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Impact and Process Evaluation of 2013-2014 (PY6) Ameren Illinois Company Commercial & Industrial Custom Efficiency Program

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1. Executive Summary

This report presents results from the evaluation of the sixth program year of the Ameren Illinois Company (AIC) Commercial and Industrial (C&I) Custom Program for electric and gas energy efficiency. In PY6 (June 1, 2013–May 31, 2014), AIC expected the Custom Program to account for 23.4% of the overall portfolio electric savings and 4.5% of portfolio therm savings.[1] Savings from the Custom Program come from the custom incentive offering, the Competitive Large Incentive Projects (CLIP), projects related to Staffing Grant, and New Construction Lighting projects.[2]

The PY6 evaluation of the Custom Program involved both impact and process assessments. To support the process evaluation, we interviewed Staffing Grant, CLIP, and New Construction Lighting participants, as well as program administrators, participating program allies, and Energy Advisors. Our impact evaluation research efforts included a survey with customers who installed gas measures through the Custom Program, Staffing Grant interviews, and site visits to determine gross electric and gas impacts.

Below we present the key findings from the PY6 evaluation.

1.1 Impact Results

Overall, the PY6 Custom Program performed well. As shown in Table 1 below, the program achieved 104,507 MWh in gross electric savings and 1,674,147 therms in gross gas savings. In addition, realization rates across savings categories were generally high. The table also provides the PY6 Custom Program ex post net impacts.[3] As outlined in the evaluation plan, the team applied the PY3 net-to-gross ratios (NTGRs) to ex post gross savings for all of the program's components to estimate net savings. The PY6 Custom Program achieved 78,380 MWh in net electric savings and 1,255,610 therms in net gas savings. This level of savings enabled the program to exceed its PY6 electric and gas goals.

Table 1. Custom Program Impact Summary

Savings Category	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR	Ex Post Net
Energy Savings (MWh)	99,277	105%	104,507	0.75	78,380
Demand Savings (MW)	13.2	89%	11.7	0.75	8.8
Gas Savings (Therms)	1,836,207	91%	1,674,147	0.75	1,255,610

1.2 Process Results

In PY6, the Custom Program completed a highly successful year in terms of its performance against goals and participant satisfaction. Now in its sixth year, the program's implementation has remained relatively stable. However, the program did adjust its design and implementation, including the introduction of the Metering

[1] Based on Three-Year Evaluation Plan for the Ameren Electric & Gas Residential and Commercial Portfolios, PY4–PY6. Note that these shares do not include New Construction Lighting projects, as New Construction is included as a separate program in the Three-Year Plan.

[2] While AIC processes most new construction projects through the Standard program, lighting and HVAC projects are processed through the electric Custom program with lighting projects falling under the New Construction Lighting offering and large scale HVAC projects included the custom incentive offering.

[3] "Ex post" refers to the estimated impact found by the evaluation team.

and Monitoring Pilot and the launch of an improved behind-the-scenes program data tracking system to prepare for the new application system in PY7.

1.3 Conclusions and Recommendations

Interviews with different types of participants (CLIP, New Construction Lighting, and Staffing Grant) and other stakeholders (program allies and Energy Advisors) revealed positive feedback on the program, as well as some areas in which the program could improve. Based on the team's PY6 evaluation activities, we make the following recommendations for the program:

- **Consider a review of CLIP communication and responsiveness.** While CLIP participants indicated high satisfaction, each participant who recommended improvement cited some aspect of implementer-participant communication. One indicated being unaware of Custom and Standard Program options. Another questioned the program's continued funding for the program and had difficulty receiving a satisfactory answer from the program. A third participant became nervous about the continuation of their project after not receiving a confirmation from the implementer about having received the participant's project update. In each case, responsive communication would likely have alleviated the issue and increased satisfaction. Reviewing the communication procedures for CLIP may yield opportunities for improvement in this area.

- **Consider sector-specific technical assistance.** Several CLIP respondents indicated that increased access to industry-specific technical assistance might increase program participation by allowing potential participants to identify custom projects that they would otherwise not be able to identify. While an energy audit, or a feasibility study, from AIC may identify some opportunities, other opportunities that require a thorough knowledge of industry-specific equipment and processes may be overlooked.

- **Encourage Energy Advisors and other program staff to fully leverage the features of Amplify.** Energy Advisors strongly believe the lead-tracking features built into the new program tracking database, Amplify, will be very useful to them in conducting customer outreach. However, information reported by Energy Advisors indicated that the database was not yet being used to its fullest potential. Energy Advisors need to more fully take advantage of the new system by incorporating more useful information on customer contacts into the system. AIC should consider working with program staff, implementers, and Energy Advisors to increase the amount of information entered into Amplify to improve the usefulness of its lead tracking capabilities.

2. Introduction

This report presents results from the evaluation of PY6 of the Ameren Illinois Company (AIC) Commercial and Industrial (C&I) Custom Program. The Custom Program is one of three programs within the AIC C&I portfolio, which also includes the Standard and Retro-Commissioning Programs.

The PY6 evaluation of the Custom Program involved both impact and process assessments. To support the process evaluation, we interviewed Staffing Grant, Competitive Large Incentive Projects (CLIP), and New Construction Lighting participants, as well as program administrators, participating program allies, and Energy Advisors. Our impact evaluation research efforts included a survey with customers who installed gas measures through the Custom Program, as well as site visits to determine gross impacts.

2.1 Program Description

The C&I Custom Program allows AIC business customers to complete energy efficiency projects that involve the installation of equipment not covered through the Standard Program. The availability of this program option allows customers to propose additional measures and to tailor projects to their facility and equipment needs. Custom incentives are available for electric measures, such as lighting, compressed air, energy management systems, and industrial process measures, among others, and the program also offers gas measures, including heat recovery, process heat, and improvements to steam systems.

The program also provides special program offerings, such as the CLIP initiative, Staffing Grants, and Feasibility Studies. In addition, in PY6, the program initiated a new behavior-based program, the Metering and Monitoring Pilot. Consistent with prior years, the PY6 Custom Program serves as the channel for the submission of New Construction Lighting projects.

- The CLIP initiative offers customers the opportunity to request the amount of incentive needed to complete large energy efficiency project(s) with total savings greater than 300,000 kWh and/or 30,000 therms. The payback period must be less than 10 years, and there is no minimum payback required. Multiple technologies (such as lighting, variable-frequency drives [VFDs], compressed air, HVAC, and process improvements) are included.

- The Staffing Grant offering, launched in PY4, provides customers with funding to help address energy efficiency project staffing needs. The program distributes funds based on the proportion of proposed savings ultimately achieved by the grant recipients.

- The Feasibility Study offering, launched in PY4, helps participants define project costs and energy savings opportunities, primarily targeting manufacturing/industrial facilities with compressed air systems. Incentives cover up to 50% of the study cost, with an incentive cap of $10,000 or 25% of the annual estimated savings identified in the study. In PY6, there were 10 participants, up from 4 in PY5.

- The Metering and Monitoring Pilot, launched in PY6, is a marketing channel to promote the ability for customers to buy software and sub-meters to view and analyze their energy use. The pilot allowed participants to submit their own plan for energy monitoring software implementation for identifying energy savings opportunities. AIC reimbursed approved customers for the cost of the software implementation: 50% of the cost up to $10,000 initially, and 50% of the cost up to $10,000 after measures related to software/metering were installed. Only 4 firms participated in the pilot in PY6, fewer than the pilot's limit of 20.

- The New Construction Lighting program, launched in PY4, offers additional incentives for lighting measures in new construction projects.[4] A total of 22 projects received New Construction Lighting incentives in PY6.

2.2 Research Objectives

The objective of the PY6 Custom Program evaluation is to provide estimates of gross and net electric and gas savings associated with the program. In addition, we assessed the performance of newly implemented initiatives and promotional efforts designed to improve the participation process and the ability of customers facing resource constraints to participate in the program.

The PY6 impact evaluation answers the following questions:

1. What are the estimated gross energy and demand impacts from this program?
2. What are the estimated net energy and demand impacts from this program?
3. What are the levels of free-ridership and spillover among Custom Program participants with gas savings and among customers with Staffing Grants?

As part of the PY6 evaluation, the evaluation team also explored a number of process-related research questions, focused on special initiatives and program components, including CLIP, the Staffing Grants, and the New Construction Lighting Program.

1. For the Custom Program's special initiatives (CLIP and Staffing Grants) and for the New Construction Lighting Program, how many projects were completed? By how many unique customers?
2. Does customer participation meet expectations? If not, how different is it, and why?
3. How do participants become aware of these initiatives and program components?
4. Are participants of the special initiatives (CLIP and Staffing Grants) and the New Construction Lighting Program satisfied with their experiences? What aspects of program design or implementation could AIC change to improve program effectiveness and participant satisfaction?
5. How do internal company approval processes affect participation in the CLIP initiative and the New Construction Lighting Program?
6. What impact, if any, does the New Construction Lighting Program have on the timing of the design and implementation of lighting in the new construction projects? Does the program have any effect on the design practices of engineering and architectural firms?
7. What barriers to participation exist for the special program offerings, such as CLIP and the New Construction Lighting Program? How is the program seeking to overcome them?

[4] AIC processes most New Construction projects through the Standard Program, but includes lighting projects in the New Construction Lighting initiative in the Custom Program. Additionally, large-scale new construction HVAC projects fall under the Custom Program.

3. Evaluation Methods

The assessment of PY6 of the AIC C&I Custom Program included both process and impact analyses. In addition, we gathered data to update the net-to-gross ratio (NTGR) for therm savings for application in PY8. For PY6, we applied the NTGR from PY3, given that the program's implementation has remained relatively consistent, as has the NTGR for this program over the past three program years.

Table 2. PY6 Custom Program Evaluation Methods

Activity	PY6 Process	PY6 Impact	Forward Looking	Details
Review of Program Materials and Data	✓			Gather information about program implementation and performance.
Program Staff In-Depth Interviews*	✓		✓	Explore changes made since PY5, as well as the design and implementation of special promotions, CLIP performance, New Construction Lighting projects, the Metering and Monitoring Pilot, and Staffing Grants initiatives.
Program Ally In-Depth Interviews*	✓		✓	Gather data on process, program ally satisfaction, customer feedback, and barriers to participation.
Energy Advisor Interviews*	✓		✓	Gather data on process, Energy Advisor satisfaction, customer feedback, and barriers to participation.
Customer Survey			✓	Collect data for gas participants to assess therm NTGR for PY8.
Staffing Grants Participant Interviews	✓	✓	✓	Support the development of NTGRs for these participants. The team applied these NTGRs retroactively.
CLIP Participant Interviews	✓		✓	Investigate how CLIP projects differ, as well as satisfaction, program processes, and areas for improvement.
New Construction Lighting Participant Interviews	✓		✓	Gather data on process, above-code lighting, impact on design practices, and barriers to participation.
Site Visits		✓		Collect data to inform participant verification and gross impacts.
Engineering Review		✓		Compare inputs provided in the application to the assumptions used in the analysis, verify consistency in savings estimates, and provide input into the validity of ex ante energy savings.
Net Impact Analysis		✓		Estimate net impacts using PY3 NTGR values to both the gas and electric savings.

