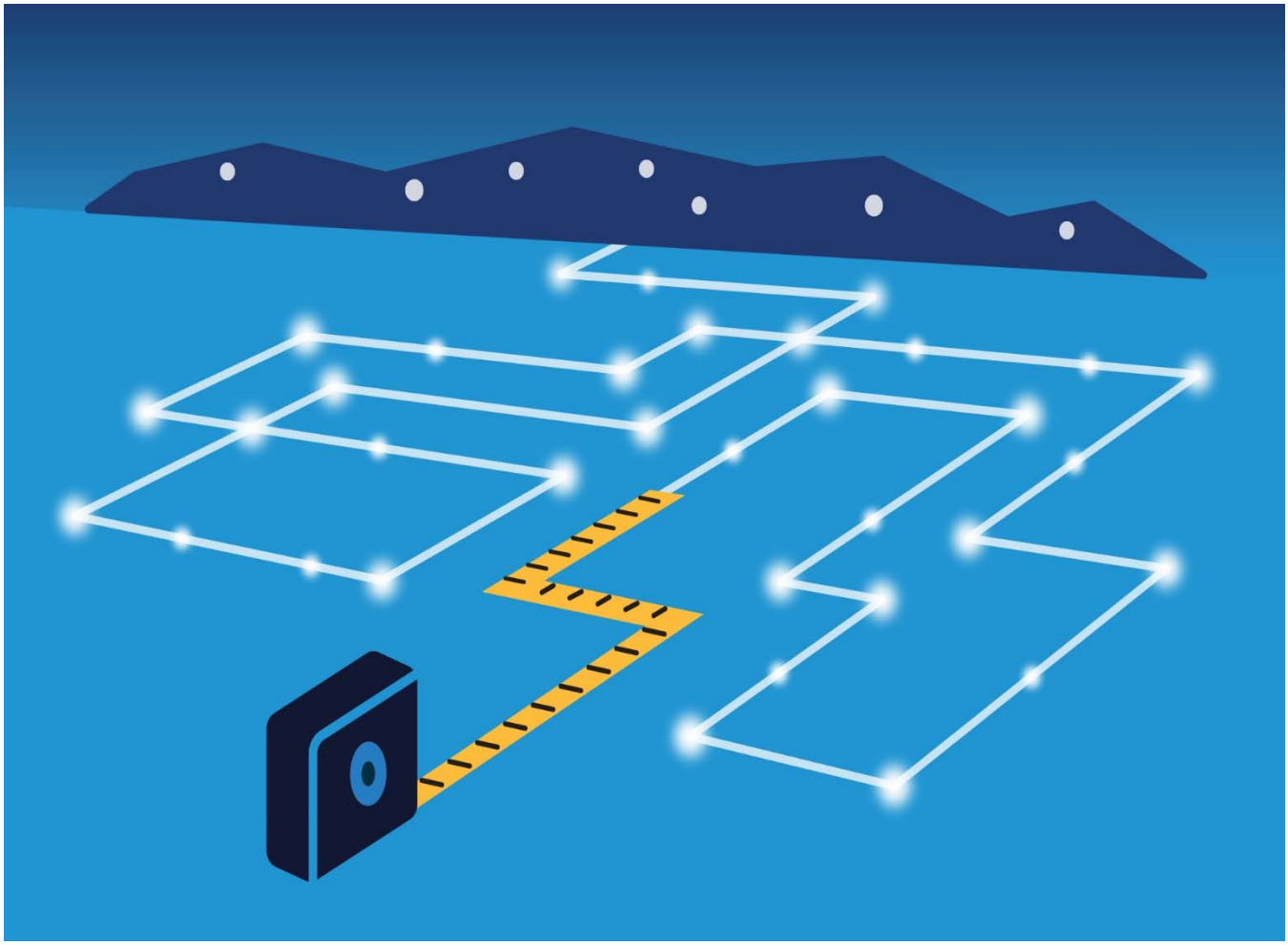
Opinion Dynamics

Boston | Headquarters

617 492 1400 tel
617 497 7944 fax
800 966 1254 toll free

1000 Winter St
Waltham, MA 02451



Impact and Process Evaluation of 2016 (PY9) Ameren Illinois Company Commercial & Industrial Standard Efficiency Program

Final

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NAVIGANT

MichaelsEnergy

Hannah Howard
Managing Director, Opinion Dynamics

Aaiysha Khursheed
Principal Consultant, Opinion Dynamics

Zach Ross
Principal Consultant, Opinion Dynamics

Matt Drury
Director, Engineering, Opinion Dynamics

Mallorie Gattie-Garza
Managing Consultant, Engineering, Opinion Dynamics

Marion Cundari
Consultant, Engineering, Opinion Dynamics

Karla Soriano
Consultant, Opinion Dynamics

Hilary Polis,
Consultant, Opinion Dynamics

Stephen Mariani
Associate Consultant, Opinion Dynamics

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1. Executive Summary

This report presents the results of Opinion Dynamics's evaluation of the Ameren Illinois Company (AIC) Commercial and Industrial (C&I) Standard Program for electric and gas energy efficiency (referred to as the Standard Program). It covers the program's performance in Program Year 9 (PY9), which ran from June 1, 2016 through May 31, 2017. According to the PY9 Implementation Plan, AIC expected savings from this program to account for 48% of overall portfolio electric savings and 15% of overall portfolio therm savings (including both residential and commercial programs).

The Standard Program offers AIC business customers fixed incentives for the installation of specific energy efficiency measures. The core portion of the Standard Program (herein after referred to as the Core Program) covers energy efficient lighting, variable frequency drives (VFDs), HVAC equipment, refrigeration/grocery equipment, commercial kitchen equipment, steam traps, and other measures. Leidos is the main program implementer.

Additionally, the Standard Program includes the Ameren Illinois Business Customer Online Store (Online Store) offering that is available to all electric business customers. The Online Store, maintained by Energy Federation, Inc. (EFI), offers a variety of energy-saving lighting products, including LED lighting, LED exit signs, and occupancy sensors. The program also continued its Green Nozzle initiative in PY9, which is a small offering that provides free efficient water nozzles to all natural gas customers and to customers in the food service sector who have electric water heating. Finally, in PY9, the program continued its Instant Incentives offering, which was first introduced as a midstream lighting pilot program in PY7. The Instant Incentives component provides incentives to customers purchasing lighting at lighting distributor locations to help increase the market share of efficient lighting products.

Our evaluation of the Standard Program included impact and process assessments of specific components. We reviewed program materials and program-tracking data, interviewed program administrators and implementation staff, and conducted additional research. Our quantitative research included surveys of customers who purchased equipment through the Core Program and who purchased lighting through the Instant Incentives offering. We also collected and analyzed data to support updated net-to-gross ratios (NTGRs) for prospective application to the Instant Incentives offering.

Below we present the key findings of the PY9 evaluation.

Program Impacts

Table 1 shows that electric and gas gross realization rates for all program components are either at or above 100% or very close to it. As outlined in the evaluation plan, the team applied Illinois Stakeholder Advisory Group (SAG)-approved NTGRs to the program's ex post gross savings to develop estimates of ex post net savings. Table 1 also provides the PY9 Standard Program ex ante and ex post gross and net impacts. The PY9 Standard Program achieved 97,497 MWh and 14.65 MW in net electric savings and 1,980,678 therms in net gas savings. This level of savings enabled the program to exceed its PY9 internal electric goals and greatly exceed its internal gas goals.

Table 1. Standard Program Impact Summary

Savings Category	Ex Ante Gross	Realization Rate	Ex Post Gross	NTGR	Ex Post Net
Energy Savings (MWh)					
Core Program	87,141	99.5%	86,696	0.78	67,571
Instant Incentives	32,023	102.1%	32,690	0.78	25,490
Online Store	5,306	100.0%	5,306	0.83	4,404
Green Nozzle	29	121.1%	35	0.92	32
Laminar Flow Restrictor[a]	–	N/A	–	N/A	–
Total MWh Savings	**124,499**	**100.2%**	**124,727**	**0.78**	**97,497**
Demand Savings (MW)					
Core Program	11.63	98.9%	11.50	0.78	9.02
Instant Incentives	6.72	102.6%	6.89	0.78	5.38
Online Store	0.31	100.0%	0.31	0.83	0.26
Green Nozzle	–	N/A	–	N/A	–
Laminar Flow Restrictor[a]	–	N/A	–	N/A	–
Total MW Savings	**18.66**	**100.2%**	**18.71**	**0.78**	**14.65**
Gas Savings (Therms)					
Core Program	3,256,970	100.0%	3,256,319	0.61	1,974,286
Instant Incentives	–	N/A	–	N/A	–
Online Store	–	N/A	–	N/A	–
Green Nozzle	4,510	99.3%	4,481	0.89	3,988
Laminar Flow Restrictor[a]	3,562	100.0%	3,562	0.68	2,404
Total Therm Savings	**3,265,042**	**100.0%**	**3,264,361**	**0.61**	**1,980,678**

Note: Savings for the Instant Incentives offering include carryover from PY7 and PY8 projects.
[a] Referred to as program offering "SA - Sink Aerator" in the PY9 C&I Standard database. We refer to this program offering as "Laminar Flow Restrictor" throughout this report.

Key Findings and Recommendations

- **Finding #1:** Our impact evaluation found electric and gas gross realization rates of, or just under, 100% for all program components, indicating that the program is tracking its savings and projects carefully. However, we continue to find minor discrepancies in the database that do not reflect the latest TRM updates.
  - **Recommendation #1:** We recommend incorporating all Illinois Statewide Technical Reference Manual Version 5.0 (IL-TRM V5.0) updates and applying the correct measure assumptions consistently across all measures to ensure AIC continues achieving high realization rates moving forward.
- **Finding #2:** The implementer indicated that one participant requested laminar flow restrictors (LFRs) with a higher flow rate compared to the flow rate of other LFRs installed within the program. The algorithm within the IL-TRM V5.0 includes throttling factors for flow rates measured during the direct install. Incorporating the throttling rates for this one LFR project results in flow rates (2.20 gpm * 0.95

throttle rate = 2.09 gpm) less than the baseline flow rate (2.46 gpm * 0.83 throttle rate = 2.04), thus resulting in negative therm savings.

  - **Recommendation #2:** We recommend the implementer require a larger flow rate reduction such that savings yield positive results.

- **Finding #3:** An examination of the participant tracking database for the Core Program shows that first-time participants outnumbered participants who had previously engaged with the program. In the case of the Instant Incentives offering, 48% of the survey participants who used the program in PY9 did so for the first time as well. We inquired with first-time Core Program and Instant Incentives participants to ask why they had not participated before PY9. Forty percent of Core Program participants reported that they did not know about the program and another 38% reported that they did not need to do any upgrades prior to PY9. Of the Instant Incentives participants, 75% were unaware of the program prior to PY9, while 12% reported that they had not been interested in energy efficiency until now.

  - **Recommendation #3:** While the Core Standard Program is quite mature, there are still a number of AIC business customers who were not aware of the program or were not interested in participating until this past program year. AIC's marketing plan utilizes several approaches to reach its business customers, and we recommend that it continue to use multiple avenues as a way of getting the attention of customers who are unaware of the program. Additionally, AIC could consider launching a marketing campaign that offers a bonus to first-time participants to entice them to participate. This might gain the attention of customers who felt they could not afford to make upgrades or who might be on the cusp of considering energy efficient projects.

- **Finding #5:** The popularity of the Instant Incentives offering increased as it completed its second full year as part of the Core Standard program. Participation increased from 273 customers in PY8 to over 1,600 customers in PY9, and net ex post savings grew from 3,888 MWh in PY8 to 25,359 MWh in PY9. Over 95% of respondents reported that they were extremely satisfied with the program overall, as well as with the lighting equipment purchased.

  - **Recommendation #5:** Based on the increasing popularity of Instant Incentives, AIC should continue with this offering as part of its Core Standard Program. Growth in participation and energy savings, along with high levels of participant satisfaction, support the continued offering of this component of the Standard Program.

- **Finding #6:** Customers who participated in the Instant Incentives offering reported the most common way they learned about the offering is through distributors and retailers. This is not surprising since distributors are a main way customers purchase energy efficient lighting through this program component. To ensure lighting distributors are familiar with this offering, AIC provides Instant Incentives training opportunities to lighting distributors through webinars as part of its marketing plan.

  - **Recommendation #6:** AIC should continue to provide training opportunities and marketing strategies aimed towards lighting distributors and retailers to grow the Instant Incentives offering, as it experienced a positive reception by AIC business customers. Since this offering is still relatively new, we recommend expanding the distribution of relevant marketing materials to inform additional customers and program allies of this opportunity.

2. Evaluation Methods

The PY9 assessment of the Standard Program for electric and gas energy included both process and impact analyses.

2.1 Research Objectives

The primary objective of the PY9 Standard Program evaluation was to provide estimates of gross and net electric and gas savings associated with the program. In particular, the PY9 impact evaluation sought to answer the following questions:

1. What were the estimated gross energy and demand impacts from this program?
2. What were the estimated net energy and demand impacts from this program?
3. What was the estimated NTGR for the Instant Incentives offering (for prospective application)?

In addition, the evaluation team conducted a targeted process assessment, with an emphasis on the Core Program and Instant Incentives offerings, focusing on the following research questions:

4. Program Participation
    a. What were the characteristics of participating customers? How many projects were completed? By how many different customers? What types of projects?
    b. Did customer participation meet expectations? If not, how different was it and why?
    c. For first time program participants, what factors led them to choose to participate now in such a mature program?
5. Program Design and Implementation
    a. Did the program, as implemented, change compared to PY8? If so, how and why and was this an advantageous change?
    b. What, if any, implementation challenges occurred in PY9, and how were they overcome?
    c. What changes could the program make to improve the customer experience and generate greater energy savings?
6. Participant Experience and Satisfaction
    a. How satisfied were participating customers with various aspects of their program experience?
    b. How did participants become aware of the program?
    c. What changes would participants suggest to improve the program?

