NAVIGANT

Business Custom Incentive Program

GPY5 Evaluation Report

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

FINAL

October 30, 2017

Prepared for:

Nicor Gas Company

Submitted by:
Navigant Consulting, Inc.

Nick Beaman, Associate Director
510.926.9008
nick.beaman@navigant.com

Charles Ampong, Managing
608.497.2336
charles.ampong@navigant.com

Sharon Mullen, Senior Consultant
608.497.2351
sharon.mullen@navigant.com

Rick Berry, Senior Consultant
608.497.2326
Rick.Berry@navigant.com

www.navigant.com

Submitted to:

Nicor Gas Company
1844 Ferry Road
Naperville, IL 60563

Submitted by:

Navigant Consulting, Inc.
150 N. Riverside Plaza, Suite 2100
Chicago, IL 60606
Phone 312.583.5700
Fax 312.583.5701

Contact:

Randy Gunn, Managing Director
312.938.4242
randy.gunn@navigant.com

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

Laura Agapay-Read, Managing Consultant
312.583.4178
laura.agapay.read@navigant.com

Acknowledgements

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

Figures

Tables

E. EXECUTIVE SUMMARY

This report presents a summary of the findings and results from the impact and process evaluation of gas program year 5 (GPY5) of the Nicor Gas Business Custom Incentive Program (Custom Program). The Custom Program is targeted to commercial and industrial customers of Nicor Gas. The program provides these customers with rebate incentives for the installation of cost-effective natural gas-related energy improvements that are not specified for a prescriptive rebate under the Nicor Gas Business Energy Efficiency Rebate program. The Custom Program relies on wholesale and retail trade allies to assist in the program marketing. The Custom Program also provides custom assessments and engineering studies to assist customers in understanding their efficiency opportunities by identifying potential projects, quantifying the estimated project costs, energy savings, forecasted incentives, and payback periods.

Nicor Gas' Energy Efficiency Plan (EEP) for GPY4 through GPY6 transitioned to the energySMART brand for implementation. Integration of the energySMART brand seeks to deliver consistent and targeted messaging using market data, and encouraged cross-promotion between offerings to ensure that each customer interaction delivers a recognized and relevant call-to-action at any point on their energy efficiency application. As an example of this strategy, the Custom Program offered Retro-Commissioning (RCx) through a purchase agreement with ComEd and Nexant, and the Strategic Energy Management (SEM) tracks. The RCx and SEM tracks presented participants the opportunity to optimize process operations and building efficiency by providing them with technical advice and financial incentives to perform low-cost tune-ups and adjustments. Evaluation results for the RCx and SEM component of the Custom Program were reported separately in the Nicor Gas and ComEd joint implementation of the RCx and SEM Programs.[1],[2] This evaluation report covers only the program savings realized from the custom measure component of the Custom Program. When this report refers to the "Custom Program" impacts, Navigant is excluding RCx and SEM savings. For comparison purposes, the GPY5 gross ex ante savings for the various tracks were Custom-83 percent, RCx-7 percent, and SEM-10 percent. Navigant has provided the combined Custom, RCx and SEM savings in Appendix 7.1 for reference.

The GPY5 impact evaluation approach for the Custom Program involved on-site measurement and verification (M&V) and engineering desk reviews on a random sample of completed projects. This includes real time Parallel Path reviews of a sample of projects, and applying the necessary research to verify the reported savings. Navigant verified the GPY5 program net savings based on the 0.73 Net-to-Gross (NTG) ratio approved by Illinois Energy Efficiency Stakeholder Advisory Group (SAG) consensus. The GPY5 evaluation included participant free ridership and spillover research, participating trade ally spillover research, monthly meetings with the program manager and the implementation contractor staff to discuss program performance, findings from real-time Parallel Path gross impact evaluation engineering project reviews, and review of the tracking system. The Custom Program was implemented in GPY5 by CLEAResult.

[1] ComEd Nicor SEM EPY8 GPY5 Evaluation Report 2016-10-01
[2] EPY8-GPY5 RCx Evaluation Report 2017-02-13 Final

E.1. Program Savings

Table E-1 summarizes the natural gas savings from custom projects in the Custom Program. The Custom Program achieved a verified net savings of 2,474,063 therms in GPY5.

Table E-1. GPY5 Custom Program Results

Program	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTGR†	Verified Net Savings (Therms)
Custom GPY5	3,471,518	2,534,208	0.98	3,389,128	0.73	2,474,063

Source: Utility tracking data and Navigant analysis.
* Based on evaluation research findings, rounded to two digits.
† Source:
http://ilsagfiles.org/SAG_files/NTG/2016_NTG_Meetings/Final_Documents/Nicor_Gas_NTG_Summary_GPY1-6_2016-02-29_Final.pdf

Table E-2 summarizes the program verified savings by project strata, based on gross energy savings boundaries that placed about one-third of program-total savings into each stratum. Overall, the Custom Program achieved a verified gross realization rate of 0.98, estimated at ± 6.5 percent relative precision at 90 percent confidence level.

Table E-2. GPY5 Custom Program Results by Savings Strata

Savings Strata	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate‡	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
1	1,238,678	1.04	1,293,854	0.73	944,513
2	1,121,971	0.76	856,223	0.73	625,043
3	1,110,869	1.12	1,239,050	0.73	904,507
Total	**3,471,518**	**0.98**	**3,389,128**	**0.73**	**2,474,063**

Source: Utility tracking data and Navigant analysis.

E.2. Impact Estimate Parameters for Future Use

The GPY5 evaluation conducted research on net-to-gross values for approval by the SAG. Table E-3 shows the recommended NTG parameters. The SAG has deemed the NTG parameters, effective January 1st, 2018, for application to the GPY7 Custom Program.

Table E-3. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source	Deemed or Evaluated?
Free Ridership	0.21	SAG Document	Deemed for GPY7
Participant Spillover	0.00	SAG Document	Deemed for GPY7
Trade Ally Spillover	0.00	SAG Document	Deemed for GPY7
Net to Gross Ratio	0.79	SAG Document	Deemed for GPY7

Source: Navigant analysis.
http://ilsagfiles.org/SAG_files/NTG/2017_NTG_Meetings/Final/Nicor_Gas_NTG_Summary_GPY1-7_2017-03-01_Final.pdf

E.3. Participation Information

Table E-4 provides an overview of GPY5 participation. The Custom Program implemented 55 custom projects from 49 participants. The GPY5 program measures varied and comprised 30 measure types, with a majority of the savings derived from boiler and burner replacements and upgrades, regenerative thermo-oxidizer (RTOs) replacement projects, refractory flares, furnace pre-heat systems, heat exchange systems, controls, heat treatment equipment, and insulation.

Table E-4. GPY5 Primary Participation Detail

Participation	Program Total
Participants[3]	49
Completed Projects[4]	55
Installed Measure Types	30

Source: Program tracking data and Navigant analysis.

E.4. Finding and Recommendations

This section summarizes the key findings and recommendations.

Program Savings Achievement

Finding 1. Navigant verified the GPY5 Custom Program achieved 2,474,063 net therms savings from custom projects. If the above custom results are combined with verified net savings of 293,672 therms from the RCx component and 484,769 therms from SEM, a total of 3,252,504

[3] Participants are defined based on the number of business accounts or names reported in the tracking system.
[4] Projects are defined based on the unique applications submitted by customers through the GPY5 program.

net therms are verified for the Custom Program. This total verified savings was 182 percent of the net savings target of 1,783,479 therms.[5]

Gross Realization Rates

Finding 2. Navigant randomly sampled 15 custom projects for custom savings verification through engineering file review, with on-site M&V for five of the 15 projects. Of the 15 projects, eight had a 100 percent verified gross realization rate, three projects had a realization rate above 100 percent, and the other four projects had savings adjusted downward with realization rates below 100 percent. The overall verified gross realization rate is 98 percent, after weighting the sample realization rates to the population of 55 custom projects. The results produced 3,389,128 therms verified gross savings, compared to the ex ante estimate of 3,471,518 therms.

Finding 3. Two Parallel Path projects involved the same customer and the same equipment, and occurred over approximately the same time period. CLEAResult assumed a 5 percent adjustment factor in the ex ante savings for project NG05-103 but not in project NG05-044, despite involving the same equipment in both projects. After review, Navigant applied the adjustment factor to both projects in the ex post estimates. Additionally, NG05-103 used only one day of equipment metering data when additional data was available as part of NG05-044. After updating the adjustment factors and including additional usage data, project NG05-044 had a 95 percent gross realization rate, and NG05-103 had a 118 percent gross realization rate.

Recommendation 1. Nicor Gas should ensure assumptions are consistent within all projects for a given customer. Additionally, Nicor Gas should take advantage of opportunities to leverage site information, such as additional metering data, between such projects to create stronger input assumptions and savings estimates.

Finding 4. Two projects, NG05-103 and NG05-022, did not normalize the gas usage by production quantity and instead relied on estimated factors (e.g., load factors). In both cases, some form of production data was available and included in the project documentation. Navigant's adjustment of the calculations based on energy per product ("therms/feed rate" and "therms/lb.") increased the projects' gross realization rates above 100 percent.

Finding 5. One project (NG04-126) used a production-normalized approach for calculating savings but was based on one week of production data. Navigant found the quantity of production data insufficient and requested additional pre-and post-installation data. Navigant performed a regression analysis on the updated production data and the project received a realization rate of 62 percent. The additional data showed that ex ante savings underestimated the baseline therms/lb. value and overestimated the efficient therms/lb. value, resulting in a gross realization rate of 62 percent.

Recommendation 2. Projects involving production equipment should be normalized by production quantities when participants can provide production data that is representative of pre- and post-retrofit conditions. This approach avoids the need to estimate factors such as operating hours,

[5] Nicor Gas Energy Efficiency Plan, June 2014 - May 2017 (Revised Plan Filed Pursuant to Order Docket No. 13-0549). The combined verified savings is shown here for comparison purpose only. The EE plan net savings target of 1,783,479 therms is a combined value for the Custom, RCx, and SEM components. The plan does not specify how much of this savings target is expected from the custom component which is the subject of this report.

production days and load factors. Additionally, this approach allows the production quantity to be held constant in both baseline and efficient case estimations, which prevents unjustly penalizing or rewarding projects for changes in production rates. Production data should cover a time period that is sufficient to provide high confidence that anomalies do not significantly affect the savings estimate.

Finding 6. Navigant verified that one of the five Parallel Path projects had a 56 percent realization rate due to improving a calculation approach. The calculation was determining an average ("therms/ton") by taking the simple average of monthly averages rather than the sum of the numerator divided by the sum of the denominator (i.e., a weighted average). The updated approach minimizes the potential effects of anomalous months with low usage and emphasizes months with high usage.

Recommendation 3. Nicor Gas should calculate weighted averages using the total population of data. If there is a need to deviate from this approach, justification should be provided in the project documentation. Navigant will reevaluate the parallel path review process and update its protocols to ensure that any errors are captured during the review stages to prevent future any surprises during reporting.

Program Participation

Finding 7. The GPY5 Custom Program implemented 55 projects from 49 participants, who installed 30 types of custom measures. Compared with GPY4, the Custom Program had lower project participation in GPY5 relative to the annual goal (91 projects for GPY5). One of the primary reasons the Custom Program did not achieve its GPY5 participation target is that not all projects accepted for GPY5 were installed and operational by the May 31st deadline. Those projects were carried-over into GPY6, similar to results seen in prior years as projects under this program tend to be longer-term in nature and require customer commitment for start-up and completion. It should be noted that, although the program did not meet its participation target, it did exceed its savings target, achieving 182 percent of the net savings target.

Process Results

Finding 8. Participants were satisfied with the program, with an average satisfaction rating over nine on a scale of 0-10, and two thirds of the surveyed participants rating the program at either a nine or ten. The ease of applying to the program received an average rating of 8.27, with thirty six percent offering a nine or ten rating.

Finding 9. On the same 0-10 scale, trade ally satisfaction with the program-in-general averaged 7.25. TAs were particularly satisfied with the assistance they received from the program and the impact of the program on their business. During the interviews, concerns were offered about the extended application process, including paperwork; engineering reviews; and delays in approving applications.

Finding 10. TAs and affected customers were dissatisfied when approved rebates were reduced following installation.

Nicor Gas should consider Recommendations 4 and 5 drawn from TA interviews:

Recommendation 4. One TA recommended that when possible, a return on investment (ROI) could be incorporated into the application process to provide additional insight into life cycle costs.

Recommendation 5. A TA recommended that as elements of the Custom Program become standardized, including controls and economizers, the IC should consider providing a prescriptive calculator/approach to increase the efficiency of the application process. The IC should also consider submitting workpapers to the TRM update process.