* Conducted in conjunction with the Standard Program.

3.1 Data Collection

The following activities informed the PY6 evaluation of the Custom Program.

3.1.1 Program Staff Interviews

As part of the evaluation of the Custom Program, the evaluation team conducted in-depth interviews with program and implementation staff. We conducted three interviews with staff from Leidos, the program

implementer: one with the program managers, one with program database staff, and one with program marketing staff. Interviews focused on changes in program implementation since PY5.

3.1.2 Review of Program Materials and Data

We conducted a comprehensive review of all program materials and tracking data. We reviewed the program's implementation plan, applications, and extracts from the program-tracking database. We received extracts from the program-tracking database in January 2014 for evaluation planning and survey sampling, and we received updated data in May 2014 and then again in July and August 2014 as program implementers finalized the PY6 database.

3.1.3 Program Ally Interviews

The evaluation team conducted in-depth interviews with 12 program allies active in PY6. The evaluation team targeted program allies accounting for the largest shares of completed projects from both the Custom and Standard Programs. Interviews focused on program participation processes, program ally satisfaction, barriers to participation among eligible AIC business customers, and the impact of program participation on the program ally business and business practices.

3.1.4 Energy Advisor Interviews

As part of the evaluation of the Custom Program, the evaluation team conducted in-depth interviews with five Energy Advisors active in PY6. (The program had a total of seven Energy Advisors active in PY6, and we attempted to complete interviews with the six of the seven that were still active in the program.) Interviews focused on Energy Advisors' perceptions of customer interest in the program, interactions with customers, program processes for coordination between the Energy Advisors and Key Account Executives, and suggestions for program improvement.

3.1.5 Gas Participant Telephone Survey

We conducted a telephone survey with participants in the Custom Program that completed a gas project during PY6. We attempted to conduct a survey with all PY6 Custom Program participants that completed a gas project. We removed duplicate contact names from the sample where a single person was involved in more than one project, as well as contacts who completed a Staffing Grants project and would be called as part of that effort. While we asked participants mainly about one project to reduce respondent burden and randomly selected that project, we also captured details related to the decision-making process for those participants with more than one project of the same type.

The following table presents the population values and completed survey information for the Custom Program in PY6. Overall, we surveyed participants responsible for 75% of the total gas savings from PY6 Custom Program gas projects.

Table 3. Completed Custom Gas Projects Survey Points

Interviewees	Sample Frame*			Completed Surveys		
	Unique Customers	Associated Projects	Therm Savings	Unique Customers	Associated Projects	Therm Savings
Custom Participants	24	39	1,848,945	8	8	1,389,229

* The total number of projects listed reflects the population in Amplify as of July 2014. This includes projects with a status of check cut or check queued.

The participant survey collected information on free-ridership and spillover. The NTGR questions will be used to develop a NTGR value for the Custom Gas Program-level NTGR in PY8. Sampling error is not a factor for the PY8 NTGR because we attempted to gather data from a census of program participants installing custom gas measures. We describe other potential sources of error and the steps taken to mitigate them in Section 3.3. See **Error! Reference source not found.** for information about the NTGR research.

Survey Disposition and Response Rate

The table below shows the final survey dispositions of the telephone numbers in the PY6 samples. Table 4 provides the final survey dispositions.

Table 4. Custom Program Participant Survey Dispositions

Disposition	N
Completed Interviews (I)	8
Partial	0
Eligible Non-Interviews	12
Refusals (R)	2
Telephone Answering Device (NC)	0
Mid-Interview Terminates (R)	1
Respondent Never Available (NC)	9
Not Eligible (e)	4
Wrong Number	2
Non-Working/Disconnect	1
No Eligible Respondent	1
Unknown Eligibility Non-Interview (U)	0
No Answer	0
Total Participants in Sample	**24**

The following table provides the response and cooperation rates. We calculated the survey response rate using the standards and formulas set forth by the American Association for Public Opinion Research (AAPOR).[5]

Table 5. Custom Program Survey Response and Cooperation Rates

AAPOR Rate	Percentage
Response Rate	40%
Cooperation Rate	73%

3.1.6 Staffing Grant Interviews

We conducted in-depth interviews with Staffing Grants recipients during July and August 2014. These interviews focused on collecting data on free-ridership and spillover, in addition to information about barriers to project completion. The team attempted a census of Staffing Grants participants, as shown in the table below.

[5] *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys,* AAPOR, 2011. http://www.aapor.org/AAPORKentico/AAPOR_Main/media/MainSiteFiles/StandardDefinitions2011_1.pdf.

Table 6. Completed Staffing Grants Interviews

Interviewees	Population of Grant Recipients		Completed Interviews	
	Unique Recipients	Associated Projects	Unique Recipients	Associated Projects
Grant Recipients	12	23	2	3

Overall, the team spoke with two customers with three projects associated with staffing grants. Given that we made a census attempt, there is no sampling error or precision estimate associated with our NTGR findings. The team assigned the NTGR developed through the interview process to all Custom Program projects completed by those Staffing Grant participants if the NTGR based on interview findings was higher than the deemed NTGR. It is important to note that this adjustment was made only to relevant Staffing Grant projects and that the average NTGR resulting from these efforts was not extrapolated to the entire participant population.

3.1.7 CLIP Participant Interviews

We conducted eight interviews with PY6 CLIP participants. The interviews investigated ways that CLIP participants' projects differed from other Custom Program projects, and as well as satisfaction, program processes, and areas for program improvement.

Table 7. Completed CLIP Participant Interviews

Interviewees	Population of CLIP Participants		Completed Interviews	
	Unique Participants	Associated Projects	Unique Participants	Associated Projects
CLIP Participants	13	15	8	8

Overall, the team spoke with participants responsible for 54% of the kWh savings and 85% of the therm savings associated with projects implemented by CLIP recipients.

3.1.8 New Construction Lighting Participant Interviews

We conducted interviews with 3 of the 22 customers who received an incentive for a new construction lighting project in PY6. We screened for contacts who either were involved in the choices regarding the energy efficiency of the building design or had knowledge of the decision-making process.

Table 8. Completed New Construction Lighting Interviews

Interviewees	Population of New Construction Lighting Participants		Completed Interviews	
	Unique Participants	Associated Projects	Unique Participants	Associated Projects
New Construction Lighting Participants	22	22	3	5

Note: Two New Construction Lighting projects were near completion when interviewed ("pre-approved" and "invoices received") but were not completed within PY6. These are included within the interview results and response totals, but are not included within the Custom Program savings totals.

These interviews focused on the processes of the New Construction Lighting portion of the Custom Program, the timing of the design and implementation of above-code lighting in commercial new construction, and the influence of program participation on the design practices of engineering and architectural firms. We also

explored barriers to participation among eligible AIC business customers, including delays in the design process and/or construction due to program participation.

3.1.9 Site Visits

Energy and demand impacts associated with the Custom Program were determined based on site audits and metering measurement and verification (M&V), as well as a detailed engineering desk review of completed projects discussed below. We used these site visits to develop a sample-based realization rate that was applied to the population of projects.

We selected the sample of participant projects for these activities in two waves, drawing from data included in two separate extracts from the Amplify tracking system taken on January 31, 2014 and July 8, 2014. We drew sample from the population of the custom incentive offering, CLIP, and New Construction Lighting projects, as well as projects related to Staffing Grants.

The evaluation team selected a sample of 40 projects for engineering review and metered site verification in two waves. We chose the sample using a stratified random sample design. For the stratification, we used the Dalenius-Hodges method to determine strata boundaries and the Neyman allocation to determine the optimal allocation of the available projects to the strata. We also drew the sample in two waves to ensure a sufficient percentage of the savings from the program was assessed and to allow the team to complete the M&V in time to meet reporting deadlines.

The following tables show the sample of projects with electric savings and gas savings, respectively, selected in both waves. Overall, the 40 sites with on-site verification account for 38% of the programs' ex ante kWh savings and 95% of the gas savings.[6]

Table 9. Two-Wave Custom Site Visit Sampling Approach for Projects with Electric Savings

Sampling Strata	KWh Savings Range	Number of Projects*	Site Visits Completed
Wave 1			
1	1,560–100,000	40	3
2	100,001–350,000	15	2
3	350,001–1,400,000	8	5
Wave 2			
1	188–500,000	53	8
2	500,001–2,000,000	6	2
3	2,000,001–12,500,000	5	5
Total		**127**	**25**

* Given that we selected the samples prior to the finalization of the PY6 program-tracking data, the total number of projects does not match the final Amplify extract and the project counts presented elsewhere in the report.

[6] Ex ante savings are estimates of savings in the utility tracking system or what the utility believed they had saved prior to the evaluation. Note that the sum of electric savings includes only savings from the sample of electric projects and does not include electric savings from the sample of projects with gas savings.

Table 10. Two-Wave Custom Site Visit Sampling Approach for Projects with Gas Savings

Sampling Strata	Therms Savings Range	Number of Projects*	Site Visits Completed
Wave 1			
1	9–100,000	20	2
2	100,001–1,000,000	3	3
Wave 2			
1	571–30,000	11	5
2	30,001–100,800	5	5
Total		39	15

* Given that we selected the samples prior to the finalization of the PY6 program-tracking data, the total number of projects does not match the final Amplify extract and the project counts presented elsewhere in the report.

The final sample design provides statistically valid impact results at the 90% confidence level ±8% precision on a kWh basis for the Custom Program overall and ±18% for therms savings. We calculated precision for our gross impact results by pooling the results from both waves of site visits.[7]

To calculate relative precision, the team first determined the variance in the sample and then calculated the standard error and confidence interval. The figure below outlines the equations used.

To adjust the ex ante gross energy and demand impacts for all 182 total projects, the ratio adjustment method[8] was used. The team used the following ratio adjustment algorithm.