2.2 Evaluation Tasks

Table 2 summarizes the PY9 evaluation activities conducted for the Standard Program.

Table 2. PY9 Standard Program Evaluation Methods

Activity	Impact	Process	Forward Looking	Details
Program Staff Interviews		✓	✓	Explore changes made since PY9 and gather information about program marketing and implementation, with a focus on the Core Program and Instant Incentives offerings.
Review of Program Tracking Data and Program Materials	✓	✓		Comprehensive review of program data to assess any changes in program processes or impacts and to support evaluation planning, sampling, and reporting.
Core Program Participant Survey		✓		Investigate program processes and participant satisfaction, verify installation of equipment.
Instant Incentives Participant Web Survey	✓	✓	✓	Investigate program processes and participant satisfaction, verify installation of equipment, and gather data for estimation of NTGRs (i.e., free-ridership and spillover).
Gross Impact Analysis	✓		✓	Estimates gross impacts through review of the program-tracking database and application of the IL-TRM V5.0
Net Impact Analysis	✓		✓	Estimate net impacts using SAG-approved NTGR values for PY9.

2.2.1 Program and Implementation Staff Interviews

The evaluation team conducted an in-depth interview with two Leidos program staff in April 2017 to understand changes made to the program in PY9 and to discuss the evaluation priorities of program and implementation staff.

2.2.2 Review of Program Tracking Data and Program Materials

The evaluation team reviewed all program materials and tracking data, including program marketing and implementation plans, customer and program ally communications, and extracts from program tracking databases. We received multiple extracts of the master AMPlify program database, beginning in February 2017 to support initial activities, with a final database provided in October 2017. Additionally, we received separate databases for the Instant Incentives and Online Store offerings with additional detail on measures included in those offerings.

The evaluation team used program tracking databases as the sample frames for the Core Program participant telephone survey and the Instant Incentives participant web survey described below.

2.2.3 Core Program Participant Telephone Survey

The evaluation team conducted quantitative telephone interviews with customers who participated in the Core Program in PY9. These interviews focused on measure installation verification and process related questions regarding program marketing and outreach, satisfaction with the program and program components, and suggestions for program improvement. We selected the sample of Core Program participant projects from the August 22, 2017 extract of the AMPlify database we received. A total of 1,498 projects were completed through the Core Program in PY9.

As in previous program years, we sampled by project contact, rather than by project, because many customers completed more than one project in PY9. To reduce respondent burden and to facilitate question wording, we asked each contact about only one project. The evaluation team formed a sample frame of 774 unique customer contacts for the Core Program survey.[1] If a contact had more than one project we chose one of their projects at random about which to ask them.

The evaluation team stratified the sample by first-time versus repeat participants to help understand why new participants have not engaged with the program prior to PY9. Within each stratum, we then drew a random sample and set quotas for first-time and new participants as shown in Table 3.

Table 3. Sample Design for Core Standard Participant Survey

Stratum	Target Completes	Completed Interviews[a]
First-time Participant	70	63
Repeat Participant	70	77
Total	**140**	**140**

[a] The total number of completes per stratum was 70 as targeted. However, upon review of the data, the evaluation team reclassified seven respondents as repeat participants based on responses to open ended questions that indicated prior participation in the program.

Table 4 shows how the telephone interview respondents compare to the sample frame and the Core Program population by end use, ex ante MWh savings, and therm savings. As shown in the following table, telephone interview respondents are comparable to the population and the sample frame with respect to project or contact counts as well as ex ante MWh and therm savings. For instance, among all end uses, lighting projects were the most popular among program participants in the population (n=707 out of 809 unique contacts, or 87%) as well as participants who completed the interviews (n=118 out of 140, or 84%). In addition, lighting projects also contributed the most savings within the population (60,001 MWh, or 69% of savings from the Core Program) and within the subset of participants that completed the interviews (5,334 MWh, or 66% of savings from the set of projects for which interviews were conducted). The same consistent trend can be seen with other end uses such as variable frequency drives, cooling, heating, and water heating, and steam traps. Based on these findings, there appears to be no evidence of non-response bias.

[1] The evaluation team also removed any participants who received a Staffing Grant in PY9, completed a Retro-Commissioning project, participated in the Strategic Energy Management (SEM) offering or completed Competitive Large Incentive Program (CLIP) project. Given the limited sample sizes for efforts to evaluate these other programs, we chose to attempt to interview these participants as part of efforts related to their respective programs.

Table 4. Completed Core Program Interviews

End Use	Population				Sample Frame			Completed Interviews		
	Projects[a]	Contacts	Ex Ante MWh Savings	Ex Ante Therm Savings	Projects	Ex Ante MWh Savings	Ex Ante Therm Savings	Projects	Ex Ante MWh Savings	Ex Ante Therm Savings
Lighting	1,225	707	60,001	–	670	34,317	–	118	5,334	–
Refrigeration	93	10	1,647	–	6	389	–	–	–	–
Cooling	13	12	1,408	–	12	820	–	2	311	–
Variable Frequency Drives	49	33	18,291	–	23	10,087	–	7	2,104	–
Heating	22	20	386	13,876	20	334	13,104	3	51	754
Steam Traps	17	24	–	3,193,927	17	–	3,121,753	5	–	122,340
Food Service	12	7	39	8,599	5	19	5,569	1	–	505
Cooling, Heating, and Water Heating	2	2	58	6,092	2	58	6,092	1	44	1,972
Compressed Air	8	8	170	–	3	33	–	–	–	–
HVAC	46	22	1,280	34,477	8	367	25,237	2	46	216
Leak Survey and Repair	9	7	3,849	–	5	596	–	1	232	
Water Heating	1	1	3	–	2	–	258	–	–	–
Agricultural	1	1	6	–	1	6	–	–	–	–
Total	**1,498**	**809[b]**	**87,141**	**3,256,970**	**774**	**47,024**	**3,172,013**	**140**	**8,120**	**125,786**

Note: Columns may not sum to the totals listed in the last row due to rounding error.

[a] The total number of projects listed reflects the population in AMPlify as of October 12, 2017.

[b] This number is not equal to the total within this column (854) because some contacts completed projects covering more than one end-use. The number of unique contacts in the population is equal to 809.

Survey Dispositions and Response Rates

We fielded the Core Program Participant Survey from September 19 to September 29, 2017. Table 5 provides the final survey dispositions. The target number of survey completes (140) was reached prior to dialing through the entire sample frame of 774, which is why the total participants dialed in the sample is equal to 451.

Table 5. Core Program Participant Survey Dispositions

Disposition	Input[a]	Total
Complete interview	I	140
Eligible incomplete interview	N	10
Survey-ineligible household	X1	15
Not an eligible household	X2	19
Household with undetermined survey eligibility	U1	220
Undetermined if eligible household	U2	47
Total Participants Dialed in Sample	**N/A**	**451**

[a] Inputs are for American Association for Public Opinion Research (AAPOR) response and cooperation rates detailed in Appendix B.

Table 6 provides the response and cooperation rates. Appendix B provides information on the methodology used to calculate response rates (RRs) and cooperation rates (CRs) for web surveys.

Table 6. Core Program Participant Survey Response and Cooperation Rates

AAPOR Rate	Percentage
RR3	36%
CR3	76%

Weighting

To ensure that survey responses were representative of the population of first-time and repeat core offering participants, we developed and applied weights to the survey data. For each participant type, we calculated a weight by dividing each the participant type's share of the first-time and repeat participant population by its share of survey completes. Table 7 provides the weights for first-time and repeat participants.

Table 7. Core Program Participant Survey Weights

Stratum	Population		Survey Completes		Population Weight
	# of Participants	% of Participants	# of Participants	% of Participants	
Repeat Participants	244	30%	77	55%	0.548
First-time Participants	565	70%	63	45%	1.552
Total	**809**	**100%**	**140**	**100%**	**1.000**

2.2.4 Instant Incentives Participant Web Survey

The evaluation team conducted a quantitative internet survey with customers who purchased lighting through the Instant Incentives offering during PY9. We used the survey to gather data to support estimation of a NTGR for prospective application in 2019 and to support the estimation of an in-service rate (ISR) for the offering.[2] As discussed below, we applied the estimated ISRs as part of the PY9 impact evaluation following TRM guidance that states that Year 1 (purchase year) lighting installations can be characterized "using…evaluated assumptions if available." We will also recommend these ISRs for inclusion in future versions of the IL-TRM via a forthcoming workpaper. The survey also included questions to support a targeted assessment of program processes and participant satisfaction.

The evaluation team attempted a census of all participants in the Instant Incentives offering who had a valid email address (n=667). For the purposes of sampling and survey fielding, the evaluation team aggregated all purchases that each participant made at each unique distributor during PY9, including the nineteen customers who purchased lighting at more than one distributor during this program year.

The survey focused on LED technologies, which account for all ex ante gross savings achieved by the offering in PY9. While the survey asked respondents to verify receipt and installation of all purchased LED products, the NTGR battery focused on one bulb type per respondent to reduce the length of the survey and minimize respondent fatigue. For participants who purchased multiple types of LEDs, we prioritized linear LEDs if these were purchased by the customer, followed by standard LEDs, and finally specialty LEDs to reflect the purchases made by the population of Instant Incentives customers. Using this strategy, the proportion of responses to the NTG battery somewhat reflected the proportions of customers who purchased each bulb type (see Table 8). We conducted surveys with 11% of PY9 Instant Incentives participants, who collectively accounted for 27% of ex ante savings.

[2] We apply our PY9 researched ISRs to ex post savings as suggested by the IL-TRM V5.0 for Year 1 installs, under the "Deferred Installs" section 4.5.4.

Table 8. Completed Instant Incentives Participant Surveys

Measure	Population			Sample Frame			Completed Surveys		
	Participants	Ex Ante MWh	% of Total Ex Ante MWh Savings	Participants	Ex Ante MWh	% of Total Ex Ante MWh Savings	Participants	Ex Ante MWh	% of Total Ex Ante MWh Savings
Linear LED	1,278	25,194	79%	537	24,685	78%	142	9,610	87%
Specialty LED	314	2,643	8%	120	2,143	7%	21	660	6%
Standard LED	261	4,093	13%	135	4,684	15%	17	714	7%
Total[a]	**1,603**	**31,930[b]**	**100%**	**667**	**31,512**	**100%**	**160**	**10,984**	**100%**

[a] Participants by measure does not sum to total participation in the last row because participants who purchased multiple types of measures are counted under each measure type.
[b] Excludes carryover savings from PY7 and PY8.

Survey Dispositions and Response Rate

We fielded the survey of Instant Incentives participants from September 6 to September 30, 2017. Table 9 provides the final survey dispositions.

Table 9. Instant Incentives Participant Survey Dispositions

Disposition	Input[a]	N
Complete - web	I	160
Mid-interview terminate - Partial Interview - web	N	21
Mid-interview terminate - Break off (Before screeners) - web	U1	30
Refused (replied but refused) - email	U1	2
No Response - web	U1	387
Known Ineligibles (replied with reason) - web	X1	1
Known Ineligibles (screened out) - web	X1	10
Bounced	X2	56
Total Participants in Sample	**N/A**	**667**

[a] Inputs are for AAPOR response rates and cooperation rates detailed in Appendix B.

Table 10 below provides the response rate (RR) and cooperation rate (CR) for the Instant Incentives participant survey. Appendix B provides information on the methodology used to calculate RRs and CRs for telephone surveys.

Table 10. Instant Incentives Participant Survey Response and Cooperation Rates

AAPOR Rate	Percentage
RR3	28%
CR3	75%

2.2.5 Gross Impact Analysis

The evaluation team used the IL-TRM V5.0 and engineering review to calculate ex post gross savings associated with the measures installed through the program. The following table summarizes the gross impact analysis approach used for each component of the Standard Program.

Table 11. Standard Program Gross Impact Methods by Component

Program Component	Application of IL-TRM V5.0 Savings Values	Engineering Review	ISR from Participant Survey
Core Program	✓	✓	
Online Store	✓		
Instant Incentives	✓		✓
Green Nozzle	✓	✓	
Laminar Flow Restrictor	✓	✓	

The following sections provide additional details for each of the employed methods.

Core Program

To determine gross impacts associated with the Core Program, the evaluation team reviewed the program-tracking database and verified the correct application of the IL-TRM V5.0 savings assumptions. To conduct the engineering review, we performed the following steps:

1. Compared measures in the AMPlify application database with the data presented in the measure database.

2. Applied algorithms and values from the IL-TRM V5.0 to estimate ex post savings. Note that the actual project specific data was applied when provided in the database in place of IL-TRM default values. Otherwise, we applied IL-TRM default values.

3. Reviewed spreadsheets from the implementer that include ex ante algorithms and savings calculations and compared them with the IL-TRM V5.0 and the ex ante savings provided in the measure database.

Online Store

The evaluation team calculated the savings from the Online Store offering by performing the following steps:

1. Reviewed the ex ante algorithms and saving calculations and compared them with the IL-TRM V5.0 and the ex ante savings provided in the database.
2. Reviewed the ex ante measure assumptions, including values for both baseline and efficient wattage for each lighting measure.
3. Used IL-TRM V5.0 algorithms and applied previously reviewed and approved lighting wattages and program tracking data to estimate ex post savings.

