?

- 1 YES [CONTINUE]
- 2 NO [SKIP TO P90]
- 98 (DON'T KNOW) [SKIP TO P90]
- 99 (REFUSED) [SKIP TO P90]

[ASK P14a IF P14=1]

P14a. Did a contractor install your programmable thermostat?

- 1 YES [CONTINUE]
- 2 NO [SKIP TO P90]
- 98 (DON'T KNOW) [SKIP TO P90]
- 99 (REFUSED) [SKIP TO P90]

[IF P14a = 1]

P14b. Did the contractor help you program the thermostat when you installed it? In other words, did the contractor help you set the programmable thermostat to save energy by lowering the thermostat based on your schedule—the times you sleep, leave for work, etc.?

- RECORD [CONTINUE]
- 1 YES [CONTINUE]
- 2 NO [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

[IF P14a = 1]

P14c. Have you changed the settings on your thermostat since then, or does your thermostat still have the settings that were programmed by the contractor?

- RECORD [CONTINUE]
- 1 YES [CONTINUE]
- 2 NO [CONTINUE]
- 98 (DON'T KNOW) [CONTINUE]
- 99 (REFUSED) [CONTINUE]

Thank you. Nicor Gas values your time and your insights. Your input will help improve the program.

Thank you very much for your time. It's been a pleasure talking with you. Have a great day!

**7.2.2 Trade Ally Survey Instrument**

**energySMART, a Nicor Gas Program  
Trade Ally Phone Survey Interview Guide  
Efficient Furnace and Programmable Thermostat Trade Allies**

|                                    |  |
|------------------------------------|--|
| <b>Respondent name:</b>            |  |
| <b>Respondent phone number:</b>    |  |
| <b>Respondent title:</b>           |  |
| <b>Email address:</b>              |  |
| <b>Respondent company:</b>         |  |
| <b>Respondent mailing address:</b> |  |
| <b>Date:</b>                       |  |

**SCREENER/INTRODUCTION**

**INTRO1**

Hello, my name is \_\_\_\_\_, and this is not a sales call. I'm calling on behalf of Nicor Gas to ask for your organization's feedback on the energySMART program, specifically how well it has worked for you and how it can be improved. May I speak to <CONTACT NAME>?

[IF <CONTACT NAME> IS NULL] May I speak to your residential sales, service or installation manager?

[If not available, request their name and a good time to call back.]

I work for The Blackstone Group, a research firm hired by Nicor Gas to collect equipment installers' comments.

The questions will only take about a half hour or less. And as a token of Nicor Gas' appreciation of your time, you will receive a \$100 Visa gift card after completing the survey. Is this a good time to talk? [IF NOT, SCHEDULE A CALLBACK.]

The following questions refer to the energySMART program, which offers residential rebates.

[INTERVIEWER: THROUGHOUT, <GPY4AFUE\_NUM> REFERS TO THE TOTAL NUMBER OF NEW FURNACES INSTALLED BY THE TA THROUGH THE energySMART PROGRAM IN GPY4, JUNE 1 2014 TO MAY 31, 2015. <GPY4PTSTAT\_NUM> REFERS TO THE NUMBER OF NEW PROGRAMMABLE THERMOSTATS INSTALLED BY THE TA THROUGH THE energySMART PROGRAM DURING THE SAME PERIOD OF TIME. <GPYAFUE\_95\_NUM> AND <GPY4AFUE\_97\_NUM> REFER, RESPECTIVELY, TO THE NUMBER OF REBATED FURNACES OF

95% AFUE AND 97% AFUE THE TA SOLD THROUGH THE energySMART PROGRAM DURING THE SAME PERIOD.

[IF IS OK TIME TO TALK, begin with question PD1]

*PARTICIPATION DECISION BY TRADE ALLY*

PD1. The energySMART program for home owners was launched in June 2010 and until 2014 it was called the Home Energy Efficiency Rebate (HEER) program. How did you first learn about the energySMART program? [DO NOT READ. ALLOW RESPONDENT TO CHOOSE ONLY ONE OPTION. IF RESPONDENT OFFERS MULTIPLE OPTIONS, RECORD FIRST.]