Figure 1. Ratio Adjustment Algorithm

$$I_{EP} = \frac{I_{EPS}}{I_{EAS}} * I_{EA}$$

where:

I_{EP} = the ex post[9] population energy and demand impacts
I_{EA} = the ex ante population energy and demand impacts
I_{EPS} = the ex post sample energy and demand impacts
I_{EAS} = the ex ante sample energy and demand impacts

Based on the on-site sample, the evaluation team calculated the gross realization rate and applied this ratio ($\frac{I_{EPS}}{I_{EAS}}$) to adjust the ex ante energy and demand savings for the population of all 182 projects.

[7] The error bound of the total savings is estimated by calculating the square root of the sum of the squared error bounds of each wave. These calculations are consistent with California Evaluation Framework.

[8] Cochran, William G. *Sampling Techniques.* 1977. New York: John Wiley & Sons.

Figure 2. Equations for Calculating Precision for Lighting Verification Visits

$$Stratified\ Ratio\ Estimator = \frac{\sum_{i=1}^{n} w_i\, y_i}{\sum_{i=1}^{n} w_i\, x_i} \qquad \text{Equation 1}$$

$$Standard\ Error = \frac{1}{\hat{X}}\sqrt{\sum_{i=1}^{n} w_i\ (w_i - 1)\ e_i^2} \qquad \text{Equation 2}$$

$$90\%\ Confidence\ Interval = \ 1.645 * Standard\ Error \qquad \text{Equation 3}$$

$$Relative\ Precision = \frac{Confidence\ Interval}{Stratified\ Ratio\ Estimator} \qquad \text{Equation 4}$$

where:

w = case weights for each stratum h (N_h/n_h)
y = ex post savings
x = ex ante savings
$e = y_i - b\ x_i$
$\hat{X} = \ w_i\ x_i$

3.2 Analytical Methods

3.2.1 Impact Analysis

Gross Impacts

The gross impact analysis of the Custom Program involved engineering review, data logging, engineering modeling, database and document verification, and on-site verification to determine gross impacts. Overall, the evaluation team reviewed a sample of 40 Custom Program projects. For these projects, the team performed a desk review to compare the inputs provided in the application to the assumptions used in the ex ante analysis, verify consistency in savings estimates throughout the project file, and provide insight into the validity of the ex ante energy savings.

Additionally, the team completed site visits at all 40 of the sampled sites to provide increased accuracy in the gross impact results. For 26 sites (65%), the team used metered data collected through the installation of data loggers or the onsite energy management systems (EMS), or the most recent billing or production data to inform ex post impacts beyond traditional engineering calculations.

Projects fell into one of several categories: lighting, compressed air, boiler/furnace, EMS/controls, and miscellaneous. The following sections provide additional details about the evaluation team's methodology and assumptions by project category.

Lighting: Lighting projects accounted for 11 of the 40 projects verified through site visits. The lighting projects reviewed by the evaluation team involved efficient lighting systems for industrial buildings and storage space. For retrofit projects, the evaluation team compared the proposed system to the existing system to determine ex post savings. For new construction projects, the evaluation team compared the proposed system to a baseline lighting power density based on the space type.

If the details about the fixture and bulb type were unavailable, the team calculated the ex post savings using the wattages supplied by the customer, vendor, or typical fixture wattage values. The team considered the energy consumption of the ballast, as well as the bulb, to estimate savings.

The evaluation team verified the quantity of lights by inspection during the site visit and obtained the hours of operation from the customer during the visit. The team did not meter lighting systems that operated under fixed schedules or that ran continuously all year. However, the team installed data loggers on 2 of the 11 projects to verify hours of operation.

Compressed Air: Compressed air projects accounted for 10 of the 40 projects verified through site visits. The compressed air systems involved replacing older air compressors with more efficient systems, newer variable frequency drive (VFD) controlled compressors, or automation systems to operate systems more efficiently, or removing an inefficient use of compressed air. The ex post savings compared the original system to the proposed system for all of the projects evaluated. The team obtained the details of the original and proposed systems from the documentation available, as well as information collected during the site visits. When possible (8 of 10 sites), we installed energy loggers on the air compressors to determine typical and peak loading profiles.

VFD compressor projects typically used the VFD compressor as a lag/trim compressor. VFD lag/trim compressors allow the system to modulate with the adjusting compressed air demand at the facility in the most efficient manner. The team used metered data from these installations to determine typical loading and peak load conditions and then compared this information to the baseline system as described by the customer and project documentation.

Boiler/Furnace: The boiler and furnace projects accounted for 7 of the 40 projects verified through site visits. Projects in this category involved the installation of efficient furnaces or boilers, a high-efficiency burner, or controls to improve the efficiency of the boiler. During the site visit, the evaluation team verified the installation of the efficient furnace, boiler, or burner. When possible, the team verified combustion efficiencies with a stack-gas analyzer. For controls projects, the set points and operation of the boilers were verified though inspection and customer interviews. Additionally, we used billing data to inform ex post savings calculations for six of the seven projects.

EMS/Controls: EMS/controls projects accounted for 6 of the 40 projects verified through site visits. Two of the six projects included direct digital controls (DDC) and other adjustments to HVAC controls. One project converted constant air volume (CAV) boxes to variable air volume (VAV) and made other adjustments to set points and scheduling throughout the project area. One project installed a new building automation system (BAS), allowing the user to more easily monitor and adjust scheduling, ventilation rates, and set points. The remaining two projects consisted of improvements to HVAC controls.

The team verified these projects through customer interviews and site visits. The team used a combination of billing data, data loggers, and readouts from the EMS to inform ex post estimates for these six projects.

Miscellaneous: The team classified the remaining six projects as “miscellaneous” or “other.” Many of these projects required project-specific calculations. The miscellaneous category consisted of the following:

- One project consisted of new chilled water equipment, including a chiller, a cooling tower, and VFDs to control the pumps and fans.
- One project was a regenerative thermal oxidizer to eliminate volatile organic compounds generated from a manufacturing process.

- One project replaced fully functioning steam traps with venturi steam traps.
- One project installed new process equipment, including filters and hammer mills, to consolidate and replace old equipment.
- One project removed an existing dust collector that vented conditioned air by re-routing ductwork to make more efficient use of a new dust collector.
- One project reduced outside air infiltration into a facility by sealing the return air plenum in the attic, which had been allowing outside air to infiltrate the building.

Net Impacts

After gross impacts were estimated, the evaluation team applied the PY3 NTGR of 0.75 for electric and gas projects. The NTGR value is based on self-reported information from the PY3 participant telephone survey that quantified the percentage of gross impacts for rebated projects, as well as participant spillover. For gas projects, we also estimated a revised NTGR that will be applied to PY8 savings. Information about the data collected to update the PY8 gas NTGR appears in **Error! Reference source not found.**.

In addition, the team utilized findings from interviews with Staffing Grants participants to retroactively adjust a select number of Custom Program projects implemented by these participants. The following section outlines the methodology used to develop customer-specific NTGRs.

Staffing Grant NTGR

The evaluation team took the following steps to arrive at a NTGR per participant that was applied to all of the projects that participants completed as a result of the grant.[10]

1. **Application Review**: The team reviewed project documentation, specifically the Staffing Grants application, to assess the stated need for staff resources in order to complete projects. This review served as background for interviews with participating customers.
2. **Interviews**: Analyst staff conducted participant interviews to estimate NTGR. The NTGR consists of two scores: Program Influence Component 1 and Program Influence Component 2. These components were determined as follows:
   - *Program Influence Component 1*: This free-ridership score is based a single survey question (N6) that asks respondents to rate the importance of the Staffing Grants on their ability to implement the energy saving projects completed at their facility. To convert this response into the Component 1 score (LI), the team used the following formula:

$$LI = 1 - (N6 \times 0.1)$$

   - *Program Influence Component 2*: This free-ridership score is based on two questions: the likelihood that each project would have been completed without the Staffing Grants (N10), and if the project would have been completed at the same time or later (N11). The team asked these two questions for each of the projects that the participant implemented as a result of the grant.

[10] Please note that not all of the projects completed by Staffing Grant recipients were submitted through the Custom Program. Similar adjustments were made within the Standard and Retro-Commissioning Programs.

The participant responses to N10 were converted into a value between 0 and 1 based on the following formula:

$$QI = N10 \times 0.1$$

In addition, the team assigned free-ridership values between 0 and 1 for responses to N11 using the following formula:

IF N11 = "Never," T1 = 0

IF N11 = "Same time," T1 = 1

IF N11 = "Within 1 year," T1 = 0.66

IF N11 = "Within 2–3 years," T1 = 0.33

As outlined above, each sub-component score (Quantity and Timing) can take on a value of 0 to 10, where a lower score means a lower level of free-ridership. The overall Component 2 score for a participant is the average of the QI and TI scores.

$$Component\ 2 = Average\ (QI, TI)$$

- *Overall Free-Ridership—Combination of Components 1 and 2*: To calculate an overall program influence score, the evaluation team averaged Component 1 and Component 2. The resulting free-ridership factor for each participant thus ranges from 0 (no free-ridership) to 1 (100% free-ridership).

$$FR = Average\ (Component\ 1, Component\ 2)$$

- *NTGR Score*: To develop the NTGR score, the team subtracted the free-ridership score from 1 as shown below:

$$NTGR = 1 - FR$$

- *Spillover*: The team also asked questions to gather information about potential spillover, which would be integrated with the NTGR score as NTGR = (1 − FR + SO). To determine the participant-level spillover factor, the team divided the estimated net savings of the measures installed outside of the program (but influenced by the program) by the gross savings the respondent realized through the program.

Figure 3. Spillover Algorithm

$$\text{Spillover} = \frac{Respondent\ Net\ Energy\ Savings\ from\ Measures\ Installed\ outside\ the\ Program}{Respondent\ Gross\ Energy\ Savings\ from\ Measures\ Installed\ through\ the\ Program}$$

3. **Consistency Check:** The evaluation team included questions in the survey to identify instances in which the interview findings contradicted the data available in the application and developed protocols to reconcile inconsistent findings, if identified. However, the team found that there were no cases in which the interview results contradicted the data in the application.

4. **Final NTGR Determination**: As a final step in this process, the evaluation team compared the NTGR developed through the interview process above with the existing PY3 NTGRs for the various C&I

programs.[11] The PY3 NTGRs were used as a floor and, if the NTGR developed through the Staffing Grants interview exceeded the PY3 value, the team applied the new NTGR to all of the projects completed by that participant in PY6.[12] However, if the newly developed NTGR fell below the established PY3 value, the team applied the appropriate PY3 value to each of the participant's projects. This type of adjustment was made for four projects associated with two participating customers.