Instant Incentives

The evaluation team calculated savings from the Instant Incentives offering by performing the following steps:

1. Reviewed the ex ante algorithms and saving calculations and compared them with the IL-TRM V5.0 and the ex ante savings provided in the database.
2. Reviewed the ex ante measure assumptions, including values for both baseline and efficient wattage for each lighting measure.
3. Used IL-TRM V5.0 algorithms and applied previously reviewed and approved lighting wattages and program tracking data to calculate savings. Applied the PY9 researched first-year ISR of 77.89% to arrive at ex post gross savings. Ex ante savings applies the PY8 researched first-year ISR (77.8%).

Green Nozzle

We verified participation in the Green Nozzle initiative by examining the program-tracking database. We then calculated gross impacts based on the IL-TRM V5.0.

Laminar Flow Restrictor (LFR)

The evaluation team examined the program-tracking database and reviewed ex ante savings calculations and variable assumptions for the Laminar Flow Restrictor initiative. We then calculated gross impacts based on the IL-TRM V5.0.

2.2.6 Net Impact Analysis

For PY9 net savings, the evaluation team applied SAG-approved NTGRs, specific to end uses, to PY9 gross savings.[3] The table below summarizes the NTGRs used in the net impact analysis. Through research detailed above, the team also developed new NTGRs for the Instant Incentives offerings for prospective application in 2019 (see Appendix C).

[3] For projects conducted as part of a Staffing Grant, the team assigned a NTGR based on the higher of (1) one developed based on the interviews conducted with Staffing Grant participants and (2) the deemed NTGR for the applicable program (e.g., Custom, Prescriptive, or Retro-Commissioning). Note that this adjustment was made only to relevant Staffing Grant projects.

Table 12. SAG-Approved PY9 NTGRs

Measure Type	Electric NTGR	Gas NTGR
Lighting	0.78	–
Variable Frequency Drives	0.83	–
HVAC	0.56	0.49
Specialty Equipment	0.85	0.68
Steam Traps	–	0.61
Leak Survey and Repair	0.70	–
Green Nozzles	0.92	0.89
Laminar Flow Restrictors	0.85	0.68
Online Store	0.83	–
Instant Incentives – LEDs (PY9)	0.78	–
Instant Incentives – CFLs (PY7 and PY8 Carryover)	0.68	–
Instant Incentives – LEDs (PY7 and PY8 Carryover)	0.77	–

2.3 Sources and Mitigation of Error

Table 13 provides a summary of possible sources of error associated with data collection conducted for the Standard Program. We discuss each item in detail below.

Table 13. Possible Sources of Error

Research Task	Survey Error		Non-Survey Error
	Sampling Error	Non-Sampling Error	
Core Program Participant Survey	Yes	• Measurement error • Non-response and self-selection bias • Data processing error • Sample frame error	N/A
Instant Incentives Participant Survey	N/A, census attempt	• Measurement error • Non-response and self-selection bias • Data processing error • Sample frame error	N/A
Gross Impact Calculations	N/A	N/A	Analysis error
Net Impact Calculations	N/A	N/A	Analysis error

The evaluation team took steps to mitigate potential sources of error throughout the planning and implementation of the PY9 evaluation.

Survey Error

- **Sampling Survey Error**

- **Core Program Participant Survey:** The evaluation team surveyed 140 customers out of a population of 809. For process results, we achieved a precision of 6.3%, assuming a coefficient of variation of 0.50, at the 90% confidence level.

- **Instant Incentives Participant Web Survey:** The evaluation team conducted a census attempt of Instant Incentives participants; hence, there is no sampling error associated with the survey results. We surveyed 160 customers out of a population of 1,603 and achieved a precision of 6.2%, assuming a coefficient of variation of 0.50, at the 90% confidence level.

- Non-Sampling Error

  - **Measurement Error:** The validity and reliability of survey data were addressed through multiple strategies. First, we relied on the evaluation team's experience to create questions that align with the idea or construct that they were intended to measure (i.e., face value validity). We reviewed the questions to ensure that we did not ask double-barreled questions (i.e., questions that ask about two subjects, but allow only one response) or loaded questions (i.e., questions that are slanted one way or another). We also checked the overall logical flow of the questions to avoid confusing respondents, which would decrease reliability.

    All survey instruments were reviewed by key members of the evaluation team and were provided to AIC and Illinois Commerce Commission (ICC) staff for review. To determine whether question wording was clear and unambiguous, we pretested each survey instrument and reviewed the pretest survey data. We also used the pretests to assess whether the length of the survey was reasonable and shortened the survey as needed.

  - **Non-Response and Self-Selection Bias – Core Program and Instant Incentives Surveys:** Because the response rates for the Core Program and Instant Incentives surveys were 36% and 28%, respectively, there is the potential for non-response bias. We attempted to mitigate possible bias by contacting each prospective Core Program survey respondent in the sample multiple times at different times of the day, until we received a firm refusal or dialed each potential respondent a total of eight times. For the Instant Incentives survey, we sent multiple reminder emails to each prospective respondent in our sample at different times of the day and week. To assess whether evidence of non-response bias existed, 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.

  - **Data Processing Error:** The team addressed processing errors by using trained, experienced Opinion Dynamics consultants to check the quality and consistency of completed survey data.

  - **Sample Frame Error:** We addressed external validity (the ability to generalize any findings to the population of interest) through the development of the sample frames that included all eligible members of the population.

Non-Survey Error

- Analysis Error

  - **Gross Impact Calculations:** We applied IL-TRM V5.0 calculations to the participant data in the tracking database to calculate gross impacts. To minimize data analysis error, a separate team member reviewed all calculations to verify their accuracy.

- **Net Impact Calculations:** We applied SAG-approved NTGRs to estimated gross impacts to derive the program's net impacts, as shown in Table 12. To minimize analytical errors, all calculations were reviewed by a separate team member to verify their accuracy.
- **Survey Data Analysis:** In analyzing the data from the Core Standard and Instant Incentive participant surveys, all calculations were reviewed by a separate team member to verify their accuracy and minimize analytical errors.

3. Detailed Evaluation Findings

3.1 Process Findings

The evaluation team's process-related research focused on program awareness, program experience, and barriers to participation. The research also considered how any changes in program implementation from PY8 to PY9 might have affected these areas. Our results are based on a review of program data, in-depth interviews with program staff, and quantitative surveys of Core Program and Instant Incentives participants.

3.1.1 Program Description

The Standard Program offers AIC business customers fixed incentives for installing specific energy efficiency measures. Incentives are delivered through five offerings:

- **Core Program:** The Core Program covers lighting, variable frequency drives (VFDs), HVAC equipment, refrigeration/grocery equipment, commercial kitchen equipment, steam traps, and other measures.
- **Instant Incentives:** The Instant Incentives offering is a midstream lighting program that offers discounts at the point of sale covering a variety of standard, specialty, and linear LEDs. AIC first piloted the offering in PY7, and PY9 represents its second year as a full-scale offering to help increase the market share of efficient lighting products.
- **Online Store:** Through the Standard Program, AIC operates an online store offering that offers all electric business customers a variety of energy-saving products; including LEDs, occupancy sensors, and LED exit signs.
- **Green Nozzles:** The Standard Program also includes the Green Nozzle offerings, which offers free low-flow pre-rinse nozzles to all AIC all-gas customers, as well as customers in the food service sector who use electric water heating. The limited participation in the initiative during PY9 reflects AIC's decision in PY5 to place less emphasis on participation in this effort. As a result, participation has continued to decrease, with very few nozzles distributed in PY9.
- **Laminar Flow Restrictors:** The Standard Program includes the Laminar Flow Restrictor offering as a pilot in anticipation of offering these measures in 2018. The laminar flow restrictors are offered as an option to healthcare and other facilities that must comply with strict Occupational Safety and Health Administration (OSHA) requirements to limit hot water consumption.

3.1.2 Program Participation

The Core Program is responsible for 70% of the Standard Program's ex ante gross MWh savings and nearly 100% (99.8%) of the Standard Program's ex ante gross therm savings. Table 14 shows the contributions of each offering to the Standard Program's overall savings.

Table 14. Summary of Standard Program Offerings

Offering	Total Projects	Ex Ante Gross Savings		
		MWh	MW	Therms
Core Offering	1,498	87,141	11.63	3,256,970
Instant Incentives	3,047	32,023	6.72	-
Online Store	5,544	5,306	0.31	-
Green Nozzle	17	29	-	4,510
Laminar Flow Restrictor	6	-	-	3,562
Total	**10,112**	**124,499**	**18.66**	**3,265,042**

Note: Savings for the Instant Incentives offering includes carryover savings from PY7 and PY8 projects.

Core Program

Table 15 summarizes the Core Program projects completed in PY9 by end use. The distribution of projects and savings by end use is consistent with what we have seen in recent program years. The vast majority of projects completed through the Core Program in PY9 (86%) have associated electric savings only, 1% have gas savings only, and 13% have both electric and gas savings. Lighting projects accounted for more than half of electric savings (69%) and over three-quarters of PY9 projects (82%) included lighting measures. Similarly, to past program years, steam traps contributed nearly all achieved gas savings (98%).

Table 15. Summary of Core Program Participation by End Use

End Use	Projects		Ex Ante Gross Electric Savings		Ex Ante Gross Gas Savings	
	#	%	MWh	%	Therms	%
Lighting	1225	81.8%	60,001	68.9%	-	-
Variable Frequency Drives	50	3.3%	18,880	21.7%	-	-
Leak Survey and Repair	9	0.6%	3,849	4.4%	-	-
HVAC	79	5.3%	2,519	2.9%	54,445	1.7%
Specialty Equipment	118	7.9%	1,892	2.2%	8,599	0.3%
Steam Traps	17	1.1%	-	-	3,193,927	98.1%
Total	**1,498**	**100.0%**	**87,141**	**100.0%**	**3,256,970**	**100.0%**

Note: Columns may not sum to totals due to rounding.

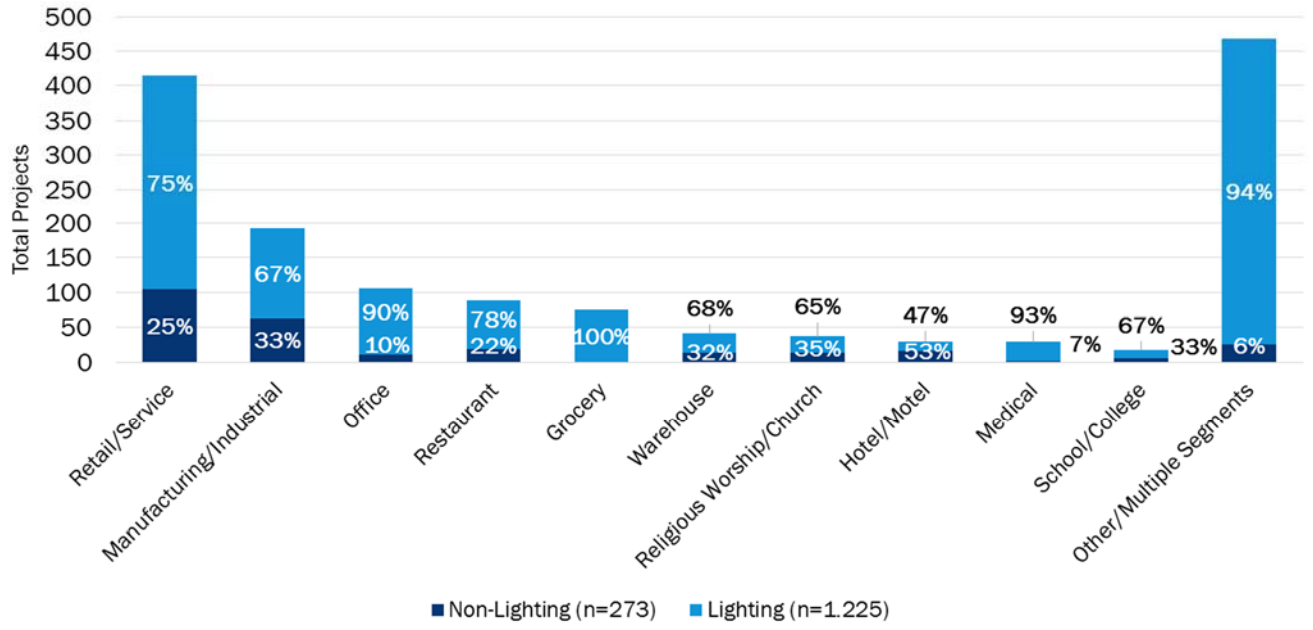
The number of Standard Program Core projects increased by more than 40% from PY8 to PY9—from 1,062 to 1,498 projects (Table 16). Gross electric savings decreased from 88,560 MWh in PY8 to 87,141 MWh in PY9, a 2% decrease. Therm savings increased slightly from PY8 to PY9 from 3,406,745 to 3,256,970 therms, a 4% increase. Despite the slightly lower electric savings, the program exceeded its PY9 target for electric savings and substantially exceeded its target for gas savings.

Table 16. Historical Standard Program Core Program Participation

Program Year	Projects	Ex Ante Gross Electric Savings	Ex Ante Gross Gas Savings
	#	MWh	Therms
PY4	1,560	70,621	507,492
PY5	1,297	98,774	2,040,085
PY6	910	64,604	975,046
PY7	1,264	78,415	1,523,095
PY8	1,062	88,560	3,406,745
PY9	1,498	87,141	3,256,970

According to the program-tracking database, the largest number of PY9 Core projects we can clearly categorize were completed in retail/service facilities (28%).[4] Other major facility types represented were manufacturing/industrial facilities (13%) and offices (7%). As discussed above, lighting projects accounted for 82% of total PY9 Core Program projects, and they represent a majority of projects installed at most facility types (Figure 1). The ratio of lighting projects to non-lighting projects was highest for other/multiple segment facility types (94%), followed by retail/services facilities (75%). Only hotels or motels installed more non-lighting projects than lighting projects (53%).