- 1 (Trade association)
- 2 (Customer first made me aware)
- 3 (Friend in the furnace/boiler/water heater industry)
- 4 (Radio)
- 5 (TV)
- 6 (Other news media)
- 7 (Bill insert from Nicor Gas about energySMART)
- 8 (Direct mailing to me from Nicor Gas or energySMART)
- 9 (Nicor Gas Representative)
- 10 (CLEAResult Representative)
- 11 (Other Utility)
- 12 (Nicor Gas website, Nicorgas.com)
- 00 Other (Record Verbatim)
- 98 Don't Know
- 99 Refused

PD2. How familiar are you with the energySMART program? On a scale from 0 to 10, where ZERO IS NOT AT ALL FAMILIAR AND TEN IS VERY FAMILIAR, how would you rank your familiarity?

RECORD 0 TO 10

- 98 Don't Know
- 99 Refused

[IF PD2<=4, ASK TO BE TRANSFERRED TO MOST KNOWLEDGEABLE PERSON. IF NOT AVAILABLE, RECORD NAME AND NUMBER OF PERSON AND SCHEDULE CALLBACK.]

[IF TRANSFERRED TO NEW PERSON, START INTERVIEW OVER AND RECORD NEW RESPONDENT NAME AND INFORMATION]

*PROGRAM INFLUENCE ON THE TRADE ALLY*

PITA1. When did you start participating in the energySMART program (what year)?  
[RECORD <YEAR> 4-DIGIT]

- 98 Don't Know
- 99 Refused

PITA2. Have you seen any advertising or marketing that Nicor Gas used to promote the energySMART program, for example, bill inserts, email blasts, print ads, website list of participating contractors, or any other marketing?

- 1 Yes
- 2 No
- 98 Don't Know
- 99 Refused

[IF PITA2 = 1, ASK PITA 2A]

PITA2A. What were they?

[OPEN END]

[RECORD VERBATIM]

- 98 Don't Know
- 99 Refused

PITA3. What ways, other than advertising and rebates, has the energySMART program helped you provide energy efficient products to your customers?

[OPEN END]

[RECORD VERBATIM]

- 98 Don't Know
- 99 Refused

PITA4A. Our records indicate that your company installed <GPY4AFUE\_NUM> high efficiency furnaces through the energySMART program between June 2014 and June 2015. Before you started participation in the energySMART program in <YEAR>, on average, how many high efficiency furnaces per year, if any, did you install? By high efficiency, I mean a furnace with an AFUE of 95% or greater. Throughout the rest of the survey, that will be the meaning of "high efficiency" furnace. [A ROUGH ESTIMATE IS OK. "ZERO" IS ALSO OK.]

[RECORD NUMBER]

- 98 Don't Know
- 99 Refused

[IF PITA4A = 98 OR 99, OR RESPONSE IS "ZERO", SKIP TO "TRADE ALLY ESTIMATE OF FREE RIDERSHIP" SECTION, OTHERWISE CONTINUE]

PITA4C. During this same period before you started participation in the energySMART program what usually was the AFUE rating of the new furnace that you would recommend?

[RECORD NUMERIC 1-100]

- 98 Don't Know
- 99 Refused

[ASK PITA4C\_X IF PITA4C<95]

PITA4C\_X. During this period before you started participation in the energySMART program, did you ever offer a new furnace with an AFUE rating of 95% or greater?

- 1 Yes
- 2 No
- 98 Don't Know
- 99 Refused

[ASK PITA4D IF PITA4C>94, OR PITA4C\_X=1]

PITA4D. Thinking of when you recommended high efficiency furnaces before you started participating in the energySMART program in <YEAR>, making your best estimate, what was the percentage of customers who actually took that recommendation?