3.3 Sources and Mitigation of Error

Error! Reference source not found. provides a summary of possible sources of error associated with data collection conducted for the Custom Program. We discuss each item in detail below.

Table 11. Possible Sources of Error

Data Collection Effort	Survey Errors		Non-Survey Errors
	Sampling Errors	Non-Sampling Errors	
Participant Survey	• N/A – Census Attempt	• Measurement error • Non-response and self-selection bias • Interviewer error • External validity	• N/A
Site Visits	• Yes	• N/A	• Analysis error
Gross Impact Calculations	• Yes	• N/A	• Analysis error
Net Impact Analysis	• N/A – Census attempt for gas projects for PY8 NTGR research	• Measurement error • Non-response and self-selection bias • Data processing error • External validity	• Analysis error

Participant Survey

The evaluation team took a number of steps to mitigate against potential sources of error throughout the planning and implementation of the PY6 evaluation.

Survey Error

- Non-Sampling Error
  - **Measurement Error:** Both the validity and reliability of quantitative data were addressed through multiple strategies. First, we relied on the experience of the evaluation team to create questions that, at face value, appear to measure the idea or construct that they are intended to measure. We reviewed the questions to ensure that double-barreled questions (i.e., questions that ask about two subjects, but that have only one response) and loaded questions (i.e., questions that are

[11] Per the Illinois NTGR Framework, the team generally applied PY3 NTGRs to determine PY6 net impacts.

[12] The team chose to establish a floor for two reasons: 1) Staffing Grant participants cannot be asked to speculate about the influence of the program and its incentive *if* they had a staff person to implement projects, and 2) it is reasonable to assume that the Staffing Grant participants are comparable to other AIC customers who went through the business programs via traditional channels, and therefore were selected for measure-specific NTGR survey batteries.

slanted one way or another) were not asked. We also checked the overall logical flow of the questions so as not to confuse respondents, which would decrease reliability.

All survey instruments were reviewed by key members of the evaluation team, as well as AIC and Illinois Commerce Commission (ICC) staff. In addition, to determine if the wording of the questions was clear, we pretested each survey instrument, monitored the telephone interviews as they were being conducted, and reviewed the pretest survey data. We also used the pretests to assess whether the length of the survey was reasonable and reduced the survey length as needed.

- **Non-Response Bias and Self-Selection Bias:** Given that the response rate for the participant survey was 40%, there is the potential for non-response bias. We attempted to mitigate possible bias by contacting each contact in the sample at least eight times, unless a hard refusal was received or the quota was filled, and by calling at different times of the day as appropriate. In addition, the team used all available data at its disposal to assess whether evidence of non-response bias exists. For this survey effort, we compared survey respondents to the population based on business type, number of projects, and project savings. We found no evidence to suggest that non-respondents differed significantly from respondents for these variables.

- **Interviewer Errors:** The team addressed this error through interviewer training, as well as quality checks of completed survey data. Opinion Dynamics interviewers went through rigorous training before they began interviewing. Interviewers also received a general overview of the research goals and the intent of the survey instrument. Further, through survey monitoring, members of the evaluation team also provided guidance on proper coding of survey responses. In addition, we carried out continuous, random monitoring of all telephone interviews and validation of at least 10% of every interviewer's work.

- **External Validity:** We addressed external validity (the ability to generalize any findings to the population of interest) through development of a stratified random sample of the population of projects. During data collection, the evaluation team managed the sample to minimize self-selection bias (i.e., we allowed for multiple attempts at different times of the day and exhausted one part of the sample prior to moving on to the next).

Non-Survey Error

- **Analysis Error**

  - **Gross Impact Calculations.** We determined gross impacts using data collected during site visits, engineering algorithms, and modeling. To minimize data analysis errors, the evaluation team had all calculations reviewed by a separate team member to verify that calculations were performed accurately.

  - **Site Visits.** To minimize data collection error, the evaluation team conducted the site visits using trained engineers and technicians familiar with the equipment covered by the Custom Program and the methods used to calculate the gross impacts.

  - **Net Impact Calculations.** We applied deemed NTGRs to estimate the program's net impacts. To minimize analytical errors, the evaluation team had all calculations reviewed by a separate team member to verify that calculations were performed accurately.

4. Detailed Findings

4.1 Custom Program Process Findings

The evaluation team performed a targeted process evaluation of the PY6 Custom Program's special initiatives and program components, including CLIP, the Staffing Grants, and the New Construction Lighting Program. Related research questions were related to the number of projects, meeting participant expectations, program awareness, satisfaction, internal decision-making processes, and barriers to participation.

Results are based on in-depth interviews with program staff; participants of the CLIP, Staffing Grants, and New Construction Lighting initiatives; and program allies and Energy Advisors.

4.1.1 Program Description and Participation

The C&I Custom Program allows AIC business customers to complete energy efficiency projects that involve the installation of equipment not covered through the Standard Program. The availability of this program option allows customers to propose additional measures and tailor projects to their facility and equipment needs. Custom incentives are available for electric measures, such as lighting, compressed air, energy management systems, and industrial process measures, among others, and the program also offers gas measures, including heat recovery, process heat, and improvements to steam systems.

The program also provides special program offerings, such as the CLIP initiative, Staffing Grants, and Feasibility Studies. In addition, in PY6, the program initiated a new behavior-based program, the Metering and Monitoring Pilot. Consistent with prior years, the PY6 Custom Program serves as the channel for the submission of New Construction Lighting projects.

Program Participation

Overall, the Custom Program approved 160 unique projects as summarized in Table 12 below. Slightly fewer projects were completed in PY6 compared to PY5 (172 projects) and the PY6 Custom Program projects contained a mix of different measure types, with some of the more common coming from the lighting, compressed air, HVAC, and refrigeration end-uses.

Table 12. Summary of PY6 Custom Measure Types

End-Use	Electric Measures		Gas Measures	
	Number	Percent of Measures	Number	Percent of Measures
Lighting	46	38.0%	0	0.0%
Compressed Air	31	25.6%	0	0.0%
Refrigeration	12	9.9%	0	0.0%
Chiller	8	6.6%	0	0.0%
Industrial Processes	8	6.6%	5	12.8%
HVAC	7	5.8%	19	48.7%
Controls	4	3.3%	6	15.4%
Motors/VFDs	4	3.3%	0	0.0%
Boiler	0	0.0%	6	15.4%
Building Envelope	0	0.0%	1	2.6%
Steam Traps	0	0.0%	1	2.6%
Miscellaneous	1	0.8%	1	2.6%
Total	**121**	**100.0%**	**39**	**100.0%**

Other Initiatives

In addition to the custom incentives listed in Table 12 above, the Custom Program also provides special program offerings. Table 13 lists these offerings and their PY6 participation. Note that the projects associated with CLIP and Staffing Grants are also included in Table 12.

Table 13. Special Custom Program Offering Participation in PY6

Initiative	Total Incentives/Grants	Unique Customers	Associated PY6 Projects
New Construction Lighting	22	19	22
CLIP	15	13	15
Staffing Grants	15	12	23
Feasibility Studies	10	9	10
Metering and Monitoring	4	4	4
Total	**66**	**57**	**74**

4.1.2 Program Design and Implementation

AIC continues to modify the Custom Program to overcome barriers to participation and create a seamless participation process for customers. Though there were a number of changes to the program in PY6, findings from the participant survey and interviews with program staff and other participants and stakeholders indicate that the C&I Custom Program continued to function smoothly and effectively.

Implementation Changes

In general, the structure and delivery of the Custom Program remained consistent with PY5. However, AIC implemented some key changes to program delivery, which are described below.

- **Metering and Monitoring Pilot:** Launched in PY6, the Metering and Monitoring Pilot is a marketing channel to promote the ability of customers to buy software and sub-meters to view and analyze their energy use. The pilot allowed participants to submit their own plan for energy monitoring software implementation for identifying energy saving opportunities. AIC reimbursed approved customers for the cost of the software implementation, 50% of the cost up to $10,000 initially, and 50% of the cost up to $10,000 after measures related to software/metering were installed.

- **Early Bonus Deadlines:** To create a sense of urgency and drive early participation, deadlines to qualify for early completion bonuses were earlier in PY6 than in PY5 for both participants and trade allies.

- **Earlier CLIP and Staffing Grant promotion:** The CLIP and Staffing Grants promotions began earlier in PY6 than in PY5 to allow potential participants to consider larger projects that might have required more planning and consideration to complete. Program staff believe that this change may have driven the relatively large size of individual projects in these initiatives.

- **Program Ally Bonus:** The program ally bonus, which covered both the Illinois Power Authority (IPA) and 8-103/8-104 programs for part of the program year, helped keep program allies engaged. However, due to a large number of applications, AIC and Leidos suspended program ally bonuses in September 2013. Initially, this caused some confusion: according to program staff, some allies assumed that the program itself had ended. The majority of program allies did not express significant dissatisfaction with the suspension or suggest that any proposed projects were not completed due to the loss of this bonus. However, a minority did indicate that the loss of this "promised" bonus did affect their sales process and estimates for customers.

- **Project-Tracking Database:** In PY6, the C&I portfolio implemented a new data tracking system, Amplify, which replaced AIB. This shift represented the most significant change for the C&I programs and two key factors initiated this change.

  - First, the program intends to switch to a new application system, AMPMagic, in PY7, and designed Amplify to work seamlessly with this new application system. Program staff implemented a limited pilot of AMPMagic with program allies in PY5, and originally planned to launch AMPMagic to allow online applications for lighting projects in PY6. However, the program staff did not make the planned change when they realized that the program would easily meet its goals in PY6 and that the program budget would likely be exhausted. Instead, program staff focused on preparing AMPMagic for launch in PY7.

  - Second, the program implementer built Amplify to work with the Salesforce customer relationship management platform, allowing for greatly expanded lead tracking and reporting functionality than the previous database system. This increased functionality will aid Energy Advisors and program staff in their efforts to track and manage past, current, and potential program participants.

Marketing and Outreach

Overview of Marketing Strategy

In general, the Custom Program implementation team identified six main marketing strategies for PY6, as shown in Figure 4.

Figure 4. Custom Program Marketing Strategies

According to program staff, the PY6 changes to marketing strategy, including the earlier deadlines for bonuses and starting CLIP and Staffing Grants promotions at an earlier time, were all effective at driving participation.

Marketing Exposure in Participants

Among the primary PY6 marketing channels, targeted mailers and program allies were the most effective in bringing new customers to the CLIP program.