Recommendation 6. TA concerns with the length of time to process applications may be an issue of managing expectations and communicating typical timelines when a trade ally is a new or infrequent participant in the program.

Finding 11. Some TAs become frustrated when they recommend an Assessment in the course of selling a capital-intensive project, only to discover that the assessment they recommended suggests delaying the project under consideration. Another TA reported that some potential clients apparently cancelled jobs after receiving their Assessment Report. A Navigant review of available Reports showed that some recommended project implementation schedules are structured to commence with low capital and high interactive effect projects to generate savings applicable to future projects with higher capital requirements. One Assessment Report, for example, recommended a two-phase implementation schedule, with the simple payback for Phase One at 1.0 years, and Phase Two at 9.4 years.

1. PROGRAM DESCRIPTION

The Custom Program is targeted to commercial and industrial customers of Nicor Gas. It provides these customers with rebate incentives for the installation of cost-effective natural gas-related energy efficiency improvements that are not specified for a prescriptive rebate under the Nicor Gas Business Energy Efficiency Rebate program. The Custom Program provides custom audits and engineering studies to assist customers in understanding their efficiency opportunities by quantifying the estimated project costs, energy savings, and forecasted incentives. The program targets large commercial and industrial customers with more complex facilities that will benefit most from a custom offering during new equipment purchases, facility modernization and industrial process improvements. The Custom Program was implemented in GPY5 by CLEAResult.

Nicor Gas' Energy Efficiency Plan (EEP) for GPY4 through GPY6 transitioned to the energySMART brand for implementation. Integration of the energySMART brand seeks to deliver consistent and targeted messaging using market data, and encouraged cross-promotion between offerings to ensure that each customer interaction delivers a recognized and relevant call-to-action at any point on their energy efficiency application.[6] As an example of this strategy, the Custom Program offered Retro-Commissioning (RCx) and the Strategic Energy Management (SEM) tracks. The RCx and SEM tracks presented participants the opportunity to optimize process operations and building efficiency by providing them with technical advice and financial incentives to perform low-cost tune-ups and adjustments. Evaluation results for the RCx and SEM component of the Custom Program were reported separately in the Nicor Gas and ComEd joint implementation of the RCx and SEM Programs.[7],[8] This evaluation report covers only the evaluation of the program savings realized from the custom measure component of the Custom Program. Navigant has provided the combined Custom, RCx and SEM savings in Appendix 7.1 for reference.

The Custom Program staff work with both trade allies and decision-makers at facilities over 60,000 therms to identify and quantify efficiency opportunities at their facilities. Interested customers must first submit a letter of interest and a pre-approval application to the program. The initial application includes usage history and detailed calculations and specifications for the project. Program staff review the customer's initial reported savings and screen projects using an internal cost-benefit test. The Custom Program requires that a project's initial application be pre-approved prior to the start of the project. Prior to issuing an approval notice, pre-installation inspections are performed on selected projects, especially for complex and high impact measures.

1.1 Evaluation Objectives

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

[6] Nicor Gas Energy Efficiency Plan, June 2014 - May 2017 (Revised Plan Filed Pursuant to Order Docket No. 13-0549)
[7] ComEd Nicor SEM EPY8 GPY5 Evaluation Report 2016-10-01
[8] EPY8-GPY5 RCx Evaluation Report 2017-02-13 Final

Impact Research:

1. What are the program's verified gross savings, using field measurement and verification (M&V) and engineering research to estimate savings?
2. What are the program's verified net savings?
3. What are the results and findings from field data collection?

Process Research:

1. Effectiveness of programs delivery
2. Trade ally and customer satisfaction with the program and its major components
3. Opportunities for programs improvement

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 file reviews and on-site M&V, telephone surveys with participating customers, and trade ally interviews. The primary data collection activities are shown in the following table.

Table 2-1. Data Collection Activities

What	Who	Target Completes	Completes Achieved	When	Comments
In Depth Interviews	PM/IC	2	2	Sept - Dec 2016	Interview program staff and IC staff
Engineering File Reviews	GPY5 Projects	15	15	Dec 2016 – March 2017	Data collection supporting gross impact study
On-site M&V	GPY5 Projects	5	5	Dec 2016 – March 2017	These were a subset of the 15 engineering file reviews. Data collection supporting gross impact study
Telephone Interviews	Trade Allies	10	7	Dec 2016 – February 2017	Process and NTG research
Telephone Survey	Participating Customers	20	14*	Wave 1: January 2016 to May 2016 Wave 2: Dec 2016 to February 2017	Process and NTG research

Source: Navigant analysis
* Navigant completed 14 interviews in two waves. In the first wave, Navigant interviewed 11 respondents who answered free ridership and process questions. The second wave included follow-up interviews with three of the wave one respondents for spillover questions, plus interviews with three additional respondents who answered free ridership, spillover and process questions.[9] Navigant attempted contact with all GPY5 Custom Program participants to reach the target of 20 interviews.

[9] Overall 18 interviews were completed, but Navigant found four of the respondents were participants in the Strategic Energy Management (SEM) Program, and they were excluded from the Custom Program NTG and process analysis.

2.2 Verified Savings Parameters

2.2.1 Verified Gross Program Savings Analysis Approach

Navigant conducted on-site measurement and verification (M&V) and engineering project file reviews on a random sample of projects to determine eligibility and verify the Custom Programs' gross savings and gross realization rates. Navigant sampled a total of 15 custom projects targeting a 90/10 level of confidence and relative precision for program-level verified savings from the program tracking database population of 55 paid projects. The sample included all five Parallel Path projects completed in GPY5.

The primary goal of the Parallel Path approach is to minimize risk and uncertainty regarding the assumed energy savings values for some of the largest projects or projects with unique baselines, such as early replacement, in the Custom Program through real time feedback and assessment. Obtaining project realization rate information prior to issuing the formal project pre-approval notice allows the implementation contractor to decide to not proceed – or come up with an alternative plan – for projects identified as high risks to the Custom Program's therm savings goals during the Parallel Path review process. This process reduces the risk to the Program and allows for faster evaluation of selected Custom Program projects.

Projects were stratified at the tracking record level using the population gross therms savings determined from program tracking data. Strata were defined by project size, based on gross energy savings boundaries that placed about one-third of program-level savings into each stratum. Stratum 1 consisted of large projects with project-level ex ante savings greater than 500,000 therms, stratum 3 consisted of small projects with ex ante gross energy savings less than 73,000 therms, and stratum 2 consisted of the medium sized projects in between. Strata size are contingent on the distribution of therms savings of the program population and may vary by program year. Table 2-2 shows a profile of the sample selection.

Table 2-2. Profile of GPY5 Gross Impact Sample by Strata

	Population Summary				Sample Summary		
Program	Sampling Strata	Number of Projects (N)	Ex Ante Gross Savings (Therms)	Therms Weights	n	Ex Ante Therms	Sampled % of Population (% therms)
Custom Program	1	2	1,238,678	0.36	2	1,238,678	100%
	2	9	1,121,971	0.32	6	881,769	79%
	3	44	1,110,869	0.32	7	291,685	26%
TOTAL		**55**	**3,471,518**	**1.00**	**15**	**2,412,132**	**69%**

Source: Navigant analysis

The evaluation team completed engineering file reviews on the 15 Custom Program projects sampled and conducted on-site visits at five of the 15 sampled projects. The total sample accounts for 69 percent of the ex ante gross savings from the GPY5 population. Evaluation completed desk file reviews for the two sampled Parallel Path projects. The evaluation team collaborated with the program implementation contractor through emails and telephone conversations where clarifications were needed to verify the savings input assumptions of the sampled projects, including collection of trend and billing data to

develop independent gross estimates of energy savings or update or replace the calculation procedures that were submitted as part of the final application. The evaluation team prepared detailed, site-specific impact evaluation reports for each on-site visit and documented research findings and revisions to program claimed savings.

The evaluation team extrapolated the estimated measure-level and project-level realization rates to the program population, using a ratio estimation method to yield evaluation-adjusted verified gross energy savings.

2.2.2 Verified Net Program Savings Analysis Approach

Navigant calculated the verified net energy savings by multiplying the verified gross savings estimates by the NTGR approved through the Illinois Stakeholder Advisory Group (SAG) consensus process.[10]

Table 2-3. Net-to-Gross Ratio for the GPY5 Custom Program

Program Path	GPY5 Deemed NTG Value	NTGR Source
Custom Program, Custom Projects	0.73	IL-SAG

Source: Documents available on the Illinois Energy Efficiency Stakeholder Advisory Group web site:www.ilsag.info.

2.3 Process Evaluation and Other Research

Navigant conducted monthly meetings with key Nicor Gas and implementation staff to discuss the status of the program, any issues faced by the program staff, and program evaluation activities. In addition to the monthly program meetings, the evaluation team also conducted professional interviews with participating customers in two waves, and one wave with trade allies, to collect process research and NTG data.

Process research addressed the following topics:

1. Effectiveness of program delivery
2. Customer satisfaction with the programs and major program components
3. Opportunities for program improvement

The evaluation team completed NTG and process interviews with 14 Custom Program participants from a sample of 55 participants. The evaluation team also completed spillover and process interviews with seven TAs from a population of 46, plus two partial interviews, representing sixteen percent of the gross claimed savings.

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

3. GROSS IMPACT EVALUATION

This section presents the Custom Program gross impact evaluation results, including a tracking system review. Overall, the Custom Program achieved 3,389,128 therms verified gross savings, representing a gross realization rate of 0.98.

3.1 Tracking System Review

Navigant reviewed the GPY5 tracking data and compared input fields with sample project files downloaded from Nicor Gas Evaluation SharePoint to verify the completeness and accuracy of the tracking data and identify any issues that would affect the impact and process evaluation of the program. We concluded that overall, the tracking system gathered the necessary data for GPY5 evaluation and program performance monitoring.

3.2 Program Volumetric Findings

The GPY5 Custom Program implemented 55 projects from 49 participants. The program measures varied and comprised of 30 measure types, with most of the savings derived from industrial furnace pre-heat systems, burner replacements and upgrades, regenerative thermo-oxidizer (RTOs) replacement projects, refractory flares, heat exchange systems, controls, heat treatment equipment, and insulation. The GPY5 volumetric findings are summarized in Table 3-1.

Table 3-1. GPY5 Custom Program Volumetric Findings Detail

Participation	Program Total
Participants	49
Completed Projects	55
Measure Types	30

Source: Program tracking data and Navigant analysis.

3.3 Gross Program Impact Parameter Estimates

Navigant determined the project-level verified savings from the results of the on-site M&V and engineering project file reviews for the sampled projects as the verified gross savings. The program verified gross realization rate was determined by calculating the ratio of the verified gross savings to the reported ex ante gross savings. Results by project are summarized in Table 3-2.

Table 3-2. GPY5 Summary of Sample M&V Results

Project ID	Measure Description	Gross Realization Rate	Summary of Adjustment
NG05-044	Heat Exchangers - Phase II	95%	The adjustment factor from related project (NG05-103) was applied to this project.
NG05-103	Refractory Flare	118%	The calculation was normalized for production quantities.
NG04-126	Furnace Rebuild	62%	Billing/regression analysis produced lower savings from actual.
NG05-081	Burner Retrofit	100%	Savings verified as accurate
NG05-080	Oven Replacement	100%	Savings verified as accurate
NG03-009	RTO	56%	The calculation approach of (therm/ton value) was corrected and savings updated.
NG04-063	Direct Fired Units	88%	Weather station was updated to closest available.
NG05-068	Boiler Economizer	100%	Savings verified as accurate
NG04-104	Parallel positioning controls & RO	100%	Savings verified as accurate
NG05-070	Exhaust Fan Timer	100%	Savings verified as accurate
NG05-022	Dryer tune-ups	150%	The calculation was normalized for production quantities.
NG05-008	HVAC and Controls	115%	Billing/regression analysis produced higher savings from actual.
NG05-064	DHW Boilers	100%	Savings verified as accurate
NG03-085	Boiler draft controls	100%	Savings verified as accurate
NG05-042	Heat Recovery	100%	Savings verified as accurate

Source: Program tracking data and Navigant analysis

Out of the 15 M&V sampled projects, eight had 100 percent realization rates with minor or no adjustment to the ex ante savings. Three projects had their ex ante savings adjusted upwards after evaluation verification with gross realization rates between 115 percent and 150 percent. For these projects the adjustments were primarily due to using trend data or weather-normalized billing analysis TMY3 data, normalization of production quantities, or due to site specific measurement to accurately reflect the actual site operation. Four other projects had their ex ante savings adjusted below 100 percent down to a low of 56 percent (including two parallel path projects), due to billing analysis or weather correlation of therms usage using regression analysis, or correction of savings calculation inputs.