Figure 1. PY9 Core Projects by Facility Type



[4] More projects were completed in facilities that cannot be categorized into one of those presented in Figure 1 or facilities that fit into more than one category.

Instant Incentives

The Instant Incentives offering is designed to increase the implementation of energy-efficient lighting projects by increasing the market share of efficient lighting products that lighting distributors sell to their customers. The primary customer segment is end users, rather than contractors. In PY9, LEDs comprised all Instant Incentives sales. In PY9, the program sold 765,540 lighting measures to 496 unique business customers, compared to 55,668 lighting measures and 143 customers in PY8. Given that the program was piloted in PY7 and was officially launched in PY9, it is not surprising to see growth in participation. These increases in participation and equipment purchases indicate the Instant Incentives offering's success in achieving its objective. Table 17 summarizes the Instant Incentives lighting sold in PY9 by lighting product.

Table 17. Summary of Instant Incentives Program Participation by Measure Type

Lighting Product	Participants[a]		Measures		Ex Ante Gross Electric Savings	
	#	%	#	%	MWh	%
Linear LED	1,278	54%	708,417	93%	25,194	79%
Specialty LED	314	25%	16,602	2%	2,643	8%
Standard LED	261	21%	40,521	5%	4,093	13%
Total	**1,603**	**100%**	**765,540**	**100%**	**31,930[b]**	**100%**

Note: Columns may not sum to 100% due to rounding.
[a] Participants who purchased more than one lighting product are counted in multiple categories and therefore do not sum to the total unique participant count.
[b] Excludes PY7 and PY8 carryover savings.

Online Store

The Online Store is designed to offer commercial customers simple, convenient mail ordering of common energy efficiency products. The primary objective is to reduce the "hassle factor" associated with locating and purchasing limited quantities of energy efficiency equipment, primarily by small businesses.

The majority of discounted lighting measures (95%) sold through the Online Store in PY9 were LED bulbs. LED bulbs also account for the majority (92%) of the Online Store's PY9 savings. Table 18 summarizes the Online Store lighting sold in PY9 by lighting product.

Table 18. Online Store Program Participation by End Use

Lighting Product	Participants [a]		Measures		Ex Ante Gross Electric Savings	
	#	%	#	%	kWh	%
LED Bulb	3,929	91%	34,192	95%	4,858,969	92%
LED Exit Sign	203	5%	1,121	3%	221,365	4%
Occupancy Sensor	179	4%	710	2%	225,550	4%
Total	**4,063**	**100%**	**36,023**	**100%**	**5,305,885**	**100%**

Note: Columns may not sum to 100% due to rounding
[a] Participants who purchased more than one lighting product are counted in multiple categories and therefore do not sum to the total unique participant count. The number of participants by measure are based on application number.

Green Nozzle

While the savings from the Green Nozzle initiative are minimal relative to other Standard Program offerings, the energy savings achieved from it in PY9 is six times greater than the energy savings achieved in PY8, as shown in Table 19.

Table 19. Historical Green Nozzle Offering Participation

Program Year	Ex Ante Gross Electric Savings	Ex Ante Gross Gas Savings
	MWh	Therms
PY4	4,171	900,032
PY5	110	22,923
PY6	26	9,424
PY7	14	4,443
PY8	5	673
PY9	29	4,510

Laminar Flow Restrictors

The energy savings for the Laminar Flow Restrictor (LFR) offering accounts for 0.1% of the overall ex ante program savings. These results were expected since the LFR program offering was introduced this year as a pilot. For this reason, we are unable to compare historical energy savings and participation to the PY9 LFR results.

3.1.3 Program Design and Implementation

AIC made minor changes to the operation of the Standard Program during PY9 because of a lull in program participation in the middle of the program year. This lull in participation mid-year is likely attributable to the comprehensive new energy bill passed by the Illinois legislature in December 2016. Additionally, AIC increased reliance on its non-residential programs to meet energy and demand goals for AIC's portfolio.

In December 2016, the Illinois legislature passed a comprehensive new energy bill (SB2814). According to the program implementers, AIC business customers spent time reviewing the bill and during this time, program participation fell as customers attempted to figure out how this would affect them. Normally, consistent savings come in during the middle of the program year, but this lull led AIC to revise incentives and add more measures for which incentives could be received in the hope of increasing the number of program allies, distributors and customers who would participate in the program.

AIC placed a greater emphasis on the programs offered to its business customers to achieve goals due to the discontinuation of the Appliance Recycling Program, ENERGY STAR® New Homes Program, and Home Efficiency Standard Program during PY9. Largely because projects implemented through the C&I Custom and Retro-Commissioning Programs require longer lead times, AIC focused on increasing savings achieved through the C&I Standard program to make up for the discontinuation of residential offerings. The electric and gas savings targets for the program were 82,880 MWh and 744,554 therms when AIC finalized its implementation plan in September 2016. Both savings targets were surpassed by the program in PY9.

Implementation Changes

A variety of changes were made for PY9 to increase achieved savings from the C&I Standard program including the following:

- The Core Program offered:
  - Higher incentives on VFDs (increased to $115);
  - A 10% bonus to program allies on electric projects submitted on or after Jan. 25, 2017 and completed by May 31, 2017 with a cap of $10,000 per completed project (with additional restrictions); and
  - Increased HVAC specialty incentives.
- The Instant Incentives offering:
  - Increased the incentives available on several linear, specialty, and standard LEDs (however, occupancy sensors were no longer incentivized);
  - Added more types of specialty bulbs available for an incentive (e.g., LED Mogul – E39);
  - Established a tiered early completion bonus for distributors who completed their purchases by specified deadlines; and
  - Provided program allies with a 10% bonus on their transactions through this offering for transaction reports submitted on or after January 25, 2017 until May 31, 2017 (with certain restrictions).
- The Online Store offering provided four free bulbs to each customer upon request in addition to 25% off LED purchases

Implementation of these programmatic changes were designed to increase program participation and, as a result, increase the savings for the program to achieve the revised goals.

Marketing and Outreach

The overall Ameren Energy Efficiency for Business marketing strategy recognizes that the Core Standard Program is a common entry point for many business customers into the realm of energy efficiency projects. While some large C&I customers choose to engage in longer term projects that are better suited to the Custom or Retro-Commissioning Programs, the majority find the Standard Program less burdensome for the types of energy efficiency projects they wish to pursue. The marketing strategy for this program therefore offers information in several formats to cover a wide-range of energy efficiency projects that are relatively straightforward and for which pre-established incentives exist.

Throughout PY9, the program implementer relied upon several traditional marketing mechanisms, while also revising a few of its strategies to target specific audiences. AIC and implementer staff continue to make website and application updates as needed to reflect changes in incentives, qualifying measures, and bonuses available for early participation. Continuing a marketing strategy initiated in PY8, program allies continued to offer co-branded flyers that depicted both AIC's logo alongside the ally's logo in PY9. Periodic webinars for lighting program allies and distributors also continued through this program year to ensure these stakeholders continued their engagement with the program. Additionally, the program implementer hosted a business

symposium at the beginning of the program year in June 2016, to help spread the message about revised incentive amounts and updated lists of measures for which incentives are available. In PY8, the event was held in two locations, but for PY9 the symposium was held in one location as a single event.

"Lunch and Learn" sessions were also offered to customers and program allies in PY9. During these events, speakers shared content about the latest incentives available. In addition to these events, the program implementer continues to collaborate with Chambers of Commerce and Economic Development Associations to offer sessions to business customers. In PY9, several of these sessions were specifically designed to target the restaurant and hospitality industries.

Energy Advisors

In addition to dedicated program marketing, technical review, and call center staff, the AIC Business Program has regional Energy Advisors who market and support energy efficiency projects to AIC C&I customers. The Energy Advisors help customers identify and address opportunities for energy efficiency through participation in the Standard, Custom, and Retro-Commissioning Programs.

Program Allies

The AIC Business Program utilizes a network of Program Allies to help promote the program and its offerings. AIC Business Program allies represent a variety of market actor types, including electrical and lighting contractors, commercial refrigeration vendors, building automation system vendors and contractors, distributors, and manufacturer's representatives. Program Allies help customers identify opportunities for energy-efficient equipment installations in the ally's area of specialization, assist those customers in identifying AIC Business Program incentives that are available to them, and then work with customers to install eligible equipment. The Program Allies represent a vital and well-established link between the program and customers.

3.1.4 Participant Experience and Satisfaction

Based on the surveys conducted with Core Program and Instant Incentives participants, we present the findings related to participant characteristics, how participants heard about the program, their level of satisfaction with various program elements as well as with AIC, and any feedback and recommendations they provided about the program.

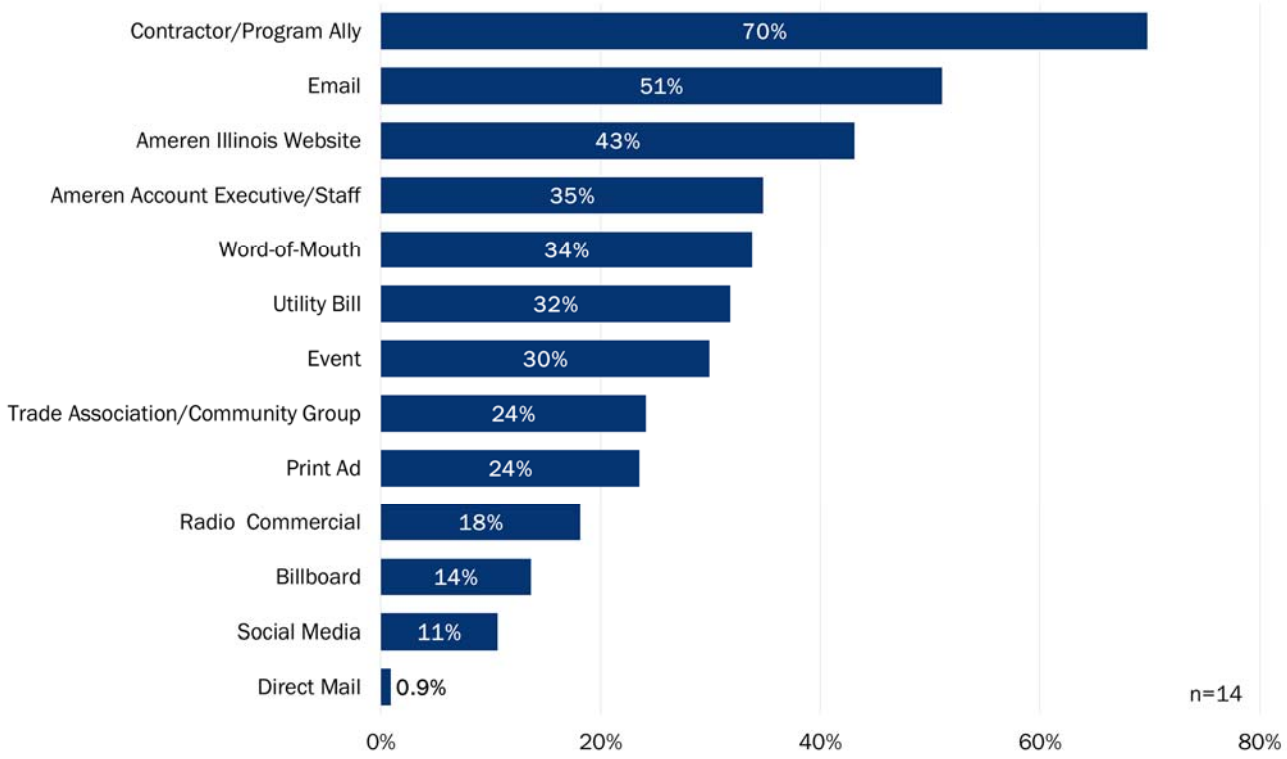
Core Program

Exposure to Marketing

As illustrated in Figure 2, when asked about the ways participants learned about the program, the majority (70%) of respondents reported learning about it through a contractor or program ally, 51% learned about it by email, and 43% learned about the program through the AIC website. These information sources have been, and continue to be, the most common ways participants report hearing about the Core Program. Considering AIC's efforts to keep program allies and contractors informed about the program, it is not surprising that 70% of respondents noted their exposure to the program through them. Part of the marketing and outreach strategy implemented by AIC includes providing contractors and allies with resources to increase their business while at the same time informing their customers about the program (for example, through co-branded flyers) as well as offering trainings so they are updated about current program offerings. Digital advertising through emails and AIC's website is also a strategic component of its marketing initiative and, in PY9, both electronic

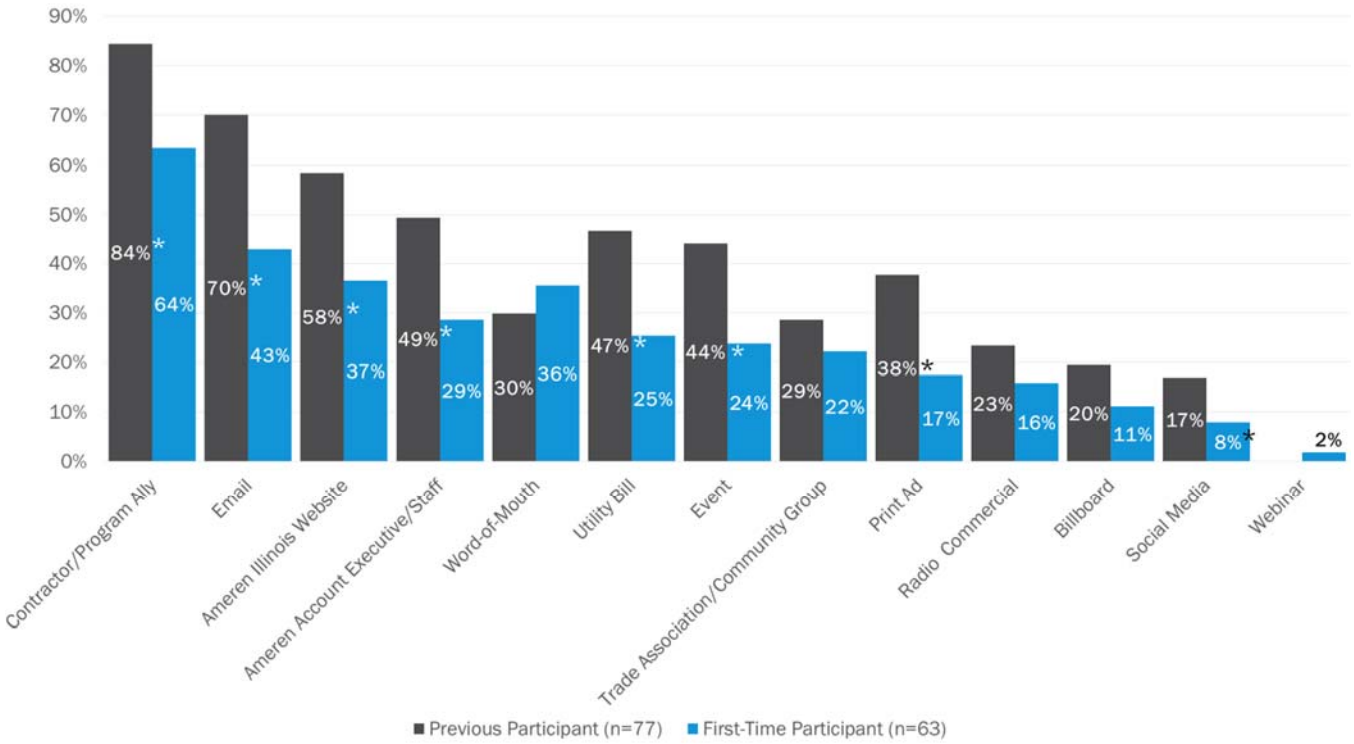
forms of communication continue to grow in importance. The marketing plan noted that monthly e-newsletters continue to include information about the Core Program.