Two of the eight interviewed CLIP participants cited a program mailer as their first exposure to the program, which motivated them to find out more through other channels, such as the website or a contractor. This matches information gathered from program staff, who said that the new sector-specific marketing messages seemed to drive interest. In two other cases, contractors successfully used CLIP as a sales tool to make the case that these projects could result in sufficient return on investment (ROI) within a reasonable period.

Some respondents cited other channels, such as previous participation (two), their Energy Advisor (one), and an unknown source within their facility staff (one).

4.1.3 Participant Experience and Satisfaction

In-depth interviews with program staff and program allies, as well as CLIP, Staffing Grants, and New Construction Lighting incentive recipients allow us to understand PY6 participant experience and satisfaction.

CLIP

Participant Characteristics

The CLIP participants interviewed tended to represent larger manufacturing facilities. Most respondents implemented projects in manufacturing facilities (five of eight), as well as one industrial facility, one office, and one distribution center. While some facilities were built within the last 10 years, the mean age of the facilities was 46 years. Compared to other companies in their industry, three of the eight respondents consider themselves to be large, four are medium, and one small.

Satisfaction

Respondents indicated high satisfaction with the CLIP offering and reported a mean overall satisfaction score of 9.1 on a scale of 0 to 10. When asked to rate satisfaction on a 0 to 10 point scale, no respondent offered a score less than 7 for any aspect of the program, including the application process, the incentive amount, the contractor, the technical review staff, and the program overall. Each respondent also said that he or she would recommend the program to others.

Benefits and Barriers

Overall, CLIP interviewees indicated that the early completion bonus was a clear program benefit. They stated that the additional incentive was sometimes the difference between making a project feasible and waiting another year for consideration. It was also useful for internal decision making, to spur action, and to prioritize project completion among competing internal demands.

One respondent indicated that the optional corporate commitment letter was a useful feature early in the program process. For this respondent, the letter gave managers within the participant organization assurance that corporate-level budget and decision-making support would continue to be available throughout the project, ultimately leading to increased participant satisfaction.

The scale and complexity of CLIP projects can be a barrier for some companies, especially if they do not have support from knowledgeable third-party experts or significant internal technical resources. Two respondents

indicated that paperwork, engineering, and budgetary tasks can be prohibitive due to the scale of these CLIP projects, However, both indicated that they were able to handle these challenges due to the size and expertise of their internal staff, as well as the critical aid of knowledgeable contractors.

Some interviewees indicated that a lack of knowledge of custom industry-specific equipment could be a barrier to participation. Two respondents indicated that they were able to identify opportunities for CLIP participation only through a combination of careful energy management and a deep specialized knowledge. They believed that an AIC energy audit would not have identified these opportunities and that other companies were likely missing opportunities due to lack of expertise.

Respondents reported general satisfaction with the time required to receive an incentive, though one respondent cited this as a potential barrier. In this case, the respondent was working with a third-party financing company to whom they were to give the incentive once it arrived. This increased the pressure to receive the incentive. Clearer communication between AIC and the CLIP recipient about the project timeline at the beginning of the program process would have mitigated the issue.

One respondent considered the Early Completion Bonus deadline to be a barrier. A project required the construction of a new facility in which to implement the CLIP measure. This additional work required the contractor to work overtime to meet deadlines. In addition, no action was allowed until after pre-approval, which pushed the scheduled timeline forward. This case was an exception, however, and no other respondent reported problems meeting the Early Completion Bonus deadline.

Participant Decision Making

Many interviewees indicated that the CLIP incentive was a crucial component of building an effective case for corporate consideration of a project. Generally, a manager at the facility level (e.g., engineering manager, facilities manager, or energy manager) identified the opportunity for efficiency and made a budgetary case for corporate funds. Some indicated that this case was based purely on the ROI, though others indicated that energy efficient projects have less stringent ROI requirements than other projects, due to both energy savings and environmental impact. Interviewed CLIP participants commonly cited ROI requirements of two to three years.

For many of the interviewed participants, the CLIP incentive (as well as the Early Completion Bonus) were critical to augment the ROI and satisfy corporate budget requirements. Without the CLIP incentive, some said that they would never have installed the equipment, some that they would have installed less-efficient equipment, and others said that they would have waited to replace-on-failure.

Opportunities for Improvement

Some CLIP interviewees offered suggestions for improvement, in many cases involving improvements in communication. For example, one participant indicated that he was not aware of AIC's Standard or Custom Program, and expressed interest in exploring these opportunities. This respondent indicated this lack of awareness was likely because he had minimal contact with AIC and relied heavily on a contractor who did not engage in any cross-promotion.

Another respondent spent a significant amount of time in doubt about whether the program would continue to be funded. This respondent contacted AIC many times to ask if the program would be available again the following year, and did not receive a satisfactory answer. While this does indicate an opportunity for improved communication about the timing of program activity, no other respondents indicated this specific area of confusion.

One respondent suggested a change to the project update process. This respondent indicated that he did not receive a confirmation from AIC after sending each required project update. One instance of this occurred during the first month of the project, leading the respondent to become nervous about the possibility that something had gone wrong and that the project would not continue. This issue was soon resolved, but consistent communication would have very likely increased satisfaction.

Several respondents indicated that increased access to industry-specific technical assistance might increase program participation by allowing potential participants to identify custom projects that they would otherwise not be able to identify. While an energy audit, or a feasibility study, for AIC may identify some opportunities, these efforts may overlook other opportunities that require thorough knowledge of industry-specific equipment and processes.

One respondent suggested that, due to the increased scarcity of T-12 bulbs, projects that involve T-12 to T-8 replacements would likely occur without program intervention.

New Construction Lighting Findings

We spoke with three participants who received incentives through the New Construction Lighting offering.

Participants unanimously said that when undertaking a new construction project, they generally attempt to build to a high degree of energy efficiency. While participants did not report codified corporate rules about energy efficiency, they stated that the general corporate push is to move toward higher efficiency equipment. Participants also reported that choices about lighting are generally made fairly early in the project timeline, either well in advance of a construction project in the planning phase or in the first round of choosing specific items of equipment to install in a new building.

Participants suggested that while the New Construction Lighting offering did help push them toward more efficient lighting, it did not cause a major shift in their lighting plans for the new construction projects they completed with the aid of the program.

One participant represented a business chain and indicated that installing high efficiency lighting in new buildings was efficient from a corporate perspective, because most buildings use a standard floor plan and specifications. Therefore, rather than having to spend the time and energy to spec out a new project every time, the company was able to select high efficiency lighting and use it as the standard installation for new buildings.

Participants reported being very satisfied with the New Construction Lighting offering and did not point out any specific flaws with the program. Anecdotally, one interviewed program ally mentioned that he believed that the information required to be submitted with a New Construction Lighting application was one of the most time consuming parts of the program. Participants unanimously reported that program allies completed the applications for them.

Staffing Grants

We also completed interviews with two Staffing Grant participants.

Both interviewed participants reported applying for Staffing Grants funds to supplement multiple potential projects, but ultimately ended up completing only one project each under the Staffing Grants. They both expressed some frustration with the structure of the offering, noting that it required participants either to commit resources upfront to determine the projects that they would complete or to “look in the crystal ball” and try to figure out what was going to happen without much aid.

Nevertheless, both participants did say that the Staffing Grant funds were important in completing the associated projects. Both said that the Staffing Grants incentive was the "icing on the cake" that led them to complete projects that may or may not have happened otherwise. Both participants said that, without the Staffing Grant funds, the projects that they completed might not have passed their internal ROI review and that the Staffing Grants incentive allowed them to easily meet these thresholds.

Neither participant reported hiring additional employees as a result of the Staffing Grant funds. Instead, they instead suggested that the funds allowed them to spend more time focusing on energy efficiency than they otherwise could have.

Both participants reported being generally satisfied with the Staffing Grants offering, but suggested that the program do a better job explaining it to potential participants. Both said that their Energy Advisor was key in introducing the offering to them and helping them understand it, and that without this assistance they would not have understood what the offering was designed to do or how to apply for incentives through it. One participant strongly suggested that the offering be reworked and not require applicants to describe all the potential projects that they might complete under it far in advance of the time frame in which these projects might happen.

4.1.4 Energy Advisor Experience and Satisfaction

In addition to dedicated program marketing, technical review, and call center staff, the ActOnEnergy Business Program has seven regional Energy Advisors who market and support energy efficiency projects to AIC commercial and industrial customers. Energy Advisors focus on helping customers identify and address opportunities for energy efficiency through participation in the Standard, Custom, and Retro-Commissioning Programs. As part of our evaluation, the team interviewed five of the seven Energy Advisors active in the ActOnEnergy Business Program during PY6. Energy Advisors felt very positive about the operation and structure of the ActOnEnergy Business Program as a whole, as well as the Energy Advisor role specifically. All Energy Advisors felt that their job has well-defined and reasonable responsibilities and that the Energy Advisor team operated smoothly.

Energy Advisor Responsibilities

AIC's service territory is broken into seven geographic territories, with each territory being the responsibility of an Energy Advisor and containing a similarly sized portion of AIC's customers. Energy Advisors had no issues with the size of their geographical or customer responsibilities, and generally felt that the program was staffed at appropriate levels.

Program Mechanics and Coordination

Besides regularly scheduled communication and meetings, Energy Advisors reported frequent informal communications with other Energy Advisors. When Energy Advisors encountered technical issues that they were unfamiliar with, they reported frequently reaching out to other Energy Advisors who might be more skilled in that particular area, and vice versa.

Numerous goals exist for Energy Advisors, including personal goals for each Energy Advisor and program-wide goals for all seven Energy Advisors combined, including goals for savings and contacts with potential customers. Energy Advisors felt that goals were thoughtfully set and reachable, and generally reported being able to meet them in PY6.

Energy Advisors also reported substantial coordination with AIC Key Account Executives (KAEs). Energy Advisors stated that they had good relationships with KAEs and that, especially because KAEs have their own energy efficiency goals, there is substantial motivation on the part of both parties to assist large customers managed by the KAEs in completing projects through the program. Energy Advisors also cited the well-developed relationships between KAEs and large customers as being beneficial in helping convert more opportunities into projects through the program.

Advisors reported less interaction with other AIC staff, but did state that marketing and outreach staff, as well as the AIC call center, do a very good job of funneling potential customers to Energy Advisors when they call looking for information on energy efficiency.