For the five Parallel Path projects in the sample, three had gross realization rates of 100 percent or higher, and two had realization rate below 100 percent. Parallel Path projects NG05-044 and NG05-103

involved the same customer and the same equipment, and occurred over approximately the same time period. CLEAResult assumed a 5 percent adjustment factor in the savings calculation for NG05-103 but not in NG05-044, despite involving the same equipment in both projects. Navigant applied this adjustment factor to both projects in the ex post estimates. Additionally, the NG05-103 ex ante savings estimate used only one day of equipment metering data when additional data was available as part of project NG05-044. After Navigant updated the adjustment factors and included additional usage data, project NG05-044 had a 95 percent gross realization rate and NG05-103 had a 118 percent gross realization rate.

Projects NG05-103 and NG05-022 did not normalize the gas usage by production quantity and instead relied on estimated factors (e.g., load factors). In both cases, some form of production data was available and included in the project documentation. The result of adjusting the calculations to be based on energy per product ("therms/feed rate" in NG05-103 and "therms/lb." in NG05-022), was an increase in the gross realization rates, 118 percent for NG05-103, and 150 percent for NG05-022.

One project (NG04-126) used a production-normalized approach for calculating savings but was based on one week of production data. Navigant found the quantity of production data insufficient and requested additional pre-and post-installation data. The additional data showed that ex ante savings underestimated the baseline therms/lb. value and overestimated the efficient therms/lb. value. A regression analysis was performed on the updated production data and the project received a realization rate of 62 percent.

Navigant verified project NG03-009 had a 56 percent realization rate due to updating a calculation approach. The calculation was determining an average ("therms/ton") by taking the simple average of monthly averages rather than the sum of the numerator divided by the sum of the denominator (i.e., the weighted average). The updated approach minimizes the potential effects of anomalous months with low usage and emphasizes months with high usage.

3.4 Development of the Verified Gross Realization Rate

Navigant determined the verified gross realization rates by comparing the ex ante gross savings with the verified gross savings. Weighted realization rates by strata were calculated for the Custom Program. Results are detailed in Table 3-3.

Table 3-3. Gross Impact Realization Rate Results for Custom Program

Program	Sample Strata	Sample-Based Ex Ante Gross Savings (Therms)	Sample-Based Verified Gross Realization Rate	Sample-Based Verified Gross Savings (Therms)
Custom	1	1,238,678	1.04	1,293,854
	2	881,769	0.76	672,915
	3	291,685	1.12	325,342
Custom Total		2,412,132	0.98	2,292,111
Overall Confidence Interval and Relative Precision (90/10) on RR			**6.5%**	

Source: Navigant analysis

3.5 Verified Gross Program Impact Results

Navigant applied the sample strata verified gross realization rates to the population strata to achieve the program-level verified gross savings. As shown in Table 3-4 below, the evaluation research adjustments resulted in verified gross energy savings of 3,389,128 therms for the Nicor Gas Custom Program. This reflects the therm-weighted verified gross realization rate of 0.98 at ± 6.5 percent relative precision at 90 percent confidence level. The detailed calculations and discussion are presented in Appendix 7.1.

Table 3-4. Custom Program GPY5 Verified Gross Impact Savings Estimates

Program Delivery	Sample	Energy Savings (Therms)	90/10 Significance?	Rel. Precision at 90% Confidence Level
Ex Ante Gross Savings		3,471,518		
Verified Gross Realization Rate	15	0.98	Yes	± 6.5%
Verified Gross Savings		3,389,128		

Source: Program tracking data and Navigant analysis

4. NET IMPACT EVALUATION

Navigant calculated verified net energy savings by multiplying the verified gross savings estimates by a net-to-gross ratio. As noted in Section 2, Navigant used a deemed NTGR to calculate the net verified savings for the GPY5 Custom Program.

As presented in Table 4-1, the GPY5 Custom Program had verified net savings of 2,474,063 therms.

Table 4-1. GPY5 Custom Program Verified Net Savings

Program	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTGR*	Verified Net Savings (Therms)
Custom GPY5	3,471,518	2,534,208	0.98	3,389,128	0.73	2,474,063

Source: Utility tracking data and Navigant analysis
* Deemed value. Source:
http://ilsagfiles.org/SAG_files/NTG/2015_NTG_Meetings/Final_2015_Documents/Nicor_Gas_NTG_Summary_GPY1-5_2015-03-01_Final.pdf

Table 4-2 summarizes the program net savings by project strata.

Table 4-2. GPY5 Custom Program Savings by Project Savings Strata

Savings Strata	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate‡	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
1	1,238,678	1.04	1,293,854	0.73	944,513
2	1,121,971	0.76	856,223	0.73	625,043
3	1,110,869	1.12	1,239,050	0.73	904,507
Total	**3,471,518**	**0.98**	**3,389,128**	**0.73**	**2,474,063**

Source: Navigant analysis
‡ RRs are sample weighted therms realization rate values rounded to 2 digits. Direct application to the ex ante gross savings to get verified gross savings will produce rounding differences.

5. PROCESS EVALUATION

Navigant conducted monthly meetings with key Nicor Gas program managers and implementation staff to discuss the status of the program, any issues faced by the program staff, and evaluation activities. The evaluation team also conducted professional interviews with participating customers in two waves, and with trade allies (TAs) in one wave to collect process research and NTG data.

Process research addressed the following topics:

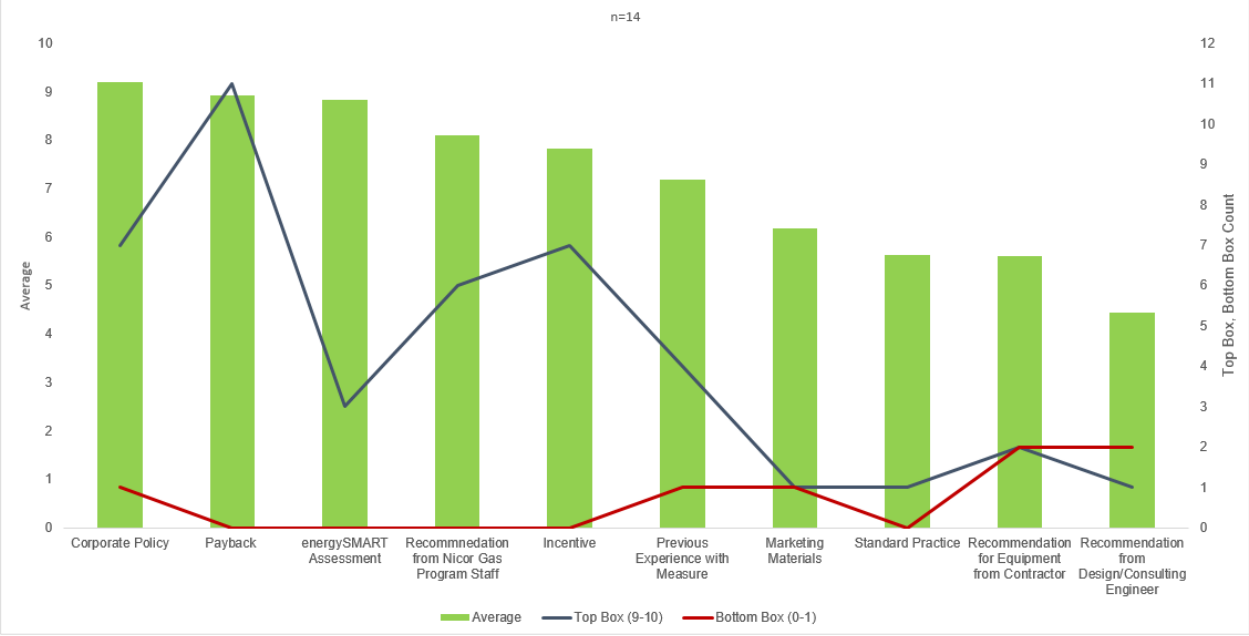
1. Effectiveness of program delivery
2. Customer satisfaction with the programs and major program components
3. Opportunities for program improvement

The evaluation team completed NTG and process interviews with 14 participants from a sample of 55 participants. The evaluation team also completed spillover and process research interviews with seven TAs from a population of 46, plus two partial interviews, representing sixteen percent of the gross claimed savings.

5.1 Program Delivery

The evaluation team asked participants what influenced their decision to participate in the program. While "Corporate Policy" enjoyed the highest average response, "Payback" had significantly more top box (ratings of 9 or 10 on a 0-10 scale) ratings than any other source of influence, as shown in Figure 5-1.

Figure 5-1. Influence on Customer Participation in Program



Source: Evaluation Analysis.

TAs confirm that customers are influenced by the rebate, as shown through the influence of quicker Payback and the Incentive. However, the rebate process had issues noted by the survey respondents. Delays in the application approval process were cited by two of the three TAs that offered reasons why customers do not apply for rebates. One TA cited operational issues for the customer, saying, "If I have a boiler that takes 26 weeks to make, [the customer] is not going to wait for [Nicor's] approval before moving forward. Because 26 weeks is half a year. So they need to get going now if they are planning on running that line next year. In the corporate world: January to January, everything has to be done in that fiscal year." Another TA explained why a project moved forward without applying to the program, saying, "I told them that I would need at least 30 days for preapproval, and that was the hindrance."

A TA offered an example of the operational challenge that the preapproval causes:

> *"When a customer decides to do a controls or a system upgrade, they may make the decision for the upgrade in a specific time frame -- they may have a planned shutdown, they have something scheduled for November and they want to hit that date. But the gas company says you can't cut a PO, you can't do anything until you have an approval letter from us. So, the amount of time it takes them to approve has been as quick as 7-10 days, and it's been 4 months. Every time it takes [Nicor] a long time to decide, the whole opportunity is completely gone because the install window is still November. If they are not approving it till three weeks before November, it is hard to get equipment that takes 4 months to make here by November."*

Post-installation reductions to the rebate adds an element of risk that, as a TA reported, "is like a moving target and accountants, or the guys in charge of the money, don't like moving targets. They like fixed numbers." According to TAs, too much leeway in testing protocols may be at fault in higher rebate approvals than rebate awards.

Addressing the broader question of why customers may not engage in energy efficiency projects, TAs reported a reluctance to launch projects based on "initial capital [requirements], or general resistance to construction, how much it affects occupants." Another TA reported that, "Energy efficiency projects are typically coupled to more than just efficiency. …whether it is increased capacity, better steam quality, lower maintenance costs, better pick up times, quicker turnarounds on shut downs, there are numerous different factors that can affect their equipment decisions."

One third of the interviewed TAs recommend Energy Assessments through the program, with one saying that they offer it at every sales call and another saying that the assessment offers credibility to the services they recommend. Those TAs who formerly recommended assessments through the program now offer an assessment of their own.

One TA reported customers being disappointed with the results of the program-based assessment, saying that it discouraged potential customers from participating in the program because the assessments focused on small savings items. The TA did not elaborate on how frequently this was observed and provided an anecdote of one customer, so we are uncertain whether the TA was generalizing from an isolated occurrence:

> *"Because they are such a large organization, it didn't matter to them that they were going to get $200 in savings annually if they changed out their aerators on a gas water heater. What matters to them is when they are saving thousands. So, the Energy Assessment wasn't impactful enough on their bottom line."*

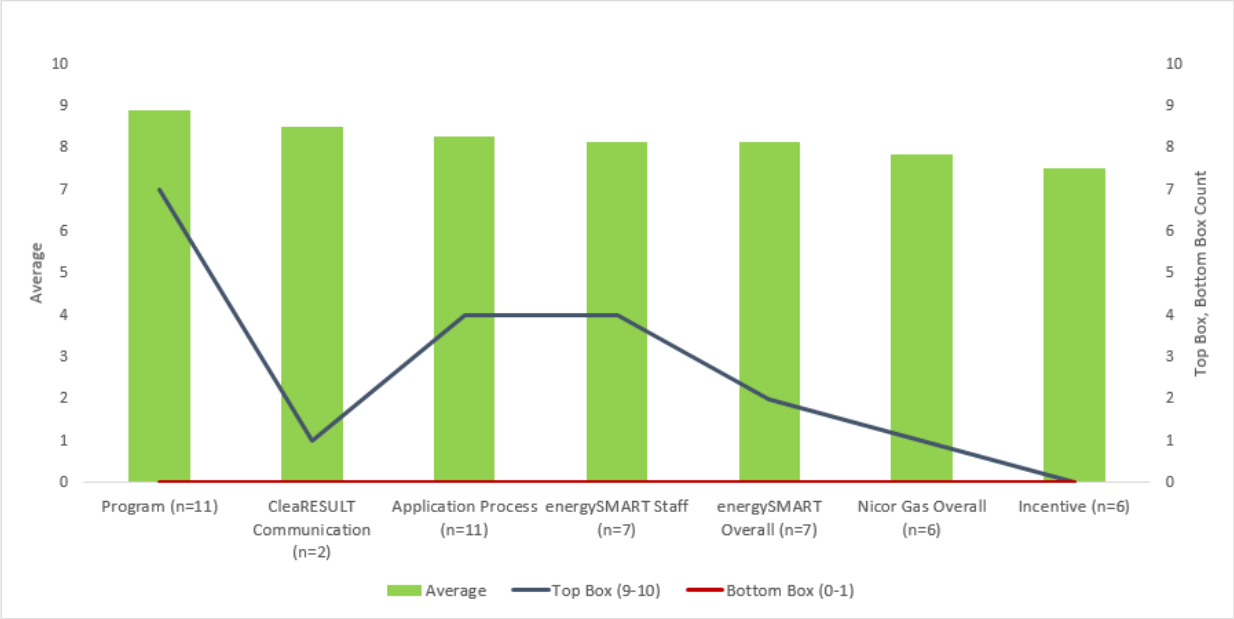
Another TA reported that some potential clients apparently cancelled jobs after receiving their Assessment Report. A Navigant review of available Reports showed that some recommended project implementation schedules are structured to commence with low capital and high interactive effect projects to generate savings applicable to future projects with higher capital requirements. One Assessment Report, for example, recommended a two-phase implementation schedule, with the simple payback for Phase One at 1.0 years, and Phase Two at 9.4 years.