- [RECORD PERCENTAGE]
- 98 Don't Know
  - 99 Refused

PITA4E. And now, thinking of the past 12 months, what usually was the AFUE rating of the new furnace that you would recommend? (Your best estimate is fine)

- [RECORD NUMERIC 1-100]
- 98 Don't Know
  - 99 Refused

[ASK PITA4E\_X IF PITA4E<95]

PITA4E\_X In the past 12 months, have you ever offered a new furnace with an AFUE of 95% or greater?

- 1 Yes
- 2 No [SKIP TO PITA4FA]
- 98 Don't Know [SKIP TO PITA4FA]
- 99 Refused [SKIP TO PITA4FA]

[ASK PITA4E\_X1 IF PITA4E\_X=1]

PITA4E\_X How often frequently have you offered new furnaces with an AFUE of 95% or greater over the past 12 months?

- [OPEN END]
- 98 Don't Know
  - 99 Refused

PITA4Ea. And now, thinking of when you recommended high efficiency furnaces in the past twelve months, making your best estimate, what was the percentage of customers who actually took that recommendation?

[RECORD PERCENTAGE]

- 98 Don't Know
- 99 Refused

[IF ANSWER TO PITA4A IS MORE THAN <GPY4AFUE\_NUM>, THEN CONTINUE TO PITA4FA, OTHERWISE SKIP TO PITA4FB].

PITA4FA. Our records indicate that your company installed <GPY4AFUE\_NUM> high efficiency furnaces through the energySMART program between June 2014 and June 2015, less than before you started participating in the energySMART program in <YEAR>. What do you think is driving this decrease in high efficiency furnaces?

[OPEN END]

- 98 Don't Know
- 99 Refused

[IF ANSWER TO PITA4A IS LESS THAN <GPY4AFUE\_NUM>, THEN CONTINUE TO PITA4FB, OTHERWISE SKIP TO PITA4FC].

PITA4FB. Our records indicate that your company installed <GPY4AFUE\_NUM> high efficiency furnaces through the energySMART program between June 2014 and June 2015, more than before you started participating in the energySMART program in <YEAR>. What do you think is driving this increase in high efficiency furnaces?

[OPEN END]

- 98 Don't Know
- 99 Refused

[IF ANSWER TO PITA4A IS EQUAL TO <GPY4AFUE\_NUM>, THEN CONTINUE TO PITA4FC, OTHERWISE SKIP TO PITA4G].

PITA4FC. Our records indicate that your company installed <GPY4AFUE\_NUM> high efficiency furnaces through the energySMART program between June 2014 and June 2015, the same as before you started participating in the program in <YEAR>. Just to confirm, is it correct that the number of high efficiency furnaces you sold after participating in the energySMART program stayed the same as before program participation?

[OPEN END]

- 98 Don't Know
- 99 Refused

PITA4G. About what percentage of the high efficiency furnaces you sold in the past twelve months were requested by the customer?

[RECORD PERCENTAGE]

- 98 Don't Know
- 99 Refused

PITA4H. On a scale of 0 to 10, how much influence has the energySMART program had on your total number of high efficiency furnace sales in the past twelve months (including any done outside the energySMART program)? ZERO IS NOT AT ALL INFLUENTIAL AND TEN IS VERY INFLUENTIAL.

[RECORD 0 to 10]

- 98 Don't Know
- 99 Refused

PITA4I. If the energySMART program and rebate had never been available, what is the likelihood that you would be installing high efficiency furnaces at your past twelve month volume, using a scale of 0 to 10 where ZERO IS NOT AT ALL LIKELY AND TEN IS VERY LIKELY.

[RECORD 0 to 10]

- 98 Don't Know
- 99 Refused

## TRADE ALLY ESTIMATE OF FREE RIDERSHIP

Now I would like to ask about your sales that were rebated by the energySMART program between June 2014 and June 2015.