Figure 2. Core Program Information Sources



For both previous and first-time participants, contractors or program allies, email, and the AIC website are the leading sources of information. However, as shown in Figure 3, significantly more previous participants heard about the program through these three marketing channels, as well as through account executives, utility bills, events, and print ads compared to first-time participants.

Figure 3. Core Program Information Sources by Participant Type



Note: (*) Indicates result is statistically significantly different across previous participant and first-time participant groups.

While most participants primarily learned about the Core Program through a contractor or program ally, 49% indicated that they would typically turn to the Internet or online sources for information on ways to save energy. Twenty-nine percent of participants would turn to AIC or their utility company and 14% would consult a vendor or contractor. AIC's marketing plan aligns well with how participants would look for energy saving tips since attention is increasingly paid to digital media and online sources to spread the word about the savings customers can achieve through their participation in the C&I Standard Program.

Table 20. Energy Specific Information Sources for Core Program Participants (Multiple Response)

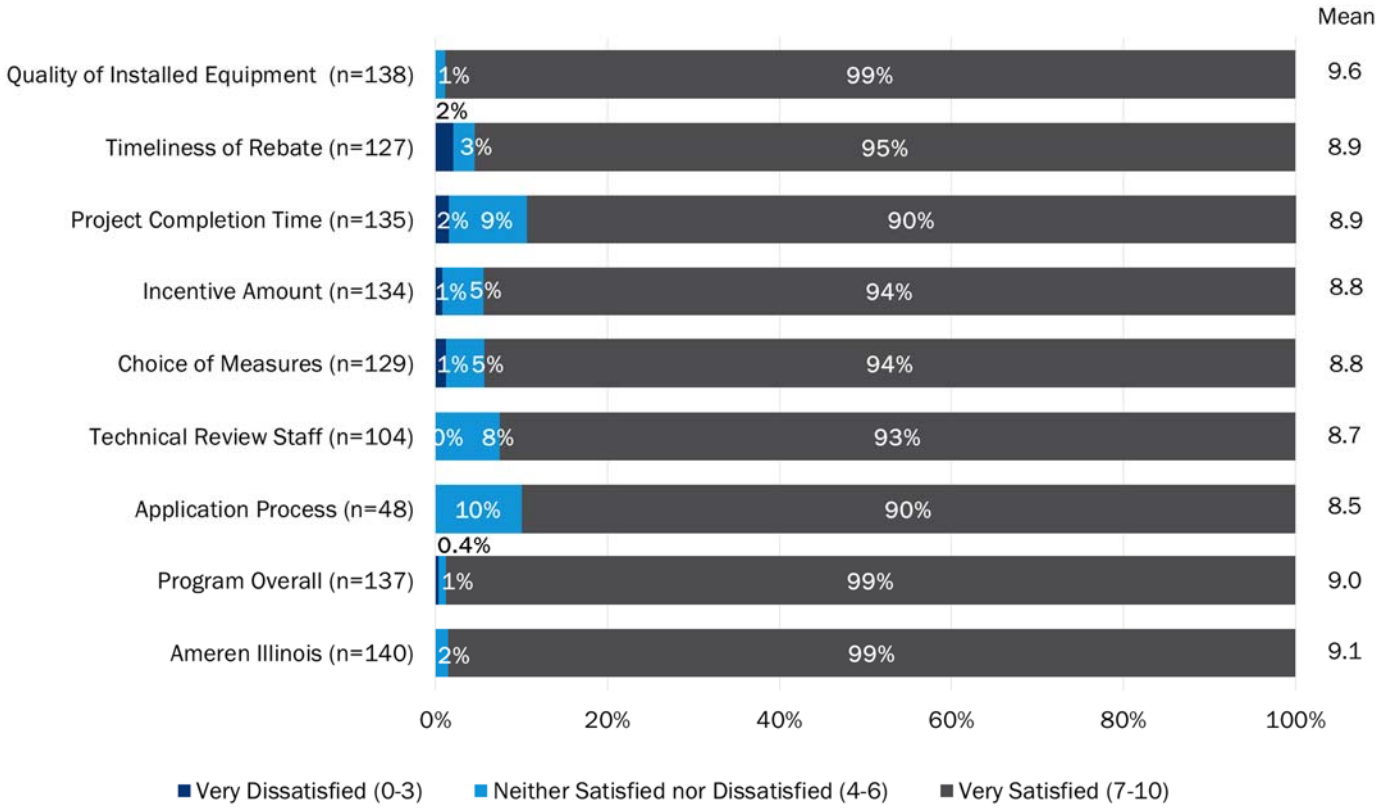
Information Sources for Saving Energy	Percent (n=140)
Internet	49%
AIC/Utility	29%
Vendor/Contractor	14%
Other (i.e. personal contact, government, news, utility bill, etc.)	7%
Don't know/Refused	1%

Notably, while only 29% of respondents cited AIC as a source of energy saving information, 76 respondents (or 87% of n=87) indicated that they generally consider AIC as a resource for energy efficiency information.

Participant Satisfaction

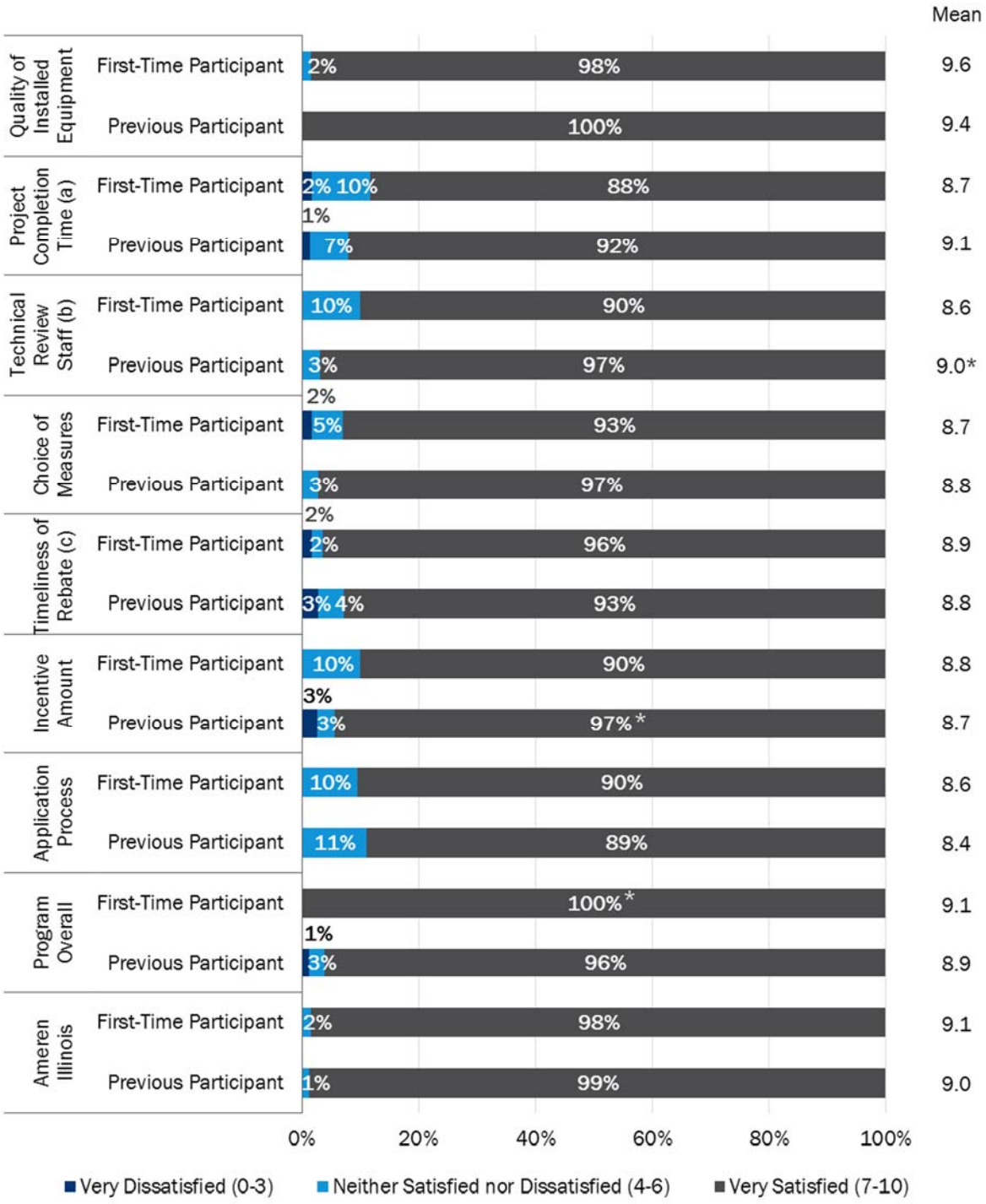
The majority of respondents were satisfied with AIC and the Core Program overall, with 99% providing a satisfaction rating of 7 or higher on a scale from 0 to 10, where 0 means "not at all satisfied" and 10 means "extremely satisfied". While most respondents were very satisfied with all program components, the quality of installed equipment, AIC, and the program overall ranked the highest in terms of mean satisfaction scores as shown in Figure 4.

Figure 4. Core Program Participant Satisfaction



Program component satisfaction by participant type is generally consistent with overall participant satisfaction, as both previous and first-time participants reported being very satisfied with the quality of the equipment installed, giving mean scores of 9.4 and 9.6, respectively, as shown in Figure 5. Significantly more first-time participants (97%) were very satisfied with the incentive amount compared to previous participants (90%). This could be because new participants to the program were unaware that they could receive rebates on energy efficiency projects and were pleasantly surprised that the cost of the project was not as high as they might have originally anticipated. Similarly, while both participant types reported being very satisfied with the program, significantly more first-time participants (100%) were very satisfied with the program overall compared to previous participants (96%).

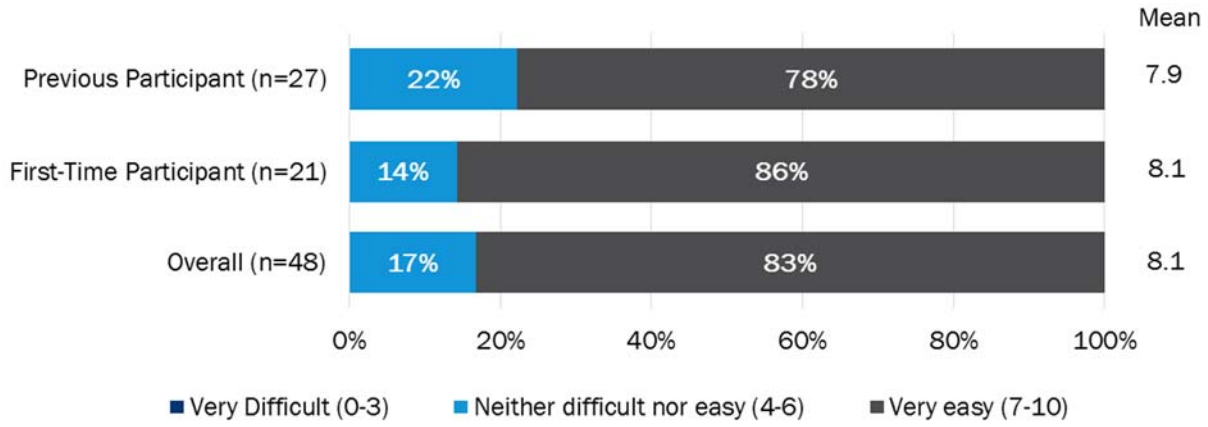
Figure 5. Core Program Participant Satisfaction by Participant Type



Note: (*) Indicates result is statistically significant
[a] Previous participant n=75, First-Time Participant n=60
[b] Previous participant n=64, First-Time Participant n=40
[c] Previous participant n=70, First-Time Participant n=57
Unless indicated by a, b, or c, Previous participant n = 77, First-Time Participant n = 63

Among the program components, respondents ranked the application process as one of the lowest on the satisfaction scale. Even though it ranks the lowest, 90% of surveyed participants still reported they were very satisfied (see Figure 4 above). As shown in Figure 6, while 83% of the 48 respondents who had firsthand experience of the application process reported that the application process was very easy and 17% indicated that it was neither difficult nor easy, suggesting that there may be an opportunity to improve the application process further. Notably, more first-time participants (86%) were satisfied with the application process compared to previous participants (78%).