Early Action Bonuses (EAB) are offered to encourage quick installation of specific measures by offering an additional 30 percent incentive for projects started within four months of receiving the Assessment Report. EABs in the above described Report were available for half the projects in Phase One ($2241 in EAB) and all the projects in Phase Two ($35,199 in EAB). If the installation schedule offered through the Assessment Report was followed, at least 94 percent of the EAB offered would be installed too late to qualify. TAs are frustrated when they recommend an Assessment in the course of selling a capital-intensive project, only to discover that the assessment they recommended suggests waiting on the project under consideration.

5.2 Program Satisfaction

The Navigant evaluation team asked participants about their satisfaction with various aspects of the programs, requesting that they rate their satisfaction on a scale of 0-10, where zero means “very dissatisfied” and ten means “very satisfied.” The results of this research are presented in Figure 5-2.

Figure 5-2. Participant Satisfaction with the Custom Offering



Source: Evaluation analysis.

The evaluation team asked participants who completed their own applications to rate the application process. On a scale of 0-10, the average among eleven participants was 8.3. The participants reported

that it was difficult to locate the required information. One participant stated that, "the application process was a hindrance, Nicor had all the information [so why do they] need us to still fill out an application."

The evaluation team also asked participants to rate their satisfaction with the incentive. As shown in Figure 5-2, the average response was 7.5. Two of the five respondents stated that the incentive was too low, and a third reported that they did not receive the amount they were initially told they would receive.

TAs rated their overall satisfaction at an average of 7.25 on the same 0-10 scale, with two Top Box scores and zero Bottom Box scores. The TAs explanation of their satisfaction fell into four categories, two positive (assistance from the program and impact on their business) and two negative (operations and adjusted rebates). TAs offered the following comments:

Assistance from the Program:

- *"They helped guide me through the whole application process. They are great to work with."*
- *"They are definitely responsive and they try to work really closely with us to have projects figured out and move them forward."*

Impact on Business:

- *"I've had good success with the custom incentive through Nicor."*

Operations:

- *"It tends to be a very extended process: the paperwork, the engineering review, to finally getting something to the customer, it just seems to take too long. But I am not sure that is Nicor, that might be whatever agency is running the program for them."*

Adjusted Rebates:

- *"This is a huge point of dissatisfaction. Nicor Gas tends to approve an application for the amount that you apply for, and when they do the retroactive M&V, what has happened on every application that I've put in, is that they then they change your approval amount. Then you go back to your client and you say this is going to cost you more, sorry about that."*

5.3 Recommended Improvements to the Program

TAs offered several recommendations to improve the program, centered around the process, standardization, and structure.

Process, Application through Invoice:

- Streamline application process and paperwork
- Incorporate a true return on investment (ROI) to the application process that addresses life cycle costs and other industrial and heavy commercial concerns
- Reduce the approval process to less than a week or, "allow projects to move forward without a letter from them, [with the assumption] that we are getting a rebate"
- Include detailed customer information, such as company name and address, on request letters, rather than a reference number

Standardization:

- Standardize testing protocols and parameters to reduce different interpretations of projected savings and improve consistency between the pre- and post- rebate amount to "lock down a [rebate amount] that doesn't change afterwards … or split the difference"
- Use a standard calculator to simplify calculations for building automation
- Elements of the Custom Program become prescriptive, including controls, such as the parallel positioning controls, and economizers, and the creation of a standard calculator for building automation.

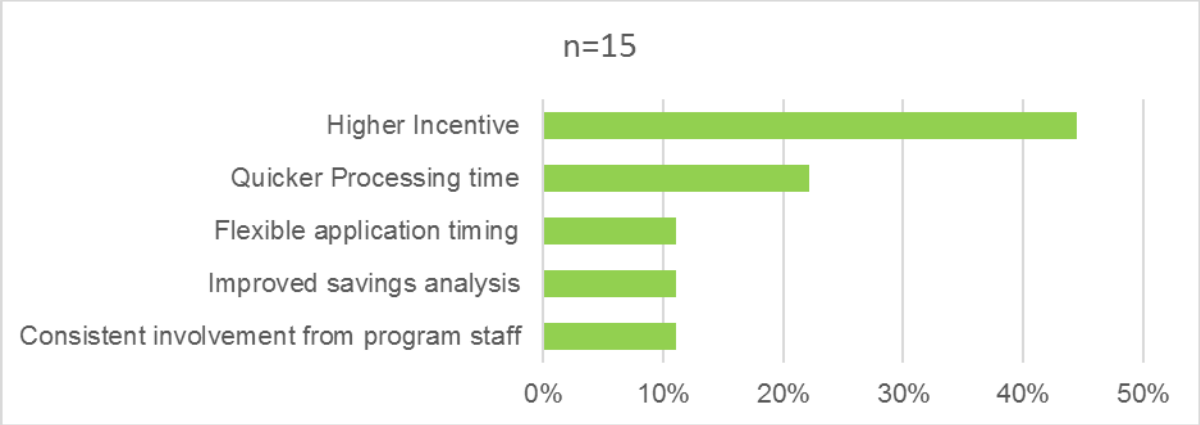
Program structure:

- Offer a joint program with the electric utilities, ComEd and Ameren

Participants' recommendations to improve the program centered on increasing incentives, as shown in Figure 5-3. Two recommendations mirrored those from the TAs:

- Improve consistency between the pre- and post-rebate amount
  "Continued involvement from the person who did the analysis, having the same Nicor Gas person who made the recommendation be part of the approval process to maintain consistency."
- Speed the application process and/or permit equipment orders prior to incentive application approval
  "The utility wants the application before you've made many decisions. The company needs to make money, and needs to make decisions quicker than the utility. There was additional equipment that could have been included, but the timing didn't work and we needed to upgrade ASAP. The program requires that the incentive be applied for and approved before any order is placed."

Figure 5-3. Participant Recommendations to Improve the Program



Source: Evaluation analysis.

6. FINDINGS AND RECOMMENDATIONS

This section summarizes the key findings and recommendations.

Program Savings Achievement

Finding 1. Navigant verified the GPY5 Custom Program achieved 2,474,063 net therms savings from custom projects. If the above custom results are combined with verified net savings of 293,672 therms from the RCx component and 484,769 therms from SEM, a total of 3,252,504 net therms are verified for the Custom Program. This total verified savings was 182 percent of the net savings target of 1,783,479 therms.[11]

Gross Realization Rates

Finding 2. Navigant randomly sampled 15 custom projects for custom savings verification through engineering file review, with on-site M&V for five of the 15 projects. Of the 15 projects, eight had a 100 percent verified gross realization rate, three projects had a realization rate above 100 percent, and the other four projects had savings adjusted downward with realization rates below 100 percent. The overall verified gross realization rate is 98 percent, after weighting the sample realization rates to the population of 55 custom projects. The results produced 3,389,128 therms verified gross savings, compared to the ex ante estimate of 3,471,518 therms.

Finding 3. Two Parallel Path projects involved the same customer and the same equipment, and occurred over approximately the same time period. CLEAResult assumed a 5 percent adjustment factor in the ex ante savings for project NG05-103 but not in project NG05-044, despite involving the same equipment in both projects. After review, Navigant applied the adjustment factor to both projects in the ex post estimates. Additionally, NG05-103 used only one day of equipment metering data when additional data was available as part of NG05-044. After updating the adjustment factors and including additional usage data, project NG05-044 had a 95 percent gross realization rate, and NG05-103 had a 118 percent gross realization rate.

Recommendation 1. Nicor Gas should ensure assumptions are consistent within all projects for a given customer. Additionally, Nicor Gas should take advantage of opportunities to leverage site information, such as additional metering data, between such projects to create stronger input assumptions and savings estimates.

Finding 4. Two projects, NG05-103 and NG05-022, did not normalize the gas usage by production quantity and instead relied on estimated factors (e.g., load factors). In both cases, some form of production data was available and included in the project documentation. Navigant's adjustment of the calculations based on energy per product ("therms/feed rate" and "therms/lb.") increased the projects' gross realization rates above 100 percent.

[11] Nicor Gas Energy Efficiency Plan, June 2014 - May 2017 (Revised Plan Filed Pursuant to Order Docket No. 13-0549). The combined verified savings is shown here for comparison purpose only. The EE plan net savings target of 1,783,479 therms is a combined value for the Custom, RCx, and SEM components. The plan does not specify how much of this savings target is expected from the custom component which is the subject of this report.

Finding 5. One project (NG04-126) used a production-normalized approach for calculating savings but was based on one week of production data. Navigant found the quantity of production data insufficient and requested additional pre-and post-installation data. Navigant performed a regression analysis on the updated production data and the project received a realization rate of 62 percent. The additional data showed that ex ante savings underestimated the baseline therms/lb. value and overestimated the efficient therms/lb. value, resulting in a gross realization rate of 62 percent.

Recommendation 2. Projects involving production equipment should be normalized by production quantities when participants can provide production data that is representative of pre- and post-retrofit conditions. This approach avoids the need to estimate factors such as operating hours, production days and load factors. Additionally, this approach allows the production quantity to be held constant in both baseline and efficient case estimations, which prevents unjustly penalizing or rewarding projects for changes in production rates. Production data should cover a time period that is sufficient to provide high confidence that anomalies do not significantly affect the savings estimate.

Finding 6. Navigant verified that one of the five Parallel Path projects had a 56 percent realization rate due to improving a calculation approach. The calculation was determining an average ("therms/ton") by taking the simple average of monthly averages rather than the sum of the numerator divided by the sum of the denominator (i.e., a weighted average). The updated approach minimizes the potential effects of anomalous months with low usage and emphasizes months with high usage.

Recommendation 3. Nicor Gas should calculate weighted averages using the total population of data. If there is a need to deviate from this approach, justification should be provided in the project documentation. Navigant will reevaluate the parallel path review process and update its protocols to ensure that any errors are captured during the review stages to prevent future any surprises during reporting.

Program Participation

Finding 7. The GPY5 Custom Program implemented 55 projects from 49 participants, who installed 30 types of custom measures. Compared with GPY4, the Custom Program had lower project participation in GPY5 relative to the annual goal (91 projects for GPY5). One of the primary reasons the Custom Program did not achieve its GPY5 participation target is that not all projects accepted for GPY5 were installed and operational by the May 31st deadline. Those projects were carried-over into GPY6, similar to results seen in prior years as projects under this program tend to be longer-term in nature and require customer commitment for start-up and completion. It should be noted that, although the program did not meet its participation target, it did exceed its savings target, achieving 182 percent of the net savings target.

Process Results

Finding 8. Participants were satisfied with the program, with an average satisfaction rating over nine on a scale of 0-10, and two thirds of the surveyed participants rating the program at either a nine or ten. The ease of applying to the program received an average rating of 8.27, with thirty six percent offering a nine or ten rating.

Finding 9. On the same 0-10 scale, trade ally satisfaction with the program-in-general averaged 7.25. TAs were particularly satisfied with the assistance they received from the program and

the impact of the program on their business. During the interviews, concerns were offered about the extended application process, including paperwork; engineering reviews; and delays in approving applications.