From our records, your company sold and rebated the following furnaces through the energySMART program:

- 1 <GPY4AFUE\_95\_NUM> furnaces with an AFUE of 95% and
- 2 <GPY4AFUE\_97\_NUM> furnaces with an AFUE of 97%

[ASK FR1A THROUGH FR1C FOR EACH OF THE TWO MEASURES]

[IF <GPY4AFUE\_95\_NUM> AND <GPY4AFUE\_97\_NUM> BOTH BLANK MEASURE FIELDS, SKIP TO FR2A.]

FR1A. Do you think that the energySMART program has influenced these <GPY4AFUE\_95/97\_NUM\_> sales of furnaces with an AFUE of 95/97 percent?

- 1 Yes
- 2 No
- 98 Don't Know
- 99 Refused

FR1B. In your opinion, what percentage of customers in these rebated sales of AFUE 95 % or greater furnaces would have installed a furnace of AFUE 95% or greater **if the energySMART program and rebate had not been offered?**

[RECORD PERCENTAGE, 0-100%]

98 Don't Know

99 Refused

[IF FR1B > 70%, AND PITA4H IS > 5, ASK CC1. ELSE SKIP AND CC1 AND CONTINUE]

CC1. In the previous question, you suggested a large percentage of customer purchases of high efficiency furnaces were **NOT** influenced by the energySMART program and rebate, but in previous questions you indicated the opposite. Let me repeat the previous question. [REPEAT FR1B. GIVE THE RESPONDENT THE OPPORTUNITY TO CHANGE ANSWER. RECORD NEW ANSWER (EVEN IF IT HAS NOT CHANGED)]

[RECORD PERCENTAGE]

98 Don't Know

99 Refused

[IF FR1B < 30%, AND PITA4H IS < 5, ASK CC2. ELSE SKIP AND CC1 AND CONTINUE]

CC2. In the previous question, you suggested only a small percentage of customers purchases of high efficiency furnaces were **NOT** influenced by the energySMART program and rebate, but in previous questions you indicated the opposite. Let me repeat the previous question. [REPEAT FR1B. GIVE THE RESPONDENT THE OPPORTUNITY TO CHANGE ANSWER. RECORD NEW ANSWER (EVEN IF IT HAS NOT CHANGED)]

[RECORD PERCENTAGE]

98 Don't Know

99 Refused

FR1C. On average, what AFUE level do you think participating customers would have chosen if the energySMART program and rebate were not available?

[DO NOT READ LIST]

[ALLOW ONLY SINGLE RESPONSE]

1 80

2 90

3 92

4 93

5 95

6 96

7 97

8 98

97 Other [RECORD VERBATIM]

98 Don't Know

99 Refused

From our records, your company sold <GPY4PTST AT\_ NUM> programmable thermostats which were rebated through the energySMART program between June 2014 and June 2015.



[IF <GPY4PTSTAT\_NUM> IS A BLANK MEASURE FIELD, SKIP TO “TRADE ALLY ESTIMATE OF SPILLOVER” SECTION.]

FR2A. Do you think that the energySMART program has influenced these <GPY4PTSTAT\_NUM> sales of programmable thermostats?

- 1 Yes
- 2 No
- 98 Don't Know
- 99 Refused

FR2B. In your opinion, what percentage of customers in these <GPY4PTSTAT\_NUM> rebated sales of programmable thermostats would have purchased a programmable thermostat **if the energySMART program and rebate had not been offered?**

[RECORD PERCENTAGE IN <ANY\_PTSTAT\_PCT> AND CALCULATE  
 <GPY4PTSTAT\_NUM\_IF\_NO\_REB> = ( <ANY\_PTSTAT\_PCT> \* <GPY4PTSTAT\_NUM> ) ]

- 98 Don't Know
- 99 Refused

[IF FR2B > 50%]

FR2C. I understand you sold <GPY4PTSTAT\_NUM> programmable thermostats that were rebated through the energySMART program, and you believe you would still have sold <GPY4PTSTAT\_NUM\_IF\_NO\_REB> programmable thermostats even if the program and rebate had not been offered—is that correct? Why do you think you would still have sold <GPY4PTSTAT\_NUM\_IF\_NO\_REB> programmable thermostats even in the absence of the energySMART program and rebate? [IF RESPONSE INDICATES THIS IS “NOT CORRECT,” REPEAT FR2B AND RECORD NEW RESPONSE. IF RESPONSE DOES NOT CHANGE, SKIP FR2C AND CONTINUE TO SO1A]

[OPEN END RECORD <VERBATIM>]

- 98 Don't Know
- 99 Refused

## TRADE ALLY ESTIMATE OF SPILLOVER

Now I'd like to ask you a few questions about your sales of equipment between June 2014 and June 2015 that did **not** receive energySMART rebates.