Customer Relationship and Project Acquisition

Energy Advisors believe that they were successful in helping the program achieve its goals and gain new participants. Advisors identified a number of different strategies for acquiring projects, depending on the types of potential customers with whom they interact. For smaller businesses or customers that may not have participated in the program previously, Energy Advisors utilize several strategies, including face-to-face visits at customer facilities and telephone contact with potential participants, during which they provide program information and attempt to gather information on the customer's needs.

For larger customers and prior program participants, Energy Advisors leverage their knowledge of the customer, their facility, and past participation in the program, if any, to attempt to identify opportunities for energy efficiency improvements the customer could make. Energy Advisors indicated that tracking customers this way is beneficial; during a project, an Energy Advisor might notice a system that will need replacement in future years and note this information. Advisors regularly review their notes and information on customers in their territories looking for opportunities that may have arisen since their last contact with a customer.

Energy Advisors specifically commented that Amplify, the new program tracking system, will be extremely useful in recording and tracking customer interactions and potential leads. While, as mentioned earlier, Energy Advisors did report some challenges in adapting to the new system, several mentioned being pleased with its lead tracking functionality. Advisors stated that the previous data tracking system was not able to easily track this information, and reviewing customer information looking for potential projects would involve reviewing paper notes, as well as relying on the Energy Advisor's memory and experience with customers in his or her service territory. Amplify's ability to track customer relationships should allow this information to be documented in a standard manner and simplify the process of searching for new opportunities. Feedback from Energy Advisors indicated that, while this functionality is available, they are not yet fully using it, given the complexity of transitioning from developed processes for managing customer information prior to the implementation of Amplify.

4.1.5 Program Ally Experience and Satisfaction

As part of our evaluation, we interviewed 12 program allies active during PY6. Interviewed allies represented a number of different market actor types, including electrical contractors, mechanical contractors, equipment suppliers, and wholesalers. Program allies also varied in terms of the length of their participation in the ActOnEnergy Business Program: a third of interviewed allies reported being relatively new to the program, having become a registered program ally in 2012 or later; a third reported joining the program in 2010 or 2011; and a third prior to 2009.

We primarily spoke to allies who had substantial participation in the program in PY6: two-thirds of interviewed allies personally reported having completed 10 or more projects through the Standard and Custom Programs

in PY6. Most allies reported completing primarily lighting projects through the program, with only a handful of other projects. We also spoke with several small companies handling only a few projects per year through the program.

Marketing and Outreach

Most program allies perceived customers as being only somewhat aware of the ActOnEnergy Business Program. Generally, allies reported that a substantial portion (but fewer than half) of their customers knew that the program existed, but that they were not well informed about its offerings. Only two allies thought that more than half of their customers were aware of the program, but one also self-identified as being a contractor well known for energy efficiency services, and indicated that customers would typically contact them to complete projects through the program.

All but two interviewed allies reported promoting the program to nearly every customer that they spoke with who was not already aware of it. A few allies indicated that they specifically focused their marketing on the ActOnEnergy Business Program (including co-branding or approval of materials by AIC), but most indicated only a casual use of program marketing materials. Instead, most program allies told us that they preferred face-to-face or telephone conversations with their potential customers, at which point they would discuss the program and its benefits for the customer.

Participation and Program Processes

Every interviewed program ally expressed that email was the best way to keep them up to date with program changes, although multiple allies simultaneously expressed that their regional Energy Advisor was also an ideal source for keeping them informed and that they felt comfortable contacting them for program information. Without prompting, many allies indicated that they were quite satisfied with the program's distribution of information to them and that they felt well informed about program updates and changes.

As stated earlier, most allies did not believe that availability of the AweSummer bonus caused their customers to apply earlier or apply for projects that they otherwise would not have completed.[13] Several program allies stated that the lifecycle of their typical projects was too long to complete new projects between the announcement of the bonus and the deadline. One ally mentioned a typical "6- to 12-month cycle," and, given that the bonus window was only 3 months long, that instead projects already in the pipeline received the bonus if their timing happened to match up with the bonus availability period. A few allies did mention that they tried to speed up projects in the pipeline to qualify for the bonus if possible, but only one interviewed ally firmly believed that the bonus brought in new projects that otherwise would not have happened.

Most program allies were aware of the suspension of the program ally bonuses in PY6. None believed that it caused planned projects not to go forward, but several did express dissatisfaction with the seemingly transient nature of this bonus. One ally stated:

> "We don't plan for [the bonus]. We don't use it in any way, shape, or form because if we did plan on that money then we would be hurting ourselves."

[13] The AIC C&I Program implemented a new customer bonus incentive in PY6. Called the "AweSummer" bonus, it consisted of a 10% bonus on projects completed by the end of September 2013. The program intended this bonus to produce a large inflow of projects early in the program year.

Another ally stated that they never planned to pass the program ally bonus amount associated with specific projects to the customer, but just used the bonus funds, if available, to help market the program more.

Most allies reported an increase in their sales of energy efficient equipment in the past year. Some allies attributed this to the program, but many believed that increases were primarily due to shifting consumer attitudes about efficient equipment, specifically lighting. About half of the interviewed allies also reported changing business practices as a result of the ActOnEnergy Business Program. These changes included increasing program-related marketing, keeping an extra stock of program-incented measures, and hiring additional staff to deal with program-related tasks.

Satisfaction and Barriers

Generally, program allies expressed satisfaction with the ActOnEnergy Business Program: All but one rated their satisfaction with the program a 7 or above on a scale of 0 to 10, and the mean score among allies was an 8.4. When asked to rate satisfaction with program components, most program allies provided very positive scores. Only two interviewed program allies provided negative feedback about more than one part of the program. All other allies either had no stated complaints about the program or had only one isolated complaint.

ActOnEnergy Business Program staff, specifically, received extremely positive feedback, with allies mentioning their satisfaction with them repeatedly and in multiple contexts. One ally said:

> "The ActOnEnergy staff that we work with have been knowledgeable and easy to work with… they explain the program well to allies, [and] staff is available to answer questions."

However, some allies did express frustration with ActOnEnergy Business Program technical review staff, either with the length of the review period for projects or, more specifically, with perceived nitpicking or spurious requests for information on applications.

Program allies provided a range of comments about barriers to participation or completion of more projects through the program. Allies did not point to any consistent barriers for their participation in the program. Barriers for potential participants mentioned multiple times included upfront cost of projects to the customer and customer awareness or understanding of the program. Multiple program allies mentioned that they believed customers thought that the program was "too good to be true," and commented that they thought that the program needed to do more marketing to inform customers about the details of the program, so that they would understand how the program works, that the opportunities are real, and how to pursue them.

In the realm of the Custom Program specifically, one program ally mentioned the New Construction Lighting spreadsheet to be "the most difficult part of the entire program." Another said that that the applications for projects going through the Custom Program take too much time and that "that can really hurt a project sometimes because usually they are in a rush to get it done."

Two program allies also mentioned issues with LEDs incented through the program. One ally mentioned that he believed the LED incentive level needed to be higher to motivate customers to pursue these measures rather than linear fluorescent lights, while another indicated that new versions of LED lights that customers wanted were not available through the program.

4.2 Impact Assessment

4.2.1 Verification and Gross Impacts

For the Custom Program, we verified program participation and gross impacts through site visits with a sample of participating customers. The site-specific M&V led to the development of a gross realization rate that is applied to the population of all projects in the program.

Site-Specific Results

Table 14 presents the results of the gross savings analysis for the 40 Custom Program sites in our sample.[14] The individual projects had realization rates ranging from 23% to 251% for electric and 0% to 262% for gas.

[14] Detailed site visit reports from 10 of the largest Custom Program projects are included in Appendix D.

Table 14. PY6 Gross Impact Realization Rate Results for the Custom Program Sample

Project ID	Wave	Stratum	Ex Ante Savings			Ex Post Savings			Realization Rate		
			kW	kWh	Therm	kW	kWh	Therm	kW	kWh	Therm
600003	2	3	1,427.00	12,500,000	-	1,580.4	13,844,194	-	111%	111%	N/A
600054	2	3	981.53	6,004,638	-	1,084.0	6,707,847	-	110%	112%	N/A
600022	2	3	518.80	4,364,588	(12,738)	308.0	2,919,979	(22,090)	59%	67%	173%
600028	2	3	341.40	2,867,760	-	383.2	3,050,775	-	112%	106%	N/A
600280	2	3	1,670.00	2,270,956	-	698.6	2,494,105	-	42%	110%	N/A
600041	2	2	141.01	1,847,529	-	170.0	2,355,832	-	121%	128%	N/A
600062	2	2	155.90	1,362,407	100,798	72.1	1,283,255	48,108	46%	94%	48%
600058	1	3	166.8	1,352,399	-	173.5	1,387,814	-	104%	103%	N/A
600053	1	3	139.9	1,227,854	-	140.2	1,227,854	-	100%	100%	N/A
600475	2	2	397.60	1,156,685	-	425.6	697,431	52,676	107%	60%	N/A
600417	2	2	114.08	999,262	46,404	26.1	228,391	32,065	23%	23%	69%
600150	1	3	101.4	887,826	-	98.8	865,134	-	97%	97%	N/A
600100	1	3	138.0	689,288	-	107.1	810,456	-	78%	118%	N/A
600035	1	3	96.8	637,300	-	69.6	386,342	-	72%	61%	N/A
600348	2	1	(37.00)	325,941	17,257	126.2	818,526	33,473	-341%	251%	194%
600777	2	1	38.30	287,213	-	37.0	324,120	-	97%	113%	N/A
600987	2	1	36.61	242,397	-	41.3	361,656	-	113%	149%	N/A
600659	1	2	25.9	227,355	-	15.8	132,192	-	61%	58%	N/A
600569	1	2	21.1	185,065	-	28.6	224,556	-	135%	121%	N/A
600916	2	1	19.86	165,458	-	29.2	209,087	-	147%	126%	N/A
600495	2	1	14.67	117,083	-	22.5	92,411	-	154%	79%	N/A
600155	2	1	17.23	100,628	-	6.4	52,164	-	37%	52%	N/A
600010	2	1	9.13	97,181	-	17.7	83,530	-	194%	86%	N/A
600465	2	1	11.75	94,020	-	19.0	116,133	-	162%	124%	N/A
600279	1	1	15.0	90,198	-	6.9	50,652	-	46%	56%	N/A
600430	1	1	16.7	85,261	-	0.3	52,728	-	2%	62%	N/A

Project ID	Wave	Stratum	Ex Ante Savings			Ex Post Savings			Realization Rate		
			kW	kWh	Therm	kW	kWh	Therm	kW	kWh	Therm
600106	1	1	18.3	85,209	-	19.4	70,456	-	106%	83%	N/A
601002	2	1	0.15	1,322	571	0.2	1,396	570	106%	106%	100%
601300	2	1	0.28	1,218	-	0.5	1,639	-	169%	135%	N/A
600049	1	2	-	-	110,371	-	-	110,371	N/A	N/A	100%
600068	1	2	-	-	342,206	-	-	130,838	N/A	N/A	38%
600184	1	1	-	-	16,334	-	-	17,283	N/A	N/A	106%
600302	1	1	-	-	7,671	-	-	-	N/A	N/A	0%
600012	2	1	-	-	20,055	-	-	14,908	N/A	N/A	74%
600031	2	2	-	-	37,626	-	-	26,074	N/A	N/A	69%
600052	2	2	-	-	60,983	-	-	51,502	N/A	N/A	84%
600065	2	2	-	-	49,520	-	-	35,187	N/A	N/A	71%
600137	2	1	-	-	2,137	-	-	5,602	N/A	N/A	262%
601156	2	1	-	-	3,145	-	-	4,074	N/A	N/A	130%
600005	1	2	(175.3)	(1,525,975)	937,237	(151.3)	(906,405)	1,012,261	86%	59%	108%
Total			6,422.9	38,748,065	1,739,578	5,556.9	39,944,249	1,552,902	87%	103%	89%

Table 15 presents the electric savings results of the gross savings analysis for the 40 Custom Program sites in our sample by technology category.