Finding 10. TAs and affected customers were dissatisfied when approved rebates were reduced following installation.

Nicor Gas should consider Recommendations 4 and 5 drawn from TA interviews:

Recommendation 4. One TA recommended that when possible, a return on investment (ROI) could be incorporated into the application process to provide additional insight into life cycle costs.

Recommendation 5. A TA recommended that as elements of the Custom Program become standardized, including controls and economizers, the IC should consider providing a prescriptive calculator/approach to increase the efficiency of the application process. The IC should also consider submitting workpapers to the TRM update process.

Recommendation 6. TA concerns with the length of time to process applications may be an issue of managing expectations and communicating typical timelines when a trade ally is a new or infrequent participant in the program.

Finding 11. Some TAs become frustrated when they recommend an Assessment in the course of selling a capital-intensive project, only to discover that the assessment they recommended suggests delaying the project under consideration. Another TA reported that some potential clients apparently cancelled jobs after receiving their Assessment Report. A Navigant review of available Reports showed that some recommended project implementation schedules are structured to commence with low capital and high interactive effect projects to generate savings applicable to future projects with higher capital requirements. One Assessment Report, for example, recommended a two-phase implementation schedule, with the simple payback for Phase One at 1.0 years, and Phase Two at 9.4 years.

7. APPENDICES

7.1 Detailed Impact Approaches and Findings

7.1.1 Gross Impact Findings for Custom Projects

Sampling

A sample of 15 Custom Program projects was randomly selected from a stratified population of 55 projects in the Nicor Gas program tracking database to determine program-level verified gross realization rates at a target of 90/10 confidence and precision. On-site measurement and verification (M&V) was conducted for five out of the 15 sampled projects based on IPMVP protocols, and engineering desk file review on the remaining 10 sampled projects. The M&V sample included five Parallel Path projects reviewed in GPY5. Navigant reviewed the sample to verify that there is an accurate representation by measure technology and business type within the overall sample. A profile of the sample selection is shown below in Table 7-1.

Table 7-1. Profile of GPY5 Custom Gross Impact Sample

Project ID	Ex Ante Gross Savings (Therms)	Sample Strata	M&V Type	Measure Description
NG05-044	733,437	1	File Review	Install industrial heat exchangers (Phase II)
NG05-103	505,241	1	File Review	Rebuild furnace refractory and re-route waste gas
NG04-126	411,400	2	On-site	Rebuild furnace refractory and replace burner
NG05-081	105,363	2	On-site	Retrofit high-efficiency, high-turndown burner
NG05-080	98,512	2	File Review	Replace band oven with rotary oven
NG03-009	93,541	2	File Review	Install regenerative thermal oxidizer (RTO)
NG04-063	93,264	2	File Review	Replace boiler with direct-fired forced air units
NG05-068	79,689	2	On-site	Install stack economizer
NG04-104	68,371	3	On-site	Install linkageless boiler controls and reverse osmosis (RO) treatment for makeup water
NG05-070	67,718	3	On-site	Install exhaust fan timer controls
NG05-022	56,162	3	File Review	Tune-up burners on process dryers
NG05-008	35,532	3	File Review	Comprehensive HVAC system upgrade
NG05-064	10,629	3	File Review	Replace DHW boilers
NG03-085	10,434	3	File Review	Replace boiler draft controls
NG05-042	42,839	3	File Review	Install heat exchanger

Source: Program tracking data and Navigant analysis

Engineering Review of Project Files

For each selected project, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimated ex post gross savings based on their review of documentation and engineering analysis.

To support this review, CLEAResult provided project documentation in electronic format for each sampled project. Documentation included some or all scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, and vendor proposals), pre-

inspection reports and photos (when required), post inspection reports and photos (when conducted), and calculation spreadsheets.

On-Site Data Collection

On-site surveys were completed for a subset of five of the 15 customer applications sampled. For most projects, data collection includes interviews that are completed at the time of the on-site, visual inspection of the systems and equipment, spot measurements, and short-term monitoring (e.g., less than four weeks). An analysis plan is developed for each project selected for on-site data collection. Each plan explains the general gross impact approach used (including monitoring plans), provides an analysis of the current inputs (based on the application and other available sources at that time), and identifies sources that will be used to verify data or obtain newly identified inputs for the ex post gross impact approach.

The engineer assigned to each project first calls to set up an appointment with the customer. During the on-site audit, data identified in the analysis plan is collected, including monitoring records such as measured temperatures, data from equipment logs, equipment nameplate data, system operation sequences and operating schedules, and a careful description of site conditions that might contribute to baseline selection.

All engineers who conduct audits are trained and experienced in completing inspections for related types of projects. Each carries properly calibrated equipment required to conduct the planned activities. They check in with the site contact upon arrival at the business, and check out with that same site contact, or a designated alternate, on departure. The on-site audit consists of a combination of interviewing and taking measurements. During the interview, the engineer meets with a business representative who is knowledgeable about the facility's equipment and operation, and asks a series of questions regarding operating schedules, location of equipment, and equipment operating practices. Following this interview, the engineer makes a series of detailed observations and measurements of the business and equipment. All information is recorded and checked for completeness before leaving the site.

Site-Specific Impact Estimates

Annual energy impacts were developed for each of the 15 sampled projects based on the data gathered on-site, supplemental monitoring data, application information, and, in some cases, billing or production data. Energy savings calculations are accomplished using methods that may include short-term monitoring-based assessments, simulation modeling (e. g., DOE-2), bin models, application of ASHRAE methods and algorithms, analysis of pre- and post-installation billing and production data.

Research Findings for the Gross Impact Sample

Table 7-2 shows the measure level unweighted gross realization rate estimates.

Table 7-2. Gross Impact Realization Rate Results by Measure Type

Measure Type	Measure Count	Sample-Based Ex Ante Gross Savings (Therms)	Sample-Based Verified Gross Savings (Therms)	Measure Level Verified Gross Realization Rate
Boiler Controls	2	78,805	1.00	78,856
Boiler Replacement/Upgrade	4	231,213	1.02	236,613
Exhaust Fan Control	1	67,718	1.00	67,718
HVAC Heat Recovery	1	42,839	1.00	42,839
Industrial Furnace Replacement/Upgrade	3	972,803	0.96	935,982
Industrial Equipment Replacement/Upgrade	2	831,949	0.96	795,277
Regenerative Thermal Oxidizers (RTO)	1	93,541	0.56	52,500
Install Forced Air Heating Equipment	1	93,264	0.88	82,326

Source: Program tracking data and Navigant analysis

Table 7-3 shows the project-level unweighted gross realization rate estimates. Out of the 15 sampled projects, eight had 100 percent realization rates with minor or no adjustment to the ex ante savings. Three projects had their ex ante savings adjusted upwards after evaluation verification with gross realization rates between 115 percent and 150 percent, and four projects had realization rates of 56 percent to 95 percent.

The stratified sample weighted gross realization rates are presented in Table 7-4, showing the overall verified gross realization rate of 98 percent, estimated at a 90 percent confidence interval and 6.5 percent relative precision.

Table 7-3. GPY5 Summary of Sample M&V Results

Project ID	Measure Description	Gross Realization Rate	Summary of Adjustment
NG05-044	Heat Exchangers - Phase II	95%	The adjustment factor from related project (NG05-103) was applied to this project.
NG05-103	Refractory Flare	118%	The calculation was normalized for production quantities.
NG04-126	Furnace Rebuild	62%	Billing/regression analysis produced lower savings from actual.
NG05-081	Burner Retrofit	100%	OK
NG05-080	Oven Replacement	100%	OK
NG03-009	RTO	56%	The calculation approach of (therm/ton value) was updated.
NG04-063	Direct Fired Units	88%	Weather station was updated to closest available.
NG05-068	Boiler Economizer	100%	OK
NG04-104	Parallel positioning controls & RO	100%	OK
NG05-070	Exhaust Fan Timer	100%	OK
NG05-022	Dryer tune-ups	150%	The calculation was normalized for production quantities.
NG05-008	HVAC and Controls	115%	Billing/regression analysis produced higher savings from actual.
NG05-064	DHW Boilers	100%	OK
NG03-085	Boiler draft controls	100%	OK
NG05-042	Heat Recovery	100%	OK

Source: Program tracking data and Navigant analysis

Table 7-4. Gross Therms Realization Rates and Relative Precision at 90 Percent Confidence Level

Program	Strata	Relative Precision +or-%	Low RR	Mean RR	High RR	Std. Error
Custom	1	0.0%	1.04	1.04	1.04	-
	2	13.0%	0.66	0.76	0.86	0.05
	3	13.7%	0.96	1.12	1.27	0.08
Custom Total RR (90/10)		**6.5%**	**0.91**	**0.98**	**1.04**	**0.04**

Source: Program tracking data and Navigant analysis

7.1.2 Summary Impact Findings for Custom, RCx and SEM Program Components

In Table 7-5, we present a summary of the overall GPY5 Custom Program verified net savings. The GPY5 Custom Program achieved verified net savings of 2,474,063 therms from custom measure projects. The RCx component of the program achieved verified net savings of 293,672 therms[12], and the SEM projects achieved 484,769 net therms savings[13], making a combined verified total net therms of 3,252,504 therms for the Custom Program.

Table 7-5. GPY5 Overall Custom Program Verified Net Savings

Program	Ex Ante Gross Savings (Therms)	Ex Ante Net Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTGR	Verified Net Savings (Therms)
Custom	3,471,518	2,534,208	0.98	3,389,128	0.73	2,474,063
RCx	309,711	315,905	0.93	287,914	1.02	293,672
SEM	410,087	373,179	1.30	532,713	0.91	484,769
Custom Program Total	**4,191,316**	**3,223,292**		**4,209,755**	**n/a**	**3,252,504**

Source: Program tracking data and Navigant analysis

[12] ComEd Nicor SEM EPY8 GPY5 Evaluation Report 2016-10-01
[13] EPY8-GPY5 RCx Evaluation Report 2017-02-13 Final

7.1.3 Net Impact Research Methods and Findings

Free Ridership and Spillover Research in GPY5

As part of the GPY5 evaluation, the evaluation team conducted free ridership and spillover research with participating Business Custom customers, and interviewed program trade allies to investigate spillover. The research aimed at estimating a net-to-gross (NTG) ratio and developing a recommended value for deeming by the SAG for future program application.

The free ridership research was conducted in two waves. The first wave was based on "real-time" early feedback interviews conducted from January 2016 to May 2016 with eleven customers that participated and completed projects prior to the end of GPY5 (spillover was not included in the wave one real-time customer survey). Additional participant interviews were completed in a second wave begun in December 2016, with three follow-up interviews completed with wave one respondents for spillover plus three new respondents interviewed for free ridership, spillover, and process issues. One wave of trade ally interviews was conducted from December 2016 through February 2017 to investigate spillover and process issues. The free ridership and spillover estimates were finalized after the final GPY5 program tracking data was available in February 2017.

Table 7-6 summarizes the findings from the NTG research. Participant free ridership and participant spillover are from GPY5 survey research that produced a free ridership of 0.21 based on 14 interviews (90/12 confidence and precision estimates) and no spillover, applying TRM v6.0 NTG methodologies. Interviews with 7 trade allies did not find evidence of participant or non-participant spillover. The GPY5 research applied the TRM v6.0 NTG algorithms.[14]

Table 7-6. Summary of Participant and Trade Ally Free Ridership and Spillover Results

NTG Methods	Program Path	Free Ridership (FR), Weighted	Participant Spillover (SO)	Trade Ally Spillover	Mean NTGR	NTG Sample	Relative Precision @90% CI
TRM (v6.0)							
	Custom Projects	0.21	0.00	N/A		14*	12%
	Trade Ally	N/A	N/A	0.00		7	N/A
	Overall Custom Program	**0.21**	**0.00**	**0.00**	**0.79**		**12%**

Source: Evaluation analysis

* Overall 18 interviews were completed, but Navigant found 4 of the respondents were participants in the Strategic Energy Management (SEM) Program, and they were excluded from the Custom Program NTG analysis.

Participant Data Collection for Net-to-Gross Estimates

The counts for completed interviews and sample design for the free ridership and spillover research is summarized in Table 7-7. Navigant completed 14 interviews with participating Custom Program participants from a population of 55 customers, representing 26 percent of the GPY5 total program energy savings. Navigant completed interviews with 7 trade allies. The participant survey goal was to achieve 10 percent precision at a 90 percent confidence interval.

[14] Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 6.0, Volume 4: Cross-Cutting Measures and Attachments, effective January 1st, 2018.