[IF <GPY4AFUE\_95\_NUM> AND <GPY4AFUE\_97\_NUM> BOTH BLANK MEASURE FIELDS, SKIP TO SO2A]

SO1A. For furnaces with AFUE of 95% or greater, our records indicate you sold <GPY4AFUE\_NUM> **that were rebated through the program between June 2014 and June 2015.** How many **additional** AFUE 95% or greater furnaces did you sell **without** rebates, if any? An estimate is fine.

[RECORD NUMBER] = <NO\_REB\_FURN\_NUM>

- 98 Don't Know
- 99 Refused

[IF SO1A = 98 OR 99, SKIP TO SO2A]

[CALCULATE <NO\_REB\_FURN\_PERC> = (<NO\_REB\_FURN\_NUM>/(<GPY4AFUE\_NUM>+<NO\_REB\_FURN\_NUM>))\*100

SO1B. In other words, about <NO\_REB\_FURN\_PERC> percent of your total sales of 95% AFUE or greater furnaces from June 2014 to June 2015 did not receive rebates, right?

- 1 Yes
- 2 No
- 3 Don't Know
- 4 Refused

[IF SO1B=2, ASK SO1A AND SO1B AGAIN]

SO1C. Do you think the energySMART program had any influence on the customers purchasing high efficiency furnaces where rebates were not issued?

- 1 Yes
- 2 No
- 3 Don't Know
- 4 Refused

[IF SO1C=1, ASK SO1D, OTHERWISE SKIP TO SO2A]

SO1D. How influential was the energySMART program on those sales of high efficiency furnaces that did not receive rebates, using a scale of 0 to 10 where ZERO IS NOT AT ALL INFLUENTIAL AND TEN IS VERY INFLUENTIAL?

[RECORD 0 TO 10]

- 98 Don't Know
- 99 Refused

SO1E. In your opinion, why did these sales of high efficiency furnaces not receive rebates?

[OPEN END]

[RECORD VERBATIM]

98 Don't Know

99 Refused

[IF <GPY4PTSTAT\_NUM> IS A BLANK MEASURE FIELD, SKIP TO SO4]

SO2A. Our records indicate you sold <GYP4PTSTAT\_NUM> programmable thermostats **that were rebated through the energySMART program between June 2014 and June 2015**. How many **additional** programmable thermostats did you sell **without** rebates, if any? An estimate is fine.

[RECORD NUMBER] = <NO\_REB\_PTSTAT\_NUM>

98 Don't Know

99 Refused

[IF SO2A = 98 OR 99 SKIP TO SO4]

[CALCULATE <NO\_REB\_PTSTAT\_PERC> =

(<NO\_REB\_PTSTAT\_NUM>/(<NO\_REB\_PTSTAT\_NUM> + <GPY4PTSTAT\_NUM>))\*100

SO2B. In other words, about <NO\_REB\_PTSTAT\_PERC> percent of your programmable thermostat sales between June 2014 and June 2015 did not receive rebates, right?

1 Yes

2 No

3 Don't Know

4 Refused

[IF SO2B=2, ASK SO2A AND SO2B AGAIN]

SO2C. Do you think the energySMART program had any influence on the customers purchasing programmable thermostats where rebates were not issued?

1 Yes

2 No

3 Don't Know

4 Refused

[IF SO2C=1, ASK SO2D, OTHERWISE SKIP TO SO4]

SO2D. How influential was the energySMART program on those sales of programmable thermostats that did not receive rebates, using a scale of 0 to 10 where ZERO IS NOT AT ALL INFLUENTIAL AND TEN IS VERY INFLUENTIAL?