Figure 6. Difficulty of Application Process for the Core Program



Of the 140 Core Program respondents, 3% indicated that they experienced problems during the participation process. Two respondents reported experiencing issues with the implementer, while one participant noted having issues with "labor changes", though it is unclear if this refers to changes in staff at the company or elsewhere. Other participants had issues with the limited measures covered by the program (n=1), unreturned phone calls (n=1), and the lengthy participation process (n=1).

Barriers Faced by First-Time Participants

First time participants in the Core Program were asked why they had not applied for an incentive through the program prior to PY9 and their responses are presented in Table 21. Of the group of 63 first-time participants who responded to the survey, 40% reported that they did not know about the program prior to June 2016, 38% reported that the did not need to do any upgrades prior to June 2016, and 13% reported that they had not participated prior to June 2016 due to budget constraints. However, given that the proportion of first-time participants in the population of the Core Program outnumbers the number of repeat participants, program marketing methods are clearly reaching new customers who then choose to engage with the program.

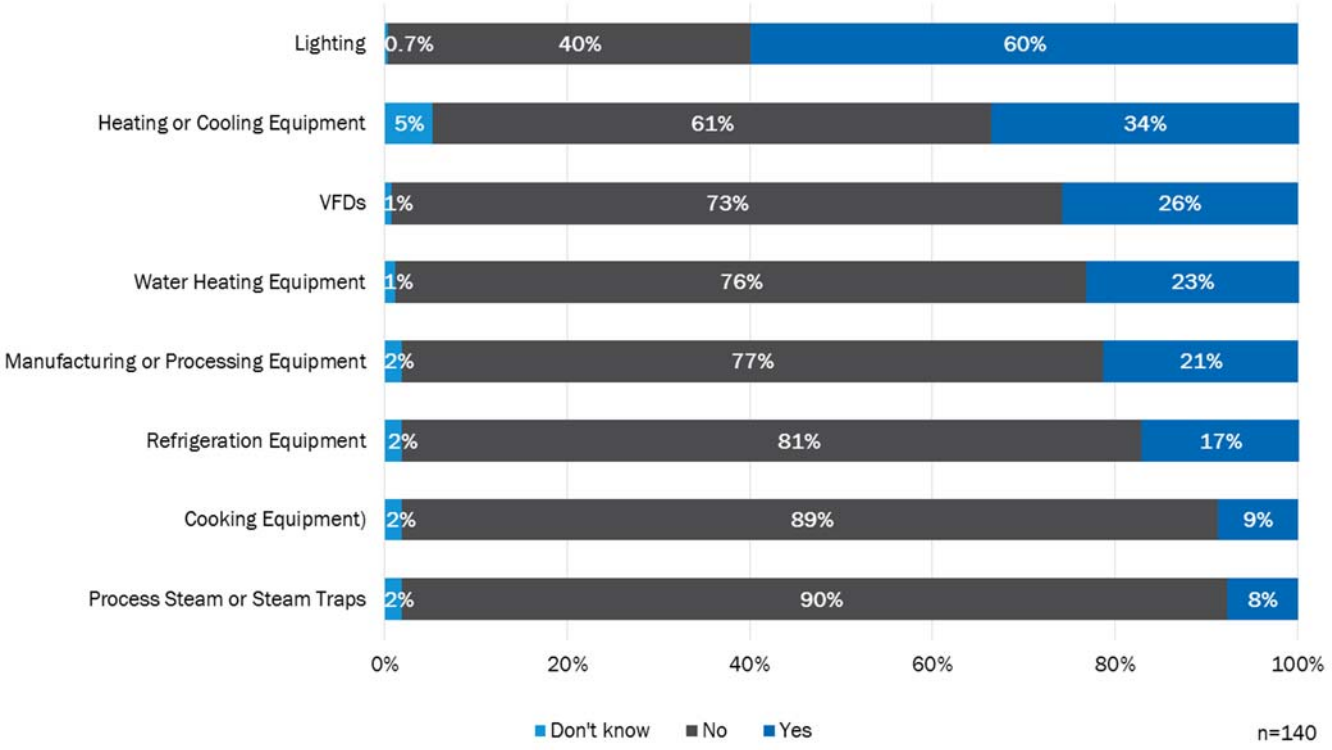
Table 21. Barriers to Core Program Participation (Multiple Response)

Barriers to Participation	Percent (n=63)
Did not know about the program prior to June 2016	40%
Did not have a need for upgrades prior to June 2016	38%
Did not participate prior to June 2016 due to budget concerns	13%
Did not participate prior to June 2016 due issues with eligibility	3%
Did not participate prior to June 2016 due lack of incentives	2%
Did not participate prior to June 2016 due business constraints	2%
Other	3%
Don't know	6%

Feedback and Recommendations

The majority (74%) of respondents noted that their company plans to invest in at least one energy equipment upgrade within the next three years. As shown in Figure 7, lighting upgrades appear to be the most popular, with 60% indicating that their company plans to invest in lighting upgrades in the next one to three years. Another 34% plan to upgrade their heating or cooling equipment, and 26% plan on upgrading VFDs. Process steam or steam traps and cooking equipment were the least popular among planned upgrades in the next three years. The future energy efficiency projects planned by Core Program participants gives insight to AIC staff and associated program allies and contractors what types of equipment their customers will likely purchase in the near future.

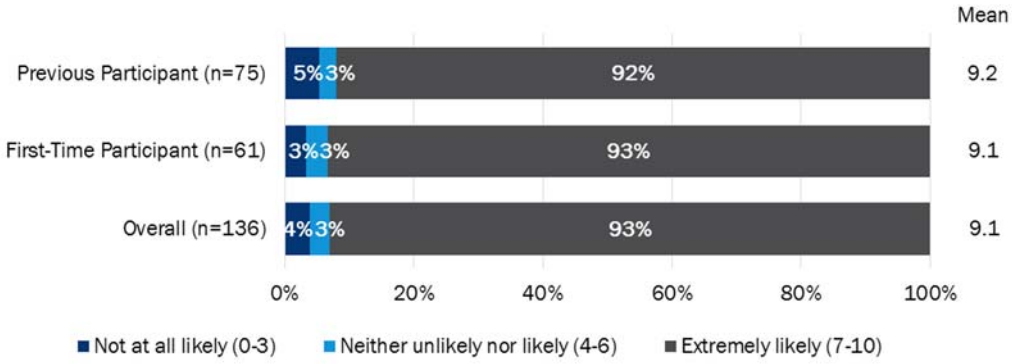
Figure 7. Future Energy Upgrade Investment Plans



The likelihood that PY9 Core Program participants will participate in future program years is high; 93% of participants indicated that they are extremely likely to participate in the program again in the future. The likelihood of future participation is consistent between previous and first-time participants, as shown in Figure 8.

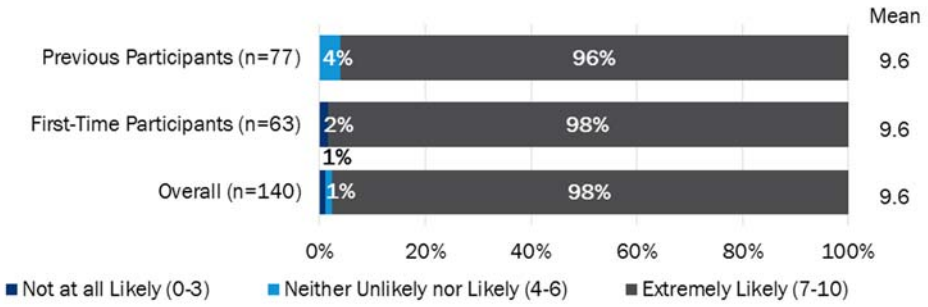
Among the six respondents who indicated that they are unlikely to participate in the program again, three noted that they would not be eligible to participate again, one respondent noted that there is no need to participate again, while two declined to provide a reason.

Figure 8. Likelihood of Future Participation in Core Program



Consistent with the high satisfaction and future participation scores, Core Program participants indicated being extremely likely to recommend the Core Program to other businesses. The vast majority (98%) of all respondents indicated that they are extremely likely to recommend the program to other businesses. Results are consistent between previous and first-time participants, as shown in Figure 9.

Figure 9. Likelihood of Recommending Core Program



While program satisfaction is high, Core Program participants noted that the program may be improved further by increasing incentives (15%), increasing publicity or awareness for the program (12%), and increasing the number of energy measures offered by the program (8%).

Table 22. Suggestions to Improve Core Program

Suggestions for Improvement	Percentage of Participants (n=140)
Increase incentives	15%
Increase publicity	12%
Offer more energy efficiency measures/equipment	8%
Streamline process	8%
Provide more program information	8%
Relax partner guidelines	2%
No recommendations	36%
Other	7%
Don't know/Refused	14%

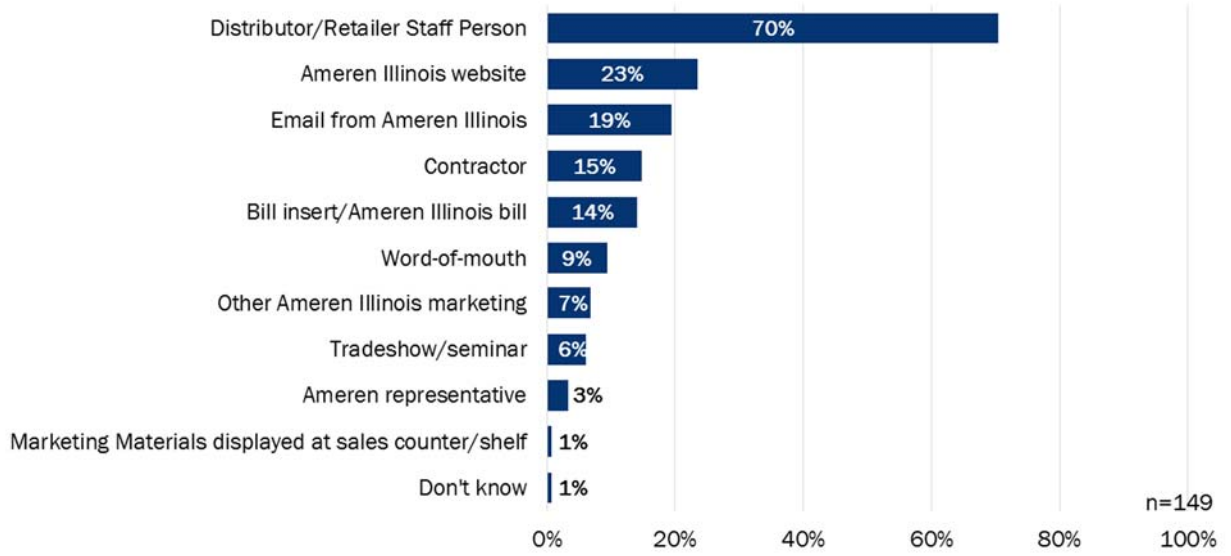
Instant Incentives End-Users

The objective of the Instant Incentives offering is to increase customer participation in implementing energy efficiency projects by increasing the market share of energy efficient lighting equipment sold to business customers.

Program Awareness and Exposure to Marketing

The vast majority (93%) of Instant Incentives survey respondents were aware of this component of the Core Program when they purchased their lighting equipment, whereas 7% were not aware of the program prior to purchasing their lighting equipment and only learned about the lighting discount when they purchased their lighting equipment. As shown in Figure 10, over two-thirds or 70% of respondents learned about the Instant Incentives offering through a distributor or retailer, while 23% learned about the program through the AIC website, and 19% learned about the program through an email from AIC. Since distributors are one of the main ways customers purchase energy efficient lighting through the Instant Incentive offering, it is not surprising that it represents the main source from which customers learn about the reduced price of lighting. Additionally, AIC provides Instant Incentives training opportunities to lighting distributors through webinars as part of its marketing plan.

Figure 10. Instant Incentives Information Sources (Multiple Response)

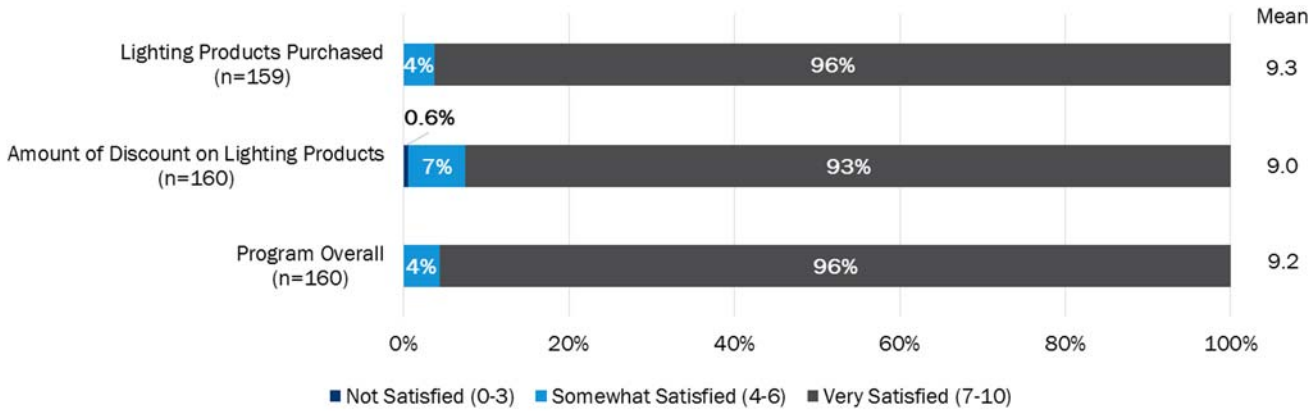


Note: Excludes 11 respondents who had no prior knowledge of the Instant Incentives Program; hence total respondents is 149.