Table 7-7. Net-to-Gross Research Survey Disposition

Free Ridership Stratum	NTG Interviews Completes	NTG Sample Design	Population Decision Makers (w/unique contacts)
Participant Free Ridership	14	14	55
Participant Spillover	6	6	55
Trade Ally Spillover	7	7	46

Source: Evaluation analysis of program data

Participant Free Ridership Scoring Algorithm and Specifications

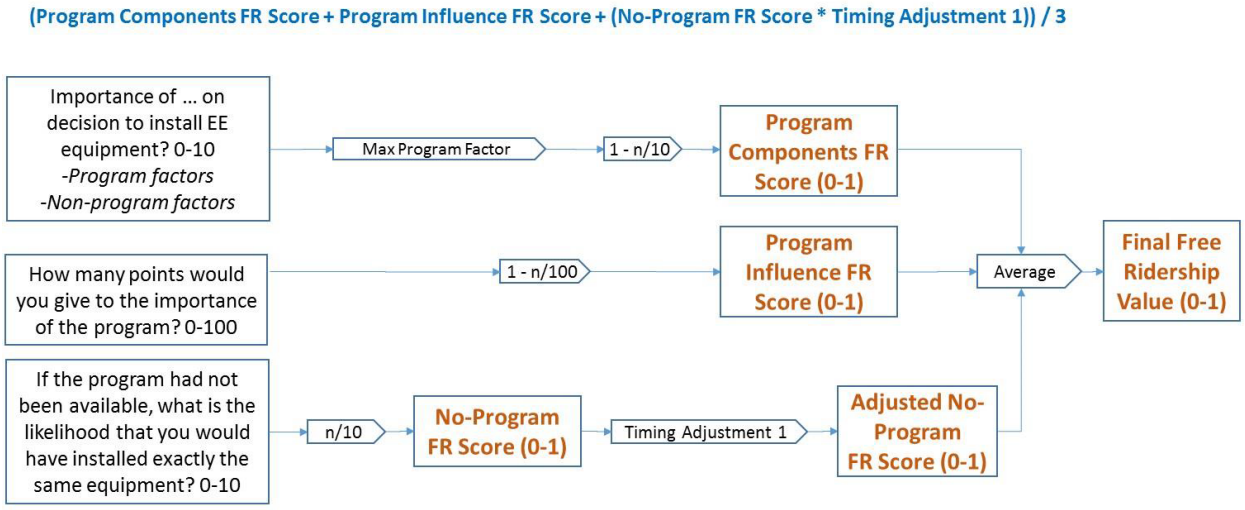
The evaluation assessed free ridership using a customer self-report approach following the core nonresidential free ridership algorithm adopted from the Illinois Statewide NTG Methodologies document (IL NTG Methods), presented in Illinois TRM V6.0.[15] We assessed the evidence of participant spillover based on certain spillover attribution conditions outlined in the IL NTG Methods. Navigant made attempts to quantify spillover using survey self-report data for measure description and quantities, while per unit savings values were drawn from the Illinois TRM and measure research.

The core nonresidential free ridership algorithm adopted for GPY5 consists of three scores that represent different ways of characterizing program influence (and its converse, free ridership): the Program Components Score, the Program Influence Score, and the No Program Score. The three scores are combined to calculate the final program-level free ridership. Navigant compared the free ridership approach in the IL NTG Methods (TRM V6.0) with the algorithm in the TRM V5.0 protocol[16] and determined that the V6.0 should be applied proactively because it incorporates the removal of non-program factors and a third timing adjustment factor for future applications. This leaves the Program Components Score computed only from the maximum program factor score, while the deferred free ridership input (timing adjustment factor for No Program Score) has two alternative specifications, which required that two free ridership estimates be made and a recommendation for the most appropriate methodology adopted for the program, going forward.

Figure 7-1 and Figure 7-2 provide a flow diagram of the algorithms for determining the free ridership, showing the changes in TRM (V6.0).

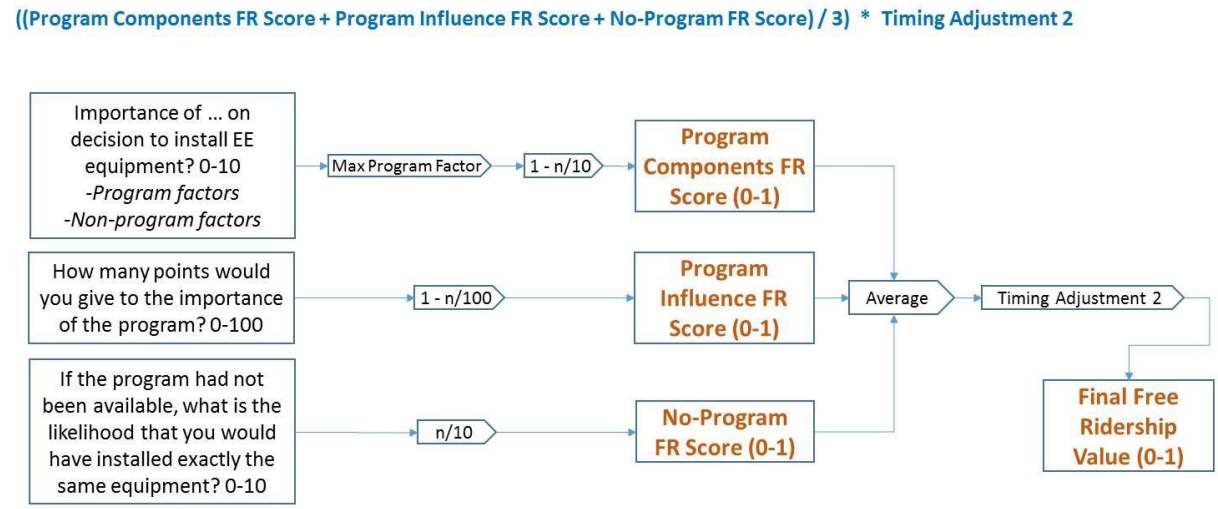
[15] Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 6.0, Volume 4: Cross-Cutting Measures and Attachments, effective January 1st, 2018.
[16] Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 5.0, Volume 4: Cross-Cutting Measures and Attachments, effective June 1st, 2016.

Figure 7-1. Core Free Ridership Option 1 (TRM V6.0)



Source: IL TRM v6.0 Vol. 4, February 8, 2017

Figure 7-2. Core Free Ridership Option 2 (TRM V6.0)



Source: IL TRM v6.0 Vol. 4, February 8, 2017

The Program Components Score reflects the influence of the most important of various program related elements in the customer's decision to select the specific program measure at this time.

The Program Components Score is derived from:

PCS = 1 - ([Maximum Program Factor Score]/10)

The Program Influence Score quantifies the importance of the program on the decision to implement energy efficiency measures relative to the importance or impact of non-program factors. Respondents

were asked to allocate a total of 100 points to the program and to non-program factors. The points allocated to the program by the participants are the “Program Points.”

Program Influence FR Score is derived from:

PI = 1 - (Program Points/100).

This score can range from 0 (no free ridership) to 1 (full free rider).

The No-Program score captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available. This score, rated on a scale of 0-10, accounts for deferred free ridership by incorporating the likelihood that the customer would have installed program-qualifying measures within One Year and/or the Number of Months Expedited variables to calculate two alternative ways of accounting for deferred free ridership.

No-Program FR Score is derived from:

NPC = Likelihood Score/10

Timing Adjustment 1 = 1 - (Number of Months Expedited - 6)/42

Timing Adjustment 2 = 1 - ((Number of Months Expedited - 6)/42)*((10 - Likelihood of Implementing within One Year)/10)

Based on the combination of the three scores and the two timing adjustment factors, Navigant calculated free ridership results in the following ways:

1) Core FR Algorithm 1 = AVERAGE([PCS], [PI], [NPC*Timing Adjustment 1])

2) Core FR Algorithm 2 = AVERAGE([PCS], [PI], [NPC]) * Timing Adjustment 2

Table 7-8. Custom Program Net-to-Gross Scoring Algorithm (FR-only) from IL-NTG Methods (v6.0)

Scoring Element	Calculation
Program Components Score. The maximum score (scale of 0 to 10 where 0 equals not at all influential and 10 equals very influential) among the self-reported influence level the program had for: A. Availability of the program incentive B. Recommendation from utility program staff person C. Information from utility or program marketing materials D. Payback on Investment E. Information provided through technical assistance received from utility or implementation contractor field staff (assessment) F. Other factors (recorded verbatim)	Maximum of (A, B, C, D, E, and F)
Program Influence Score. "If you were given a TOTAL of 100 points that reflect the importance in your decision to implement the <ENDUSE>, and you had to divide those 100 points between: 1) the program and 2) other factors, how many points would you give to the importance of the PROGRAM?"	Points awarded to the program (divided by 100).
No-Program Score. "Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely," if the utility program had not been available, what is the likelihood that you would have installed exactly the same equipment within one year or at a later date?" The NTG algorithm computes the Likelihood Score as 10 minus the respondent's answer (e.g., the likelihood score will be 0 if extremely likely to install exactly the same equipment if the program had not been available).	Interpolate between Likelihood Score and 10 to obtain the No-Program score, where If "At the same time" or within 6 months then the No Program score equals the Likelihood Score, and if 48 months later then the No Program Score equals 10 (no free-ridership)
Adjustments to "Likelihood score" are made for timing: "Without the program, when do you think you would have installed this equipment?" Free-ridership diminishes as the timing of the installation without the program moves further into the future.	Two different ways of calculating No-Program Score adjustment factors are shown above.
Project-level Free-ridership (ranges from 0.00 to 1.00)	1) Average [PCS], [PI], [NPC*Timing Adjustment 1]) 2) Average ([PCS], [PI], [NPC]) * Timing Adjustment 2
Project level Net-to-Gross Ratio (free-ridership only)	1 – Project level Free-ridership

Source: Evaluation team

Free Ridership Results

Table 7-9 summarizes the free ridership rate from the GPY5 Nicor Gas Custom Program. Results are included for the two possible TRM algorithms, as well as the historic free ridership algorithm used prior to establishment of guidelines in TRM Version 6.0. The free ridership values are weighted by respondent therm savings.

Table 7-9. GPY5 Nicor Gas Custom Free Ridership Rates

	FR Option 1	FR Option 2	Historic
Program Component Score	0.21	0.23	
Historic			0.26

Source: Evaluation analysis.

Upon critical review of the results from the free ridership algorithm options, Navigant recommended the results from the analysis option one (0.21) for adoption and approval by the SAG for the GPY7 program. Our conclusion is based on reliance on previous evaluation research findings that utilized the same C&I deferred free ridership input (two alternative specifications) and reached a conclusion that option one produced a higher correlation and acceptable reliability Cronbach alpha coefficients.[17]

Participant Spillover Attribution Algorithm Specifications

In the second wave of data collection in January 2017, Navigant interviewed six of the 14 free ridership respondents to investigate spillover effects. The respondents were asked if they have taken any additional action to reduce the energy consumption at their facility, since participating in the Custom Program.

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

1. Since participating in the Custom Program, have you purchased and installed any additional gas saving measures that you did not receive any rebate for?
2. Would the installation have qualified for an incentive?
3. On a zero to ten scale, where zero is not at all important and ten is extremely important, how important was your participation in the energySMART, including your interactions with your contractor on your decision to implement these additional gas saving services or equipment? [Attribution Score 1.]
4. If you had not participated in the energySMART, how likely is it that your organization would still have implemented this measure or equipment? Please use a zero to ten scale, where zero means that you definitely would not have implemented them and ten means that you definitely would have implemented them? [Attribution Score 2.]

Spillover was considered to be attributable to the Custom Program if the following condition is met: the average of Attribution Score 1 and (10 minus Attribution Score 2) exceeds 5.0. The evaluation identified two potential spillover candidates who installed equipment that did not receive rebates through the program. One candidate mentioned heat pumps, but the other candidate did not specify the equipment. Upon further review, Navigant found that none of the two potential candidates qualify for spillover, since they did not meet the spillover attribution condition of average scores greater than 5. Navigant determined that the sample spillover rate is 0.00, and should be applied to the Custom Program.

[17] ComEd Standard NTG Research Report 2016-10-03 (sent to ICC and ComEd on 2016-10-03)

Trade Ally Spillover Attribution Findings

From interviews with the seven trade allies, Navigant identified five of them who responded with a percentage of their sales that were potential spillover. To determine whether the sales were spillover, Navigant analyzed responses from additional questions including:

- Approximately what quantity or percentage of trade ally's total sales of EE equipment qualified for an incentive from energySMART and Nicor Gas,
- Approximately what percentage of customers or EE equipment did not receive a rebate through the program?
- Can you tell me why some customers did not receive a rebate through the program (open ended)?
- If the program did not exist, how many of these projects do you think would have completed?
- On a scale of 0-10, where 0 means "no influence" and 10 means "greatly influenced," how much did the energySMART program influence your sales of qualifying equipment to these non-participating customers?