[RECORD 0 TO 10]

98 Don't Know

99 Refused

SO2E. In your opinion, why did these sales of programmable thermostats not receive rebates?

[OPEN END}

[RECORD VERBATIM]

98 Don't Know

99 Refused

SO4. Are there any other types of **high efficiency** gas-related equipment (e.g., boilers, etc.) that you sold a good amount of in between June 2014 and June 2015 without rebates, "a good amount" meaning at least 10% of your total sales?

1 YES

2 NO

98 DON'T KNOW

99 REFUSED

[IF SO4=1, CONTINUE TO MS5, OTHERWISE SKIP TO TASAT1]

SO5. Did the energySMART program have any effect on sales of this equipment?

1 YES

2 NO

98 DON'T KNOW

99 REFUSED

[IF SO5=1, CONTINUE TO SO6, OTHERWISE SKIP TO TASAT1]

SO6. What is this **high efficiency** equipment?  
 [PROBE: ASK FOR NUMERIC EFFICIENCY INFO, AND WORKING CONDITION OF ITEMS THAT WERE REPLACED.]

[OPEN END]

98 DON'T KNOW

99 REFUSED

SO7. How many of these did you sell in between June 2014 and June 2015 **without rebates?**

[OPEN END]

98 DON'T KNOW

99 REFUSED

SO8. Can you rate the degree of influence the energySMART program had on these sales, using a scale of 0 to 10 where ZERO IS NOT AT ALL INFLUENTIAL AND TEN IS VERY INFLUENTIAL?

[RECORD 0 TO 10]

98 DON'T KNOW

99 REFUSED

SO1E. In your opinion, why did these sales of high efficiency equipment not receive rebates?

[OPEN END]

98 Don't Know

99 Refused

THERMOSTAT AND FURNACE RELATIONSHIP

TF1. When you install furnaces in a home that does not have a programmable thermostat, which of the following best describes how often you install a programmable thermostat as well?: [READ THE FOLLOWING CHOICES ALOUD AND ONLY ALLOW RESPONDENT TO CHOOSE ONE OPTION. REPEAT THE QUESTION AS NECESSARY] "Always," "Sometimes," "Rarely," or "Never."

[RECORD]

1 "Always"

2 "Sometimes"

3 "Rarely"

4 "Never"

98 DON'T KNOW

99 REFUSED

[IF TF1 = 3 or 4]

TF1a. Why not?  
[OPEN END]

*TRADE ALLY SATISFACTION WITH PROGRAM*

Next, I'm going to discuss your satisfaction--as an equipment service and sales professional--with Nicor Gas' energySMART program.

TASAT1. From your perspective as a gas appliance installer/vendor, overall how satisfied have you been with the energySMART program? Using a number scale from 0 to 10, where zero means "not at all satisfied" and 10 means "very satisfied."

ENTER RATING 0 - 10

- 98. DON'T KNOW
- 99. REFUSED

TASAT1b. Can you tell me why you gave it that rating?

RECORD VERBATIM RESPONSE - CLARIFY AS NECESSARY

- 98. DON'T KNOW
- 99. REFUSED

TASAT2. I'd like to get a sense of your satisfaction with the components of the Program. Using a number scale from 0 to 10, where zero means "Not at all Satisfied" and 10 means "Very Satisfied," how would you rate the following parts of the energySMART program? If the item doesn't apply to you, just say so.