Participant Satisfaction

Instant Incentives participants reported high levels of satisfaction with the program overall, with the lighting equipment they purchased, as well as with the discount amount. The majority (96%) of respondents reported that they were extremely satisfied with the program overall. Consistent with overall program satisfaction, 96% of respondents were also very satisfied with the lighting equipment they purchased, while 93% where very satisfied with the amount of discount on the lighting products they purchased (see Figure 11).

Figure 11. Instant Incentives Program Participant Satisfaction



Barriers Faced by First-Time Participants

Similar to the Core Program, first-time participants of the Instant Incentives offering noted some barriers to participation. Among the 160 Instant Incentives participant survey respondents, close to half (48%) had not participated in the Instant Incentives program prior to PY9. This again suggests the marketing of this offering

has reached a number of AIC business customers and has expanded the reach of this portion of the program as it entered its second full program year.

The vast majority (75%) of the 76 first-time participants cited the lack of awareness of the Instant Incentives program as the primary reason for not having participated in this offering before PY9, while 12% noted they were not interested in energy efficiency until PY9 as shown in Table 23.

Table 23. Barriers to Instant Incentives Program Participation

Why hadn't you participated in the Instant Incentives Program prior to June 2016?	Percentage of Participants (n=76)
My company was not aware of the Instant Incentives program until now.	75%
My company was not interested in energy efficiency until now.	12%
My company did not have a need for upgrades until now.	4%
My company held off until the bulbs were available at a good price.	3%
My company just moved into a new space and needed to purchase new lighting equipment.	3%
Other	3%

End-User Purchase Channels

All 160 survey respondents indicated purchasing their electric supply (94%) or delivery service (6%) from AIC, indicating that only customers who are eligible are making use of Instant Incentives offering. Of the 160 respondents, only one indicated being a contractor who purchases lighting equipment for installation at a client or third-party business. As with PY8, we included this contractor in our analysis, as contractors were not prohibited from installing discounted bulbs or acting as an intermediary to end-users. In addition, their experience with the program's participation process and any recommendations they may provide to improve the program are not invalidated due to their contractor status.

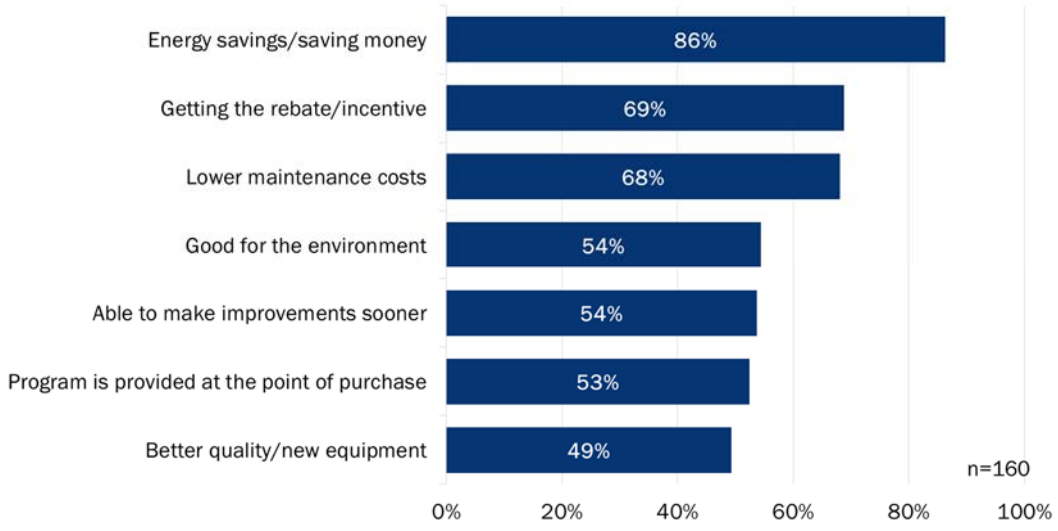
Nearly half or 48% of respondents indicated purchasing lighting products from a lighting distributor or retail store, while 34% purchase lighting equipment from Big-box/Do-it-yourself (DIY) retail stores, and 14% turn to a local hardware store for lighting equipment. The majority of respondents (92%) indicated that they replace light bulbs upon burnout, while 6% indicated replacing light bulbs based on a replacement schedule.

Figure 12. Instant Incentive Participant Typical Lighting Purchase Channels (Multiple Response)

Feedback and Recommendations

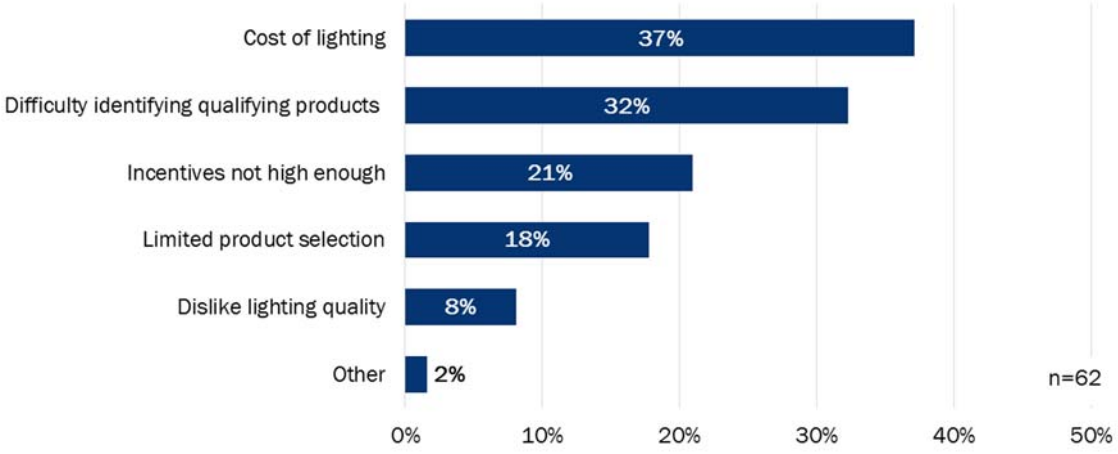
When asked about the benefits of purchasing lighting products through the Instant Incentives offering, 86% of respondents cited saving energy and/or saving money as the main benefit of purchasing lighting products through the program. Other main benefits to purchasing lighting products through the program include receiving a rebate or incentive (69%) and the lower maintenance costs the program generates for their businesses (68%) (see Figure 13).

Figure 13. Advantages of Participating in Instant Incentives Program (Multiple Response)



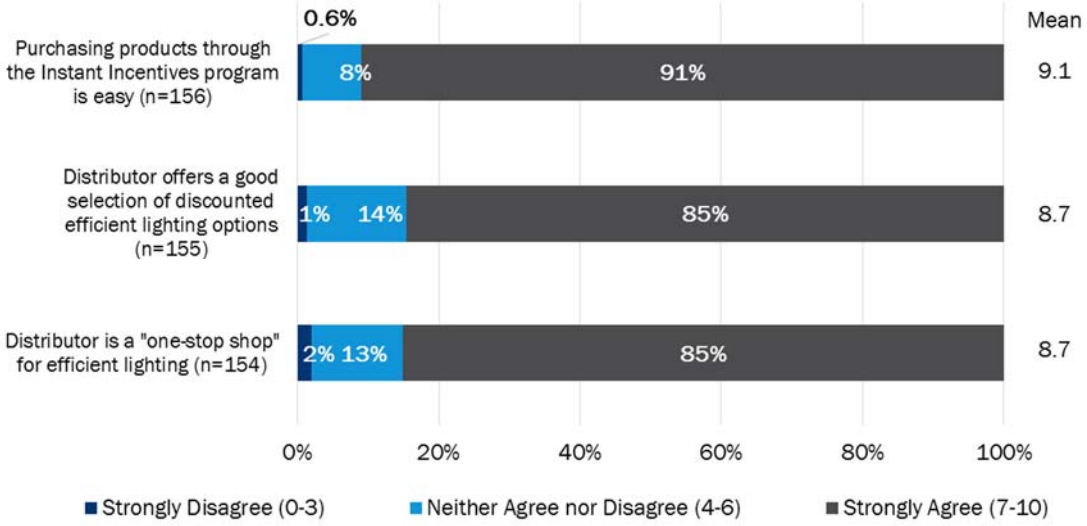
When asked about the disadvantages of purchasing lighting through the program, 61% (n=160) said there were no disadvantages, while 39% or 62 respondents named at least one disadvantage. As shown in Figure 14, respondents reported the cost of lighting (37%), difficulty identifying qualifying products (32%), and the sub-optimal amount of incentives (21%) as disadvantages. Notably, only 8% reported disliking the quality of the lighting equipment they purchased through the program.

Figure 14. Disadvantages of Purchasing Lighting through Instant Incentives (Multiple Response)



Most respondents (91%) agreed that purchasing lighting products through the Instant Incentives offering was easy. The majority (85%) also agreed that their distributor offered a good selection of discounted energy efficient lighting. Similarly, 85% also agree that their distributor is a "one-stop shop" for energy efficient lighting. Notably, all 160 respondents noted that they would recommend the program to businesses like theirs.

Figure 15. End-User Agreement with Statements about PY9 Instant Incentives Lighting Distributors



3.2 Impact Results

The following sections provide measure verification rates, in addition to gross and net impacts for PY9.

3.2.1 Gross Impacts

The total ex post gross electric and gas energy savings and demand impacts for the PY9 Standard Program are shown in Table 24.

Table 24. Standard Program Gross Impact Summary

Savings Category	Ex Ante Gross	Realization Rate	Ex Post Gross
Energy Savings (MWh)			
Core Program	87,141	99.5%	86,696
Instant Incentives[a]	32,023	102.1%	32,690
Online Store	5,306	100.0%	5,306
Green Nozzle	29	121.1%	35
Laminar Flow Restrictor	—	N/A	—
Total MWh Savings	**124,499**	**100.2%**	**124,727**
Demand Savings (MW)			
Core Program	11.63	98.9%	11.50
Instant Incentives[a]	6.72	102.6%	6.89
Online Store	0.31	100.0%	0.31
Green Nozzle	—	N/A	—
Laminar Flow Restrictor	—	N/A	—
Total MW Savings	**18.66**	**100.2%**	**18.71**
Gas Savings (Therms)			
Core Program	3,256,970	100.0%	3,256,319
Instant Incentives	—	N/A	—
Online Store	—	N/A	—
Green Nozzle	4,510	99.3%	4,481
Laminar Flow Restrictor	3,562	100.0%	3,562
Total Therm Savings	**3,265,042**	**100.0%**	**3,264,361**

[a] Includes carryover savings for CFLs and LEDs purchased in PY7 and PY8.

Core Program

AIC customers installed more than 70,000 individual measures through the Core Program in PY9 as part of 1,498 unique projects (Table 25). As in previous years, the majority of projects consisted of lighting installations, followed by specialty equipment[5] and steam trap projects.

[5] Specialty equipment includes commercial refrigeration and controls (i.e., glass door freezers, solid door freezers, strip curtains, anti-sweat heater controls, etc.) and food service equipment (i.e., fryers, dishwashers, steam cookers, hot holding cabinets, etc.).

Table 25. PY9 Core Program Verification Results

Measure Type	Program-Tracking Measure Count	Verified Measure Count	Verification Rate
Lighting	68,861	67,571	98%
Specialty Equipment	1,563	1,563	100%
Steam Traps	643	643	100%
VFDs	434	434	100%
HVAC	279	279	100%
Leak Survey and Repair	9	9	100%
Total	**71,789**	**70,499**	**98%**

Our impact analysis activities for the Core Program yielded ex post gross electric savings, gas savings, and peak demand savings that are each approximately equal to each respective ex ante estimate (Table 26).

Table 26. PY9 Core Program Gross Impacts

Measure Type	Verified Measures	Ex Ante Gross Savings			Ex Post Gross Savings			Realization Rate		
		MW	MWh	Therms	MW	MWh	Therms	MW	MWh	Therms
Lighting	67,571	7.34	60,001	—	7.19	58,767	—	98%	98%	N/A
VFDs	434	3.35	18,880	—	3.33	18,766	—	99%	99%	N/A
Leak Survey and Repair	9	0.45	3,849	—	0.45	3,849	—	100%	100%	N/A
HVAC	279	0.35	2,519	54,445	0.39	3,410	53,794	111%	135%	99%
Specialty Equipment	1,563	0.14	1,892	8,599	0.14	1,903	8,599	98%	101%	100%
Steam Traps	643	—	—	3,193,927	—	—	3,193,927	N/A	N/A	100%
Total	**70,499**	**11.63**	**87,141**	**3,256,970**	**11.50**	**86,696**	**3,256,319**	**99%**	**100%**	**100%**

The evaluation team identified differences between ex ante and ex post savings for all program measures, but for reporting purposes we outline discrepancies for measures with notable differences in realization rates (i.e., HVAC). Note that while certain inputs may increase savings, others decrease savings. The combination of all inputs brings about the overall realization rate for a specific measure.