Upon review of the TA responses and comparison with the open-ended reasons for customers not receiving rebates, Navigant determined that all five TAs with potential spillover indicated their customers in the Custom Program received rebates of some sort through the energySMART program, or the equipment did not actually qualify for the Custom Program[18], or program influence was near zero. The trade ally spillover rate was determined to be 0.00 for the program.

Summary of Findings from Free Ridership and Spillover Research

In Table 7-10, Navigant presents a summary of the research findings from the free ridership and spillover analysis from the Custom Program participants and TAs. Navigant recommended the free ridership and participant spillover results, and the resulting NTG estimate based on IL TRM V6.0 methodology be applied for GPY7, for deeming by the SAG, effective January 1st, 2018.

Table 7-10. Summary of Participant and Trade Ally Free Ridership and Spillover Results

Program Component	FR†	PSO†	TSO†	NPSO††	NTGR
Custom Participants	0.21	0.00		0.00	
Trade Ally			0.00	0.00	
Population Roll-up	**0.21**	**0.00**	**0.00**	**0.00**	**0.79**

Sources:
† Navigant analysis of data from telephone surveys conducted with GPY5 Custom Program participants and trade allies.
†† NPSO was not researched for participants and TAs.
FR = Participant Free Ridership; PSO = Participant Spillover; TSO = Trade Ally Spillover; NPSO = Non-Participant Spillover
NTGR = 1 – FR + PSO + TSO + NPSO

[18] The TA interviews were attempting to estimate spillover of program qualifying equipment.

7.2 Survey Instruments

7.2.1 Participating Customer Survey Instruments

Nicor Gas
Participating Custom Program Participant Interview Guide
Final November 17, 2016

Respondent name:	
Respondent phone number:	
Respondent title:	
Email Address:	
Respondent Company	
Date:	
Notes:	

INTERNAL NOTE – The primary purpose of this survey is to call back respondents who completed the free-ridership section and only asses Spillover and Process. For respondents who previously completed the free-ridership questions, the Free-ridership section (N2 – CC1b) will be skipped. If any participants did not previously complete the free-ridership questions, they will be asked the entirety of the survey.

INTRODUCTION

Hello, this is _____ from _____ calling on behalf of Nicor Gas. This is not a sales call. May I please speak with <PROGRAM CONTACT>?

Our records show that <COMPANY> purchased a <MEASURE DESCRIPTION>, which was recently approved to receive an <INCENTIVE AMOUNT> from Nicor Gas. When signing the application form, as a part of the programs terms and conditions, you also agreed to support evaluation efforts of Nicor Gas' Business Custom Incentive Program, which includes participating in surveys like this one. I was told you're the person most knowledgeable about the financial decision making process for this project. Is this correct? [IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.]

This survey will take about 10 minutes. Is now a good time? [If no, schedule call-back]

For the sake of brevity, I will be referring to the Business Custom Incentive Program simply as "the Program".

I1 I'd like to confirm some information in Nicor Gas' database. Our records show that you were recently approved to receive an <INCENTIVE AMOUNT> from Nicor Gas for a <ENDUSE> project at <ADDRESS> from the Program. Is this correct?

1 Yes

2 No

88 DON'T KNOW

99 REFUSED

Before we begin, I want to emphasize that this survey will only be about the <END USE> you are installing through the Program at <ADDRESS>.

I2 Can you briefly describe the company you work for and the type of business it conducts?

I3 Can you briefly summarize your roles and responsibilities at your company? For how long have you carried these out?

FREE-RIDERSHIP

N2 When did you first learn about the Nicor Gas Program? Was it before or after you finalized the specifications of the <MEASURE TYPE, the high efficiency type of measure installed from program tracking dataset > project, including the efficiency level and the scope of the project?

1 Before

2 After

88 DON'T KNOW

99 REFUSED

N3 Next, I'm going to ask you to rate the importance of Nicor Gas' Program as well as other factors that might have influenced your decision to implement this higher efficiency <Type of measure installed, from program tracking dataset> project at this time. When answering these questions, please think about the importance of each factor in terms of the efficiency level you chose and the scope of the project. Please use a scale from 0 to 10, where 0 means not at all important and 10 means extremely import. If you don't know, please say "don't know." If not applicable, please say "not applicable." [FOR N3b-n, RECORD 0 to 10; 96=Not Applicable; 98=Don't Know; 99=Refused]

[IF NEEDED] How important was…

N3b The availability of the Program incentive
N3d A recommendation from an equipment vendor or contractor that helped you with the choice of the equipment
N3e Previous experience with the measure
N3f Recommendation from a Nicor Gas program representative or account manager
N3h Information from the Program or any Nicor Gas marketing materials
N3i A recommendation from a design or consulting engineer (not a Nicor Trade ally or program contractor)
N3j The standard practice in your business/industry
N3k Project identification, savings estimates, or recommendation by the Nicor Gas energySMART Opportunity/Facility assessment
N3l Corporate policy or guidelines
N3m Payback on the investment with the incentive

Thinking about this a little differently, I would like you to compare the importance of the Program with the importance of other factors in implementing the higher efficiency < Type of measure installed; from program tracking dataset > project.

N3p If you were given a TOTAL of 100 points that reflect the importance in your decision to implement the **high efficiency** < MEASURE TYPE>, and you had to divide those 100 points between: 1) the Program and 2) all other factors, how many points would you give to the importance of the PROGRAM?
RECORD POINTS FROM 0 to 100
888 DON'T KNOW
999 REFUSED

N3o And how many points would you give to other factors?
RECORD POINTS FROM 0 to 100 = OTHERPTS
888 DON'T KNOW
999 REFUSED

[ASK INC1 IF N3p and N3o do not add up to 100]

INC1 The last question asked you to divide a total of 100 points between the Program and other factors. You just noted that you would give <N3p RESPONSE> points to the Program. Does that mean you would give <OTHERPTS> points to other factors?
1 Yes
2 No
88 DON'T KNOW
99 REFUSED

[IF INC1=2, go back to N3p]

[CONSISTENCY CHECK]
[ASK IF TWO OR MORE OF N3e, N3i, N3j, N3l > 7 AND OTHERPTS < 30]

N4a Earlier you stated that factors other than the Program were very important, but you gave all other factors a rating of <OTHERPTS>. Can you help me understand why you gave them this rating?
RECORD RESPONSE – ASK IF RESPONDENT WANTS TO CHANGE PREVIOUS RESPONSES
88 DON'T KNOW
99 REFUSED

[ASK IF TWO OR MORE OF N3b, N3d, N3f, N3h, N3k > 7 AND N3p RESPONSE < 30]

N4b Earlier you stated that various aspects of the Program were very important, but you gave all Program factors a rating of < N3p RESPONSE >. Can you help me understand why you gave them this rating?
RECORD RESPONSE – ASK IF RESPONDENT WANTS TO CHANGE PREVIOUS RESPONSES
88 DON'T KNOW
99 REFUSED

Now I would like you to think about the action you would have taken with regard to the installation of this equipment if the Nicor Gas incentive had not been available.

N5 Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the utility **program, including education, support and incentives,** had **not** been available, what is the likelihood that you would have installed exactly the same project or efficiency of equipment?
RECORD 0 to 10
88 DON'T KNOW
99 REFUSED

[ASK IF N5 > 0, ELSE SKIP TO SP1]

N7a. Using the same likelihood scale from 0 to 10, if the utility program had not been available, what is the likelihood that you would have installed exactly the same project or efficiency of equipment within 12 months of when you installed your <MEASURE DESCRIPTION> project?
RECORD 0 to 10
88 DON'T KNOW
99 REFUSED

[SKIP IF N7a = 0]

N7b. When do you think you would have installed the exact same < MEASURE DESCRIPTION > project if the utility program had not been available? [ONLY READ LIST IF NECESSARY] (Prompt, "Would you say…?" if necessary. IF N7a < 6 start prompting with 1-2 years later.)

0 (At the same time you did)
1 (up to 6 months later)

2 (7 months to 1 year later))
3 (more than 1 year up to 2 years later)
4 (more than 2 years up to 3 years later)
5 (more than 3 years up to 4 years later)
6 (more than 4 years later)
7 (never)
00 (Other, specify)
98 (Don't know)
99 (Refused)

[ASK IF N7a6 < 4 AND N7b < 4]

CC1a Based on your earlier response, it sounded like the Program was not very important to your decision to install the <MEASURE>. However, when you answered the previous question, it sounds like it was not very likely that you would have installed this measure had you not participated in the Program. Can you please explain the role the Program made in your decision to implement this measure?

[RECORD RESPONSE]
88. Don't know
99. Refused

[ASK IF N7a > 7 AND N7b > 7]

CC1b Based on your earlier response, it sounded like the Program was quite important to your decision to install the <MEASURE>. However, when you answered the previous question, it sounds like it was very likely that you would have installed this measure had you not participated in the Program. Can you please explain the role the Program made in your decision to implement this measure?

[RECORD RESPONSE]
88. Don't know
99. Refused

SPILLOVER

Next, I would like to discuss any energy efficient equipment you may have installed without a rebate or incentive from an efficiency program.

SP1 Since your participation in the Nicor Gas program, did you install any ADDITIONAL energy efficiency measures or upgrades at this facility or at your other facilities within Nicor Gas service territory that did NOT receive incentives through any utility or government program? This can include additional energy efficient upgrades or installation that were part of the rebated project, but did not receive a rebate themselves.

1. Yes [CONTINUE]
2. No [SKIP TO A1]

88. Don't Know [SKIP TO A1]
99. Refused [SKIP TO A1]

SP2 What was the equipment that you installed?
[RECORD RESPONSES a-c]
88. Don't know [SKIP TO A1]
99. Refused [SKIP TO A1]

a. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of this measure.
b. Please describe the EFFICIENCY of this measure.
c. How many of this measure did you install?

SP3 Was there any other measures installed? [IF YES] What was installed?
[RECORD RESPONSE a-c]
88. Don't know
99. Refused

a. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of this measure.
b. Please describe the EFFICIENCY of this measure.
c. How many of this measure did you install?

I have a few questions about the <SPILLOVER MEASURE> equipment that you installed. [REPEAT FOR EACH SPILLOVER MEASURE]

SP4 Would the installation have qualified for an incentive?
1. Yes
2. No
88. Don't Know
99. Refused

SP4a What were the reasons that you did not install this measure through a rebate Program?
[RECORD RESPONSE]
88. Don't know
99. Refused

SP5. Was this measure specifically recommended by a program related assessments, report or program technical specialist?
1. Yes
2. No
88. Don't know

99. Refused

SP6. How influential was your experience with the Program, including your interactions with your contractor, on your decision to implement the <SPILLOVER MEASURE>, using a scale of 0 to 10, where 0 is not at all influential and 10 is extremely influential?
[RECORD 0 - 10]
88. Don't know
99. Refused

SP6a. What were the reasons that you gave it this rating?
[RECORD RESPONSE]
88. Don't know
99. Refused

SP7. If you had not participated in the Program, how likely is it that your organization 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?
[RECORD 0 - 10]
88. Don't know
99. Refused

CONSISTENCY CHECK ON PROGRAM IMPORTANCE RATING VS. NO PROGRAM RATING

[ASK IF SP6 < 4 AND SP7 < 4]
CC1a Based on your earlier response, it sounded like the Program was not very important to your decision to install the <SPILLOVER MEASURE>. However, when you answered the previous question, it sounds like it was not very likely that you would have installed this measure had you not participated in the Program. Can you please explain the role the Program played in your decision to implement this measure?
[RECORD RESPONSE]
88. Don't know
99. Refused

[ASK IF SP6 > 7 AND SP7 > 7]
CC1b Based on your earlier response, it sounded like the Program was quite important to your decision to install the <SPILLOVER MEASURE>. However, when you answered the previous question, it sounds like it was very likely that you would have installed this measure had you not participated in the Program. Can you please explain the role the Program made in your decision to implement this measure?

[RECORD RESPONSE]
88. Don't know
99. Refused

PROCESS MODULE

I'd now like to ask you a few general questions about your participation in the Program.