The relatively low electricity realization rate in the EMS/Controls category is a result of several factors. For one project, ex ante savings appear to double-claim the savings associated with reheating. The same project claimed ex ante savings for CO_2 sensors, but the site visit confirmed that the customer never installed the CO_2 sensors. Other projects within the EMS/Controls category received lower realization rates mainly due to the ex post analysis using the most recent billing regression analysis, which supported ex post engineering calculations. In several cases, we revised ex ante assumptions based on information obtained during the site visits (e.g., flow rate of leaking heat exchanger, operation of ventilation systems, and baseline system parameters).

Within the VFD category, the low electricity savings were driven by a calculation error in the ex ante analysis. The ex ante analysis assumed the motor kW equal to the nameplate motor horsepower (hp) instead of converting to kW using the 0.746 kW/hp conversion factor. This resulted in higher than actual baseline energy usage.

Table 15. Custom Program Site Visit Results: Electric and Demand Impacts

Technology	Qty	kW Savings			kWh Savings		
		Ex Ante	Ex Post	Realization Rate	Ex Ante	Ex Post	Realization Rate
Lighting	11	655	679	104%	5,912,516	6,237,489	105%
Compressed Air	10	3,610	3,666	102%	28,054,126	28,987,245	103%
EMS/Controls	6	250	231	92%	2,788,238	2,382,337	85%
Miscellaneous	4	1,892	973	51%	1,902,988	2,286,527	120%
VFDs	1	15	7	47%	90,198	50,652	56%

Table 16 presents the natural gas savings results of the gross savings analysis for the 15 Custom Program gas projects in our sample by technology category. Note that some of the projects listed in Table 15 also appear in Table 16 because they achieved both electricity and gas savings. Overall, there was more variation in the realization rates for technologies with gas savings compared with the electric savings presented in Table 15.

Table 16. Custom Program Site Visit Results: Gas Impacts

Technology	Qty	Therm Savings		
		Ex Ante	Ex Post	Realization Rate
Boiler/Furnace	7	601,606	365,691	61%
EMS/Controls	5	205,230	143,794	70%
Miscellaneous	3	945,479	1,065,508	113%
Compressed Air	1	(12,738)	(22,090)	173%

The low therm savings realization rate in the Boiler/Furnace category stems from our evaluation of several projects. For one project, a calculation error in the ex ante analysis resulted in the time-weighted efficiency being applied to actual production instead of time-weighted production. The same project did not include the operation of Boiler #1 when it was operating at full load, where the incremental efficiency improvement is smallest. Finally, it double-counted oxygen trim controls, once in the combustion efficiency improvement and then added in separately. Another gas project received reduced savings after the evaluation team used

metered data for the before and after scenario. The team felt that this approach was the most accurate method for estimating savings for the project.

Within the EMS/Controls category, several projects contributed to the lower realization rate. For one project, the site visit concluded that the ex ante calculations overestimated the leakage rate of a heat exchanger, causing an overestimation of savings. Additionally, this same project upgraded manually controlled dampers to automatic control. During manual operation, we assumed site operators left the damper at minimum position for most of the year. This would cause the building to be under-ventilated in the baseline case. Once the new controls were implemented, the proper ventilation was brought in, resulting in increased electric and gas usage.

Other projects within the EMS/Controls category received lower realization rates mainly due to the ex post analysis using the most recent billed regression analysis, which supported ex post engineering calculations. In several cases, we revised ex ante assumptions based on information obtained during the site visits (e.g., CO_2 sensors not installed, EMS ventilation parameter set points, baseline system parameters).

Overall Program Results

Table 17 below presents the overall Custom Program realization rates, based on the site visit results detailed above.[15] These results reflect the two-wave sample design and are not the result of a simple average. The relative precision of the realization rate is 8% for kWh and 5% for kW. For gas projects, the relative precision of the realization rate is 18% therms.

Table 17. Custom Program Gross Impacts

Program	Projects	Ex Ante Gross			Ex Post Gross			Realization Rate		
		MW	MWh	Therm	MW	MWh	Therm	MW	MWh	Therm
Custom	182	13.2	99,277	1,836,207	11.7	104,507	1,674,147	89%	106%	91%

4.2.2 Net Impacts

As described in the methodology section, the team applied the PY3 NTGR (0.75) to Custom Program gross impacts to determine PY6 net impacts for all Custom Program projects except those completed through the Staffing Grants. For the two Staffing Grant participants we spoke with, we assigned the NTGR developed through the interview process to all Custom Program projects completed by those participants if the NTGR based on interview findings was higher than the corresponding PY3 NTGR. In total, this affected only one of the two participants we interviewed and only one Custom Program project. One respondent used the Staffing Grants on two projects: one Custom Program and one Standard Program lighting. The other respondent used the Staffing Grants only on a Standard Program lighting project. Based on the interview, we adjusted the NTGR of the applicable Custom Program project from 0.75 to 0.93. Changing the NTGR of this project resulted in a slight increase in the overall NTGR.

Table 18**Error! Reference source not found.** presents the PY6 net impacts for the Custom Program based on the Staffing Grants results and the application of PY3 NTGRs.

[15] The relative precision is 8% for kWh and 5% for kW.

Table 18. Custom Program Net Impacts

Savings Category	Ex Post Gross	NTGR	Ex Post Net
Energy Savings (MWh)	104,507	0.75	78,380
Demand Savings (MW)	11.7	0.75	8.8
Gas Savings (Therms)	1,674,147	0.75	1,255,610

4.3 Conclusions and Recommendations

Overall, AIC implemented a successful sixth year of the Custom Program and easily met its electric and gas savings goals, as well as goals for CLIP participation. In fact, because of extremely high number of applications early in PY6, the program delayed some applications into PY7 so as not to exceed the program's budget. Program stakeholders with whom we spoke (program staff, Energy Advisors, program allies, and participants) reported that they were generally satisfied with the program, and we detected no major barriers to participation or process issues. Nevertheless, we identified some areas in which the program could improve.

Based on our research, we provide the following recommendations for the program:

- **Consider a review of CLIP communication and responsiveness.** While CLIP participants indicated high satisfaction, each participant that recommended improvement cited some aspect of implementer-participant communication. One indicated being unaware of Custom Program options. Another doubted continued funding for the program and had difficulty getting enough information to resolve the funding issue. A third participant became nervous about the continuation of their project after not receiving a confirmation from the implementer about having received the participant's project update. In each case, responsive communication would have alleviated the issue and increased satisfaction. Reviewing the communication procedures for CLIP may yield opportunities for improvement in this area.

- **Consider sector-specific technical assistance.** Several CLIP respondents indicated that increased access to industry-specific technical assistance might increase program participation by allowing potential participants to identify custom projects that they would otherwise not be able to identify. While an energy audit, or a feasibility study, for AIC may identify some opportunities, these efforts may overlook other opportunities that require a thorough knowledge of industry-specific equipment and processes.

- **Encourage Energy Advisors and other program staff to fully leverage the features of Amplify.** Energy Advisors strongly believe the lead tracking features built into Amplify will be very useful to them in conducting customer outreach. However, information reported by Energy Advisors indicated that the database was not yet being used to its fullest potential. Energy Advisors need to more fully take advantage of the new system by incorporating more useful information on customer contacts into the system. AIC should consider working with program staff, implementers, and Energy Advisors to increase the amount of information entered into Amplify to improve the usefulness of its lead tracking capabilities.

- **Use more conservative assumptions for EMS/Controls projects.** Most of the ex post adjustments made to EMS/Controls projects decreased the overall savings. Overall, ex ante assumptions appeared to be somewhat aggressive for these projects. Many of the projects that involved an EMS consisted of multiple measures. Examined individually, the savings for each measure appeared reasonable, but, when added together, the overall estimated savings appear somewhat unreasonable.

For example, one project included six different energy conservation measures. Summing the energy consumption for all the measures totaled more than 150% of the actual facility energy usage. Due to the overestimation of baseline usage, the ex ante savings for this project resulted in 33% of overall facility electric usage. The evaluation team typically sees EMS and HVAC controls projects around 10% or less of facility energy usage.

There are several ways to improve estimates for these types of projects. The first is to ensure that the baseline energy usage for the calculations is consistent with the actual facility usage. This could help identify unreasonable assumptions and ensure that calculations are consistent with the actual building characteristics. The second way is to use a cap for these types of projects and re-examine any projects resulting in savings of more than 10%–15% of the electric or gas bill. This will help identify any potential calculation errors, unreasonable assumptions, or other issues contributing to the overestimated savings.

A. Appendix – Data Collection Instruments

The following files contain the Staffing Grants interview guide, CLIP interview guide, Energy Advisor interview guide, New Construction Lighting interview guide, and Custom Program gas participant survey.