HVAC Discrepancies:

- **Variable Frequency Drive Load Factor Discrepancy:** The implementer assumes a load factor of 0.65 per the IL-TRM V5.0 (when load factor is unknown). Ex post applied the actual load factor provided in the program-tracking database.
- **Effective Full Load Hour (EFLH) Discrepancy for Split Air Conditioners:** The implementer applied EFLHs that vary from what is provided in the IL-TRM V5.0, whereas ex post applied the values from the IL-TRM V5.0.

Online Store

Online Store program measures in PY9 (36,023 measures) increased by more than three times compared to PY8 (11,911 measures). The majority of program measures consisted of LED lamps, accounting for approximately 95% of all PY9 Online Store measures (see Table 27).

Table 27. PY9 Online Store Verification Results

Measure Type	Program-Tracking Measures	Verified Measures	Verification Rate
LED Bulb	34,192	34,192	100%
LED Exit Sign	1,121	1,121	100%
Occupancy Sensor	710	710	100%
Grand Total	**36,023**	**36,023**	**100%**

Our impact analysis activities for the Online Store offering yielded ex post gross electric and peak demand savings. Ex post savings are consistent with ex ante savings, resulting in a realization rate of 100% (Table 28).

Table 28. PY9 Online Store Gross Impacts

Measure Type	Verified Measures	Ex Ante Gross Savings		Ex Post Gross Savings		Realization Rate	
		MW	MWh	MW	MWh	MW	MWh
LED Bulb	34,192	0.25	4,859	0.25	4,859	100%	100%
LED Exit Sign	1,121	0.01	221	0.01	221	100%	100%
Occupancy Sensor	710	0.06	226	0.06	226	100%	100%
Total	**36,023**	**0.31**	**5,306**	**0.31**	**5,306**	**100%**	**100%**

Note: Columns may not sum to the totals listed due to rounding error.

Instant Incentives Measures

Instant Incentive participants installed more than 600,000 individual program measures in PY9 (Table 29). The majority of program measures consisted of linear LED lamps, accounting for approximately 93% of all PY9 Instant Incentive measures (Table 29). The evaluation team applied the self-reported participant survey verification rate of 78% to arrive at the total verified measure count. Appendix D presents more details around the derivation of the verification rate and recommended installation trajectory to capture future savings from PY9 purchases installed two and three years after purchase.

Table 29. PY9 Instant Incentives Program Verification Results

Measure Type	Program-Tracking Measure Count	Verified Measure Count	Verification Rate
Linear LEDs	708,417	551,786	78%
Standard LEDs	40,521	31,562	78%
Specialty LEDs	16,602	12,931	78%
Total	**765,540**	**596,279**	**78%**

Our impact analysis activities for the Instant Incentive program yielded ex post gross electric and peak demand savings. Table 30 shows the ex post energy and demand savings for PY9. The program contributed 32,690 MWh and 6.89 MW in ex post savings (including carryover[6] savings).

Table 30. PY9 Instant Incentives Gross Impacts

Measure Type	Ex Ante Gross Savings		Ex Post Gross Savings		Realization Rate	
	MW	MWh	MW	MWh	MW	MWh
PY9 Impacts	6.70	31,930	6.76	31,967	101%	100%
PY8 Carryover[a]	0.02	93	0.14	723	763%	780%
PY7 Carryover	1.40E-06	0.01	1.40E-06	0.01	100%	100%
Total	**6.72**	**32,023**	**6.89**	**32,690**	**102.6%**	**102.1%**

a. The realization rate for PY8 carryover is due to the fact that ex ante PY8 carryover applies the IL-TRM ISR whereas ex post PY8 carryover savings apply researched ISR leading.

The evaluation team identified one minor difference in ex ante and ex post calculations. Ex ante calculations relied on the ISR that the evaluation team recommended based on PY8 research (77.8%), while the evaluation team used a PY9 researched ISR (77.89%). This slight difference in ISR in addition to some minor rounding differences led to the discrepancies between ex ante and ex post savings.

Green Nozzle

The Green Nozzle offering incented more than six times the number of verified measure quantities in PY9 (25 measures) compared to PY8 (4 measures). The evaluation team verified the number of measures within the database and applied a verification rate of 100%. The implementer supplied detailed calculations including variable assumptions and algorithms which were carefully reviewed and compared against the IL-TRM V5.0. Table 31 summarizes the ex ante and ex post savings for the Green Nozzle initiative. Details regarding differences between ex ante and ex post savings are provided below.

Table 31. Green Nozzle Gross Impacts

Measure Type	Verified Measures	Ex Ante Gross			Ex Post Gross			Realization Rate		
		MW	MWh	Therm	MW	MWh	Therm	MW	MWh	Therm
Green Nozzle	25	—	29	4,510	—	35	4,481	N/A	121%	99%

The evaluation team identified differences between ex ante and ex post savings for the Green Nozzle offering. Note that while certain inputs may increase savings, others decrease savings. The combination of all inputs brings about the overall realization rate. We describe the differences in the ex ante and ex post savings calculations in detail below.

- **Hours per Day Discrepancy:** The implementer applied the hours per day value (0.5 hrs/day) from the IL-TRM V4.0 for small, quick service restaurants instead of the value from the IL-TRM V5.0 (1 hrs/day). As a result, ex post electric savings for the Green Nozzle offering are greater than ex ante savings.

[6] Multiple studies across the country indicate that participants install bulbs they initially placed in storage within several years of purchase, resulting in additional carryover savings for lamps purchased in PY7 and PY8 but not installed until PY9.

- **Gas Water Heater Efficiency Discrepancy:** The implementer applied the gas water heater efficiency (75% AFUE) from the IL-TRM V4.0 instead of the efficiency from the IL-TRM V5.0 (80% AFUE). As a result, ex post gas savings for the Green Nozzle offering are slightly less than ex ante savings.

Laminar Flow Restrictors

The Laminar Flow Restrictor (LFR) offering was introduced as a new initiative in PY9 with few projects (n=6) completed and 390 measures installed in PY9 (Table 32). LFRs are offered as a pilot in anticipation of including these measures in 2018. These measures are required in healthcare facilities, hospitals, senior care facilities, and medical labs that must comply with strict Occupational Safety and Health Administration (OSHA) requirements. Standard faucet aerators mix together surrounding room air and water to produce an aerated stream. However, this air can contain harmful bacteria and contaminants compromising the cleanliness of the water and thus putting public health at risk. Laminar flow restrictors do not mix air into the water stream, thus producing 100% pure water.

The evaluation team applied the IL-TRM V5.0 installation rate of 95% to arrive at the total verified measure count.

Table 32. PY9 Laminar Flow Restrictor Program Verification Results

Measure Type	Program-Tracking Measure Count	Verified Measure Count	Verification Rate
Laminar Flow Restrictor	390	371	95%

Table 33 summarizes the ex ante and ex post savings for the Laminar Flow Restrictor initiative.

Table 33. Laminar Flow Restrictor Gross Impacts

Measure Type	Verified Measures	Ex Ante Gross			Ex Post Gross			Realization Rate		
		MW	MWh	Therm	MW	MWh	Therm	MW	MWh	Therm
Laminar Flow Restrictor	371	—	—	3,562	—	—	3,562	N/A	N/A	100%

The evaluation team carefully reviewed the database and found that savings for LFRs are custom calculated for each project. Therefore, the evaluation team requested detailed ex ante calculations and variable assumptions from the implementer. The implementer provided additional documentation that outlined calculations for planning purposes, and provided the existing fixture and efficient fixture flow rates for each project. The evaluation team did not find any discrepancies between ex ante and ex post savings for the LFR offering.

3.2.2 Net Impacts

The evaluation team applied NTGRs approved by the Illinois SAG to determine net impacts for the PY9 Standard Program. Table 34 presents the net impacts for PY9 Standard Program measures installed through the Core Program, Online Store, Instant Incentives offerings, and the Green Nozzle and Laminar Flow Restrictor initiatives.

Table 34. PY9 Standard Core Program Gross and Net Impacts

Savings Category	Ex Post Gross	NTGR	Ex Post Net
Energy Savings (MWh)			
Core Program	86,696	0.78	67,571
Instant Incentives	32,690	0.78	25,490
Online Store	5,306	0.83	4,404
Green Nozzle	35	0.92	32
Laminar Flow Restrictor	—	N/A	—
Total MWh	**124,727**	**0.78**	**97,497**
Demand Savings (MW)			
Core Program	11.50	0.78	9.02
Instant Incentives	6.89	0.78	5.38
Online Store	0.31	0.83	0.26
Green Nozzle	—	N/A	—
Laminar Flow Restrictor	—	N/A	—
Total MW	**18.71**	**0.78**	**14.65**
Gas Savings (Therms)			
Core Program	3,256,319	0.61	1,974,286
Instant Incentives	—	N/A	—
Online Store	—	N/A	—
Green Nozzle	4,481	0.89	3,988
Laminar Flow Restrictor	3,562	0.68	2,404
Total Therms	**3,264,361**	**0.61**	**1,980,678**

Note: Columns may not sum to the totals listed due to rounding error.

4. Findings and Recommendations

- **Finding #1:** Our impact evaluation found electric and gas gross realization rates of, or just under, 100% for all program components, indicating that the program is tracking its savings and projects carefully. However, we continue to find minor discrepancies in the database that do not reflect the latest TRM updates.
  - **Recommendation #1:** We recommend incorporating all IL-TRM V5.0 updates and applying the correct measure assumptions consistently across all measures to ensure AIC continues achieving high realization rates moving forward.
- **Finding #2:** The implementer indicated that one participant requested LFRs with a higher flow rate compared to the flow rate of other LFRs installed within the program. The algorithm within the IL-TRM V5.0 includes throttling factors for flow rates measured during the direct install. Incorporating the throttling rates for this one LFR project results in flow rates (2.20 gpm * 0.95 throttle rate = 2.09 gpm) less than the baseline flow rate (2.46 gpm * 0.83 throttle rate = 2.04), thus resulting in negative therm savings.
  - **Recommendation #2:** We recommend the implementer require a larger flow rate reduction such that savings yield positive results.
- **Finding #3:** An examination of the participant tracking database for the Core Program shows that first-time participants outnumbered participants who had previously engaged with the program. In the case of the Instant Incentives offering, 48% of survey respondents who used the program in PY9 did so for the first time as well. We inquired with first-time Core Program and Instant Incentives participants to ask why they had not participated before PY9. Forty percent of Core Program participants reported that they did not know about the program and another 38% reported that the did not need to do any upgrades prior to PY9. Of the Instant Incentives participants, 75% were previously unaware of the program while 12% reported that they had not been interested in energy efficiency until now.
  - **Recommendation #3:** While the Core Standard Program is quite mature, there are still a number of AIC business customers who were not aware of the program or were not interested in participating until this past program year. AIC's marketing plan utilizes several approaches to reach its business customers, and we recommend that it continue to use multiple avenues as a way of getting the attention of customers who are unaware of the program. Additionally, AIC could consider launching a marketing campaign that offers a bonus to first-time participants to entice them to participate. This might gain the attention of customers who felt they could not afford to make upgrades or who might be on the cusp of considering energy efficient projects.
- **Finding #4:** The popularity of the Instant Incentives offering increased as it completed its second full year as part of the Core Standard program. Participation increased from 273 customers in PY8 to over 1,600 customers in PY9, and net ex post savings grew from 3,888 MWh in PY8 to 25,359 MWh in PY9. Over 95% of respondents reported that they were extremely satisfied with the program overall, as well as with the lighting equipment purchased.
  - **Recommendation #4:** Based on the increasing popularity of Instant Incentives, AIC should continue with this offering as part of its Core Standard Program. Growth in participation and energy savings, along with high levels of participant satisfaction, support the continued offering of this component of the Standard Program.

- **Finding #5:** Customers who participated in the Instant Incentives offering reported the most common way they learned about the offering is through distributors and retailers. This is not surprising since distributors are a main way customers purchase energy efficient lighting through this program component. To ensure lighting distributors are familiar with this offering, AIC provides Instant Incentives training opportunities to lighting distributors through webinars as part of its marketing plan.

  - **Recommendation #5:** AIC should continue to provide training opportunities and marketing strategies aimed towards lighting distributors and retailers to grow the Instant Incentives offering, as it experienced a positive reception by AIC business customers. Since this offering is still relatively new, we recommend expanding the distribution of relevant marketing materials to inform additional customers and program allies of this opportunity.

Appendix A. Data Collection Instruments

Core Program Participant Survey

PY9 CI Standard Participant Survey FI

Instant Incentives End-User Survey

AIC PY9 Standard Instant Incentives Er

Appendix B. Survey Response Rate Methodology

The survey response rate (RR) is the number of completed interviews divided by the total number of potentially eligible respondents. We calculated RR3 using the standards and formulas set forth by the AAPOR.[7] The formulas used to calculate RR3 are presented below. The definitions of the letters used in the formulas are shown in the survey disposition tables in the Online Store participant survey and Instant Incentives participant survey sections of this report.

Equation 1. Formula for RR3

$$RR3 = \frac{I}{\left(I + N + e1(U1 + e2 * U2)\right)}$$

Where:

$$e1 = \frac{(I + N)}{(I + N + X1)}$$

$$e2 = \frac{(I + N + X1 + U1)}{(I + N + X1 + U1 + X2)}$$

We also calculated a cooperation rate (CR), which is the number of completed interviews divided by the total number of eligible sample units. We used AAPOR Cooperation Rate 3 (COOP3) for the web surveys used in this evaluation, which is calculated as:

Equation 2. AAPOR Cooperation Rate 3

$$COOP3 = \frac{I}{((I + P) + R)}$$

[7] *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*, AAPOR, 2011. http://www.aapor.org/AM/Template.cfm?Section=Standard_Definitions2&Template=/CM/ContentDisplay.cfm&ContentID=3156.

Appendix C. Net-to-Gross Ratio Results

In PY9, the evaluation team conducted research with Instant