[ENTER RATING 0 – 10]

- 96. Not applicable
- 98. DON'T KNOW
- 99. REFUSED

[CREATE GRID, RANDOMIZE ORDER A-F]

- A. The promotional materials and marketing efforts
- B. The application forms and process
- C. The brands and models of equipment covered by the energySMART program
- D. The technical and customer assistance provided by energySMART
- E. The speed of getting the rebate to you if you participated in the instant discount process offered by the energySMART program
- F. The rebate and incentive levels

[PROMPT FOR EACH TASAT2A-F<6]  
 TASAT3A-F Why did you give <TASAT2 A-F OPTION TEXT> a score of <TASAT2 A-F>

[OPEN END]  
 98. DON'T KNOW  
 99. REFUSED

**PERCEIVED CUSTOMER SATISFACTION WITH PROGRAM**

TACSAT. Based on your interaction with customers, how satisfied are **they** with the **energySMART program**? Giving your best guess, how might customers rate the energySMART program on a 0 to 10 scale where 0 = "Not at all Satisfied" and 10 = "Very Satisfied"?  
 ENTER RATING 0 - 10  
 98. DON'T KNOW  
 99. REFUSED

[IF TACSAT = 5 OR LESS ASK OTHERWISE SKIP TO TACSATC]  
 TACSATB. Why do you say that?  
 RECORD VERBATIM RESPONSE - CLARIFY AS NECESSARY  
 98. DON'T KNOW  
 99. REFUSED

TACSATC. If there were one thing Nicor Gas could change about the energySMART program--other than the incentive levels—that might improve **customer satisfaction**, what would that be?  
 RECORD VERBATIM RESPONSE - CLARIFY AS NECESSARY  
 98. DON'T KNOW  
 99. REFUSED

**PERCEPTION OF NICOR GAS SUPPORT OF TRADE ALLIES**

PROB1. Have you experienced any issues in explaining and/or implementing the Program for your customers?  
 1. YES  
 2. NO  
 98. DON'T KNOW  
 99. REFUSED

[ASK IF PROB1= A.YES, OTHERWISE SKIP TO PROB2]

PROB1A. What improvements would you suggest for how energySMART can help you explain and/or implement the Programs for your customers?  
 RECORD VERBATIM - CLARIFY AS NECESSARY  
 98. DON'T KNOW  
 99. REFUSED

PROB2. Have you had any issues in following the rules for vendors in promoting the energySMART program?  
 1. YES  
 2. NO

- 98. DON'T KNOW
- 99. REFUSED

[ASK IF PROB2 =1]

PROB2A. Please describe the nature of the issues you experienced and whether they were ever resolved to your satisfaction?

RECORD VERBATIM - CLARIFY AS NECESSARY

- 98. DON'T KNOW
- 99. REFUSED

[ASK IF PROB2 =1]

PROB2B. What suggestions, if any, do you have for improvements to future energySMART offerings?

RECORD VERBATIM - CLARIFY AS NECESSARY

- 98. DON'T KNOW
- 99. REFUSED

PROB3. What additional suggestions, if any, do you have as to how the energySMART program can be improved?

RECORD VERBATIM - CLARIFY AS NECESSARY

- 98. DON'T KNOW
- 99. REFUSED

*PERMITTING AWARENESS AND PRACTICES*

PERM1. Would you classify yourself or your business as a Contractor?

- 1 YES
- 2 NO
- 888 DON'T KNOW
- 999 REFUSED

[IF PERM1 = 1]

PERM2. For what percentage of furnace installations do you file permits?

[RECORD PERCENTAGE IN <PERMIT PCT>]

- 98 Don't Know
- 99 Refused

PERM3. Do you pull permits in all the cities in which you work, or are there certain cities where you typically pull permits and others where you typically don't?

RECORD VERBATIM

- 98. DON'T KNOW
- 99. REFUSED

PERM4. Are you aware that a permit may be required in certain cities?



RECORD VERBATIM

98. DON'T KNOW

99. REFUSED

P90. Thank you for your time. My last question for you is to confirm the address to mail your \$100 gift card. The address I have for you is <ADDRESS>. Is this correct?

RECORD VERBATIM [CONFIRM OR COLLECT CORRECT ADDRESS]

98 DON'T KNOW

99 REFUSED

Thank you. Nicor Gas values your time and your insights. Your input will help improve the program.

Thank you very much for your time. It's been a pleasure talking with you. Have a great day!