PY6 C&I Custom Gas Participant Surv

Ameren C&I CLIP Interview Guide FIN

Ameren C&I New Construction Lightir

AIU C&I Energy Advisor Guide FINAL

Ameren C&I Staffing Grant Interv

B. Appendix – NTGR Results

As a result of completing surveys with few Custom Program gas participants in the PY5 evaluation effort, the research team recommended a follow-up survey in the PY6 evaluation designed specifically to explore a more representative gas NTGR for the Custom Program for use in PY8. As a result, we conducted research with program participants to update existing gas values. Consistent with prior program years, the NTGR developed in PY6 is based on self-reported information from the CATI survey that quantifies the percentage of the gross program impacts that can reliably be attributed to the program.

Because the sample size for the NTGR estimate for gas projects in the PY5 evaluation was small, the initial PY6 evaluation plan suggested that we augment the PY5 Custom Program gas sample with a sample of gas customers from PY6. Further analysis indicates that a more accurate approach would be to use only data from the PY6 Custom Program gas effort. One concern when combining analysis across two different program years is that differences in design and implementation, however small, introduce errors. These errors would be offset if the respondents from the past program year were numerous enough or represented significant savings. In this case, however, combining PY5 with PY6 data would reduce the overall proportion of savings represented by respondents. Custom Program gas respondents in PY5 accounted for 14% of gas savings and represent projects with relatively small individual savings values. Respondents in PY6 were much more representative of their program year, accounting for 75% of gas savings in PY6. For this reason, we have used only the PY6 values to calculate the prospective gas NTGR value for PY8.

NTGR Evaluation Methods

The goal of the net impact analysis is to determine the program's net effect on participating customers' electricity usage. We derived net program impacts by estimating a NTGR. This NTGR is based on self-reported information from the CATI survey that quantifies the percentage of the ex ante gross program impacts that can reliably be attributed to the program. As in previous program years, we calculated NTGR based on both the level of free-ridership and participant spillover.

As we attempted to gather data from a census of program participants, the questions regarding the NTGR have no sampling error; therefore, no confidence intervals are applied to the NTGR (i.e., no precision values). However, as noted in the Section 3.3 of the main report, we took a number of steps to address potential sources of error in this analysis.

Free-Ridership

Free-riders are program participants who would have implemented the incented energy efficient measure(s) even without the program. These estimates are based on a series of questions that explore the influence of the program in making the energy efficient installations, as well as likely actions had the incentive not been available. We developed a net-to-gross factor that consists of three scores: overall influence, influence of program components, and influence of program timing.[16]

1. **Overall influence.** This score is based on two survey questions. The first question asked respondents to rate the importance of the program compared to the importance of other factors in their decision to implement the energy efficient equipment. To do so, respondents were asked to divide 100 points between program and non-program factors. This score is equal to the number of points given to the program divided by 10. The second question asked if they had learned about the program before or

[16] This algorithm is based on the basic rigor self-report method used in California and is the same method used for the ComEd C&I programs.

after they decided to install the energy efficient equipment rather than standard efficiency equipment. If respondents learned about the program *after* deciding to install energy efficient equipment, the value from the first question (the total points given divided by 10) is halved. As a result, greater importance of the program means a lower level of free-ridership.

For example, if a respondent gave the program 70 points out of 100, the first component of the overall influence score would be 7 (70/10). If that same respondent said that he learned about the program before he decided to implement the energy efficient equipment, his score would remain a 7. However, if he said he learned about the program *after* he decided to install the energy efficient equipment, his score would be divided in half and equal 3.5 (7/2).

2. **Influence of program components.** This score is based on a series of five questions. These questions asked respondents to rate the importance of five program components, on a scale of 0 to 10 (where 0 is not at all important and 10 is very important): incentive amount, program marketing materials, recommendation from program staff, recommendation from a KAE, and information from a feasibility study if conducted. This score is equal to the highest rating given to any one of these components. Greater importance of the program components means a lower level of free-ridership.

   For example, if a respondent rated the importance of the program rebate amount as 10 out of 10, the recommendation of program staff 8 out of 10, and the information from program marketing materials 8 out of 10, the final Influence of Program Components score would be a 10 (the highest of all the scores given).

3. **Influence of program timing.** This score is developed based on questions about three factors: the likelihood that the exact same equipment would have been installed without the program (on a scale of 0 to 10); if the installation would have been done at the same time without the program; and if the installation would have been done later, how much later. This score takes the response to the likelihood question and adjusts it by the responses to the timing questions. A greater likelihood of participating without the program means a higher level of free-ridership. Later implementation without the program means a lower level of free-ridership.

   For example, if a participant says he would have installed the same equipment at the same time, he is considered a full free-rider for this part of our net-to-gross index. If he likely would have installed the equipment (a rating between 7 and 10) but would have done it later, he is considered a partial free-rider and the influence of the program influence is higher. Information about how much later (determined by question #3) helps us assign a free-ridership value. If the customer would not have installed the same equipment until 4 years later, we do not consider him a free-rider for this component of the net-to-gross index (i.e., the program is given full influence on the timing of the installation).

Each score can take on a value of 0 to 10, where a higher score means a lower level of free-ridership. The overall net-to-gross factor for a project is the average of the three scores, divided by 10. The net-to-gross factor for each project thus ranges from 0 (100% free-ridership) to 1 (no free-ridership).

For larger projects, this approach is normally supplemented with findings from interviews with trade allies where the participant indicates that they played an important role in their decision to participate in the program.[17] However, in the current effort, no respondents required interviews with trade allies or a KAE based on their stated level of influence in the participant's decision making.

[17] Projects with estimated ex ante kWh savings of 600,000 kWh or more were assessed under this Standard Program rigor approach.

A NTGR, weighted by the ex post kWh of the surveyed projects, was applied to the population-level gross impacts to determine the program's net impact before any spillover was included.

Participant Spillover

Participant spillover refers to energy efficiency installations that were influenced by the program but that did not receive an incentive. An example of participant spillover is a customer who installed incented equipment in one facility and, as a result of the positive experience, installs additional equipment at other facilities, but does not request an incentive (outside spillover). In addition, the participant may install additional equipment at the same facility because of the program (inside spillover).

We examined spillover using participant responses to the phone survey, as well as callbacks if needed. Based on these data, we found no spillover.

Had we found respondents who had reported spillover, we would have conducted an engineering assessment of participant responses and gathered additional information via follow-up interviews to determine the savings associated with measures installed outside of the program.

Custom Program NTGR Results

Error! Reference source not found. presents the results of our PY6 data collection to inform an updated NTGR for the Custom Program gas measures for application in PY8.[18] As noted above, we found no spillover.

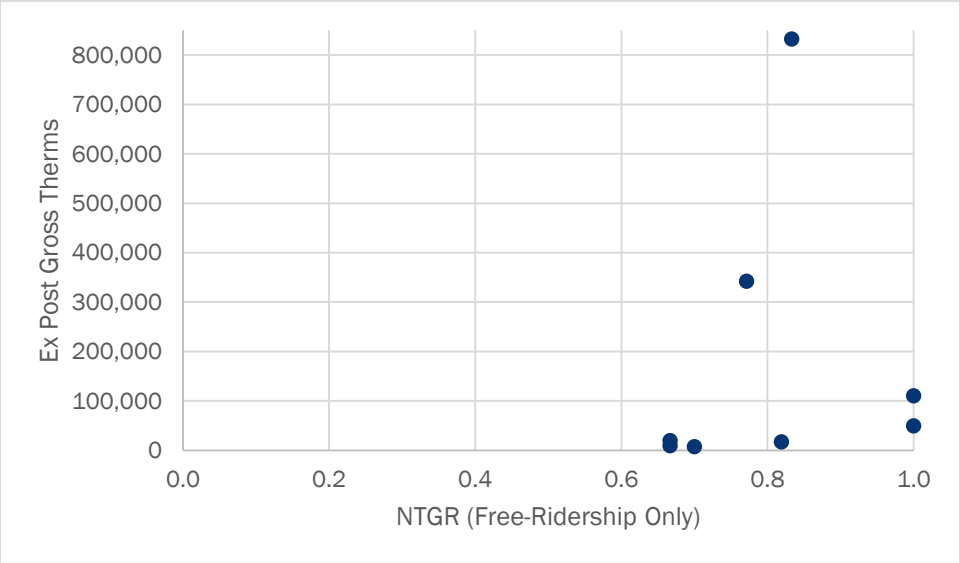
Table 19. C&I Custom Program NTGR

Program	Free-Ridership (FR)	Spillover (SO)	NTGR (1 – FR + SO)
Custom Gas	0.17	0	0.83

The results per respondent varied, but were generally high, as show in Figure 5.

[18] For PY8 net savings, we recommend using the electric NTGR developed from research in PY5 and the gas NTGR developed as part of the PY6 research.

Figure 5. Custom Program Gas NTGRs



Overall, these survey respondents account for 75% of the PY6 Custom Program's gas savings.

Participant Spillover

We examined both inside and outside spillover using participant responses to the telephone survey. Based on these data, spillover was found from one Custom Program participant in the AIC service territory, who installed LED lighting. We conducted an engineering assessment of participant responses to determine the savings associated with measures installed outside of the program.

The total spillover reported by the Custom Program sample equaled 7 MWh, while total gross savings of the participant sample equaled 11,758 MWh. The following equation provided the program spillover rate:

$$Spillover\ \% = \frac{Total\ participant\ sample\ spillover\ (MWh)}{Total\ participant\ sample\ savings\ (MWh)} = \frac{7\ MWh}{11{,}758\ MWh} = 0.001\%$$

C. Appendix – Survey Response Rate Methodology

Given that survey response rates are calculated and presented for the Custom Program participant survey, we present a definition and explanation of how the rate is calculated here. The survey response rate is the number of completed interviews divided by the total number of potentially eligible respondents in the sample. We calculated the response rate using the standards and formulas set forth by the AAPOR. For various reasons, we were unable to determine the eligibility of all sample units through the survey process, and chose to use AAPOR Response Rate 3 (RR3). RR3 includes an estimate of eligibility for these unknown sample units. The formulas used to calculate RR3 are presented below. The definitions of the letters used in the formulas are displayed in the Survey Disposition tables in the Survey Disposition and Response Rate section of the report.

$$E = (I + R + NC) / (I + R + NC + e)$$

$$RR3 = I / ((I + R + NC) + (E * U))$$

We also calculated a cooperation rate, which is the number of completed interviews divided by the total number of eligible sample units actually contacted. In essence, the cooperation rate gives the percentage of participants who completed an interview out of all of the participants with whom we actually spoke. We used AAPOR Cooperation Rate 1 (COOP1), which is calculated as:

$$COOP1 = I / (I + R)$$

D. Appendix – Site Visit Reports

AIC PY6 C&I Custom EM&V Reports.pdf

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