Awareness and Application

A1. How did you first hear about the Program? [DO NOT READ]
1. Nicor Gas Account Manager
2. Nicor Website [ASK IF CUSTOMER REMEMBERS WHICH ONE]
4. Contractor/Trade Ally
5. Friend/colleague/word of mouth
00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

A2. Who filled out the application forms for the project?
1. I did
2. Someone else did [RECORD WHO]
88. Don't know
99. Refused

[ASK IF A2 = 1]

A2a. Did the application forms clearly explain the Program requirements and how to participate?
1. Yes
2. No
3. Somewhat
88. Don't know
99. Refused

[ASK IF A2a = 2 or 3]

A2aa. Can you tell me in what way the application was not clear, or what could have been to make it clearer?
[RECORD RESPONSE]
88. Don't know
99. Refused

A2b. How would you rate the application process? Please use a scale of 0 to 10 where 0 is "very difficult" and 10 is "very easy".

[SCALE 0 - 10]
88. Don't know
99. Refused

A1d. What were the reasons that you gave that rating? [DO NOT READ]
1. Difficult to understand
2. Long process
00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

Incentive and Measures

IM1. On a scale of 0 to 10, where 0 is very dissatisfied and 10 is very satisfied, how would you rate your satisfaction with the incentive amount?
[SCALE 0-10]
77. Not Applicable
88. Don't know
99. Refused

IM1a. What were the reasons that you gave that rating? [DO NOT READ]
1. Incentive was too low
00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

IM2. Where there any energy efficiency upgrades that you wanted to undertake, but the incentive was too low for these upgrade to be cost effective?
1. Yes
2. No
88. Don't know
99. Refused

[IM2 = Yes]
IM2a. Can you please describe the energy efficiency projects?
[RECORD RESPONSE]
88. Don't know
99. Refused

IM3. Where there any energy efficiency upgrades that you wanted to undertake, but weren't able to for any other reason?
1. Yes
2. No

88. Don't know
99. Refused

[ASK IF IM3 = Yes]

IM3a. Can you please describe the energy efficiency projects?
[RECORD RESPONSE]
88. Don't know
99. Refused

IM3b. Is there anything that the Program can do to increase the likelihood that you complete these projects?
[RECORD RESPONSE]
88. Don't know
99. Refused

Energy Assessment

EA1. Before participating in the Custom program, did you receive an energy assessment from Nicor Gas?
1. Yes
2. No
88. Don't know
99. Refused

[ASK IF EA1 = Yes, ELSE SKIP TO NEXT PROCESS SECTION]

EA2. Was the <MEASURE> recommended by your energy efficiency assessment?
1. Yes
2. No
88. Don't know
99. Refused

EA2a. Were there any other energy efficiency upgrades recommended by your energy efficiency assessment?
1. Yes
2. No
88. Don't know
99. Refused

EA3. Did you complete any of these additional efficiency upgrades?
1. Yes
2. No
3. Some of them

88. Don't know
99. Refused

[if EA3 = 1 or 3]

EA3a. Can you please describe the energy efficiency upgrades that you completed?
[RECORD RESPONSE]
88. Don't know
99. Refused

EA3b. Did you apply for a rebate for any of these projects?
1. Yes
2. No
88. Don't know
99. Refused

[IF EA3b = No]

EA3c. Can you tell me why you did not apply for a rebate for these upgrades?
[RECORD RESPONSE]
88. Don't know
99. Refused

[if EA3 = 2 or 3]

EA3d. Can you tell me why you did not complete all of the upgrades recommended by the assessment?
[RECORD RESPONSE]
88. Don't know
99. Refused

EA3e. Is there anything that the Program can do to increase the likelihood that you complete these upgrades?
[RECORD RESPONSE]
88. Don't know
99. Refused

EA4. Did you receive an Early Action Bonus incentive?
1. Yes
2. No
88. Don't know
99. Refused

[ASK IF EA4 = Yes, ELSE SKIP TO NEXT PROCESS SECTION]

EA4a. On a scale of 0 to 10, where 0 is very dissatisfied and 10 is very satisfied, how would you rate your satisfaction with the Early Action Bonus incentive amount?
[SCALE 0-10]
77. Not Applicable
88. Don't know
99. Refused

EA4b. What were the reasons that you gave that rating? [DO NOT READ]
1. Incentive was too low
00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

Satisfaction

S1. On a scale of 0 to 10, where 0 is very dissatisfied and 10 is very satisfied, how would you rate your satisfaction with…
[SCALE 0-10]
66. Not Applicable
88. Don't know
99. Refused

a. the communication you had with the Program staff
b. the communication you had with CLEAResult Staff
c. the Program overall
d. Nicor Gas overall

[ASK IF S1a or S1b < 5]

S2a/b. You indicated some dissatisfaction with the communication you had with the Program staff/CLEAResult staff, what are the reasons that you gave this rating? [DO NOT READ, ACCEPT MULTIPLE]
1. Provided inconsistent information
2. Didn't understand the question
3. Hard to reach the right person/person with the answer
00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

[ASK IF S1c < 5]

S2c. You indicated some dissatisfaction with the Program overall, what are the reasons that you gave this rating?

[RECORD RESPONSE]

88. Don't know
99. Refused

[ASK IF S1d < 5]

S2d. You indicated some dissatisfaction with Nicor Gas overall, what are the reasons that you gave this rating?

[RECORD RESPONSE]

88. Don't know
99. Refused

[ASK IF S1a or S1b > 5]

S2a/b. You indicated that you were satisfied with the communication you had with the Program staff/CLEAResult staff, what are the reasons that you gave this rating? [DO NOT READ, ACCEPT MULTIPLE]

00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

[ASK IF S1c > 5]

S2c. You indicated that you were satisfied with the Program overall, what are the reasons that you gave this rating?

[RECORD RESPONSE]

88. Don't know
99. Refused

[ASK IF S1d > 5]

S2d. You indicated that you were satisfied with Nicor Gas overall, what are the reasons that you gave this rating?

[RECORD RESPONSE]

88. Don't know
99. Refused

O1. In general, what is the best way of reaching companies like yours to provide information about energy efficiency opportunities like the Program? [DO NOT READ, ACCEPT MULTIPLE]

1. Bill inserts
2. Mailings
3. E-mail
4. Telephone

5. Nicor Gas Account Manager
8. Trade allies/contractors
00. Other [RECORD RESPONSE]
88. Don't know
99. Refused

O2. Do you plan to participate in the Program again in the future?

1. Yes
2. No
3. Maybe
88. Don't know
99. Refused

O2a. Can you tell me why/why not?
[RECORD RESPONSE]
88. Don't know
99. Refused

R2 How could the Program be improved? [DO NOT READ, ACCEPT MULTIPLE]

1. Higher incentives
2. Rebates on more product/equipment
3. Greater publicity
4. Better Communication/Improve Program Information
5. Simplify application process
6. Quicker processing times
00. Other [RECORD RESPONSE]
66. No recommendation)
88. Don't know
99. Refused

7.2.2 Trade Ally Interview Guide

Nicor Gas Business Custom Rebate Program
Trade Ally Interview Guide

Introduction

(Note: the interviewer should change the introduction to match his/her own interviewing style)
Hi, may I please speak with <program contact>?

Hello, this is [INTERVIEWER NAME] from Navigant Consulting calling on behalf of energySMART, the Nicor Gas Energy Efficiency rebate program. We are conducting a quick survey based on your past participation with the program and would like your input. For your time, we will send you a $50 Visa gift card after completing the survey. May I please speak with <program contact>? Our records show that your company recently installed a <measure> for <customer> that received an energy efficiency rebate from Nicor Gas. By participating in the program as a contractor, you also agreed to support evaluation efforts of = the custom rebates offering for businesses from energySMART, a Nicor Gas program, which includes participating in surveys like this one I was told you're the person most knowledgeable about this project. Is this correct?

[IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.]

[FOR HIGHLY INFLUENTIAL TRADE ALLIES, PLEASE REVIEW THE SPECIFIC PROJECT AND CUSTOMER INFORMATION BEFORE BEGINNING SURVEY. MAKE SURE THAT THE TRADE ALLY ON THE PHONE IS THE PERSON AT THE COMPANY WHO IS MOST KNOWLEDGABLE ABOUT THAT *SPECIFIC PROJECT AND CUSTOMER*, AND NOT JUST THE PROGRAM IN GENERAL.]

Your opinion is very important to us and this survey is to learn more about your experience with the custom rebate offering from the energySMART program, which I may refer to simply as the Program.

Background

I1. How familiar are you with Nicor Gas' Custom Rebate offering for businesses? On a scale from 0 to 10, where zero is not at all familiar and ten is extremely familiar, how would you rank your familiarity?
RECORD 0 to 10
98 DON'T KNOW
99 REFUSED

[IF UNFAMILIAR (SCORE OF <5), ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.]

Process

P1. How would you rate your overall satisfaction with the program? Please use a scale of 0 to 10 where 0 is "not at all satisfied" and ten is "extremely satisfied".
RECORD 0 to 10

98 DON'T KNOW
99 REFUSED

P1a. What were the reasons that you gave that rating?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P2. What can the program do to increase participation by contractors like yourself who are already part of the program. Or stated another way...what can the program do to increase your participation in the program?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P3. What can the program do to attract new contractors into the program?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P4. In what other ways can the program be improved?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P5a. In your opinion, what prevents your customers from moving forward with energy efficiency projects?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P5b. In your opinion, what usually allows your customers to move forward with energy efficiency projects?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P6. Is there anything that Nicor Gas can do to make it easier for you to promote and sell the program to your customers...any tools you need to help you promote, sell or educate about the program or energy efficiency benefits in general?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

P7. Do you recommend energySMART assessments to your customers? Why or why not? If so, how often?
RECORD RESPONSE
98 DON'T KNOW
99 REFUSED

Spillover

SO1. Since your involvement in the energySMART program, what percentage of your sales include high efficiency equipment that qualifies for an incentive from energySMART and Nicor Gas?
RECORD NUMBER 0-100
98 DON'T KNOW
99 REFUSED

SO2. Thinking about your sales of equipment that qualifies for an energySMART incentive, in what percentage of those sales do customers actually receive an incentive from energySMART and Nicor Gas?
RECORD NUMBER 0-100
98 DON'T KNOW
99 REFUSED

[CREATE VARIABLE: 100 percent - [Response from Q0] = No_Inc]

[IF SO2 = 100, SKIP TO NEXT SECTION]

SO3. Does this mean then that <No_Inc> percent of your sales of equipment qualified for the Business Custom offering but DID NOT receive an incentive from energySMART?

1 YES

2 NO – IF NO, ASK FOR PERCENTAGE

98 DON'T KNOW

99 REFUSED

SO4. If the program did not exist, how many of these projects do you think would have completed?

RECORD NUMBER

98 DON'T KNOW

99 REFUSED

SO5. On a scale of 0-10, where 0 means "no influence" and 10 means "extremely influenced," how much did the energySMART program influence your sales of qualifying equipment to these non-participating customers?

RECORD NUMBER 0 - 10

98 DON'T KNOW

99 REFUSED

[IF SO > 0]

SO6. Why do you think that your customers did not apply for rebates for these measures?

RECORD RESPONSE

98 DON'T KNOW

99 REFUSED

Questions for Highly Influential Trade Allies

Now I'm going to ask you a few questions about <specific project and customer information>.

HI1. Using this 0 to 10 scale where 0 is not at all important and ten is extremely important, how important was the program, including incentives as well as program services and information, in influencing your decision to recommend that <customer> install the energy efficiency <measure> at this time?

RECORD NUMBER 0 - 10

98 DON'T KNOW

99 REFUSED

HI2. And using a 0 to 10 likelihood scale where 0 is not at all likely and ten is extremely likely, if the program, including incentives as well as program services and information, had not been available, what is the likelihood that you would have recommended this specific <measure> to <customer>?

RECORD NUMBER 0 - 10

98 DON'T KNOW

99 REFUSED

HI3. Approximately what percentage of the time did you recommend <measure> before you learned about the program?

RECORD NUMBER 0 - 100

98 DON'T KNOW

99 REFUSED

HI4. Approximately what percentage of the time do you recommend <measure> now that you have worked with the program?

RECORD NUMBER 0 - 100

98 DON'T KNOW

99 REFUSED

CLOSING SECTION

That brings us to the end of the survey.

1. Is there anything else that you would like to let us know based on the topics we covered today?
2. If in reviewing my notes, I discover a point I need to clarify, is it all right if I follow-up with you by phone or email? [IF YES, VERIFY PHONE NUMBER OR EMAIL ADDRESS]

On behalf of Nicor Gas, we thank you for your time today.

3. Would you like to receive your $50 Visa gift card as an egift card or a traditional gift card? Egift cards can be used only online or over the phone with stores that accept Visa debit cards and will be sent to you this week. Traditional gift cards can be used online, over the phone, and in stores that accept Visa debit cards but will take 4 weeks for you to receive.
4. What is the best address to use for your gift card?

Thank you again for your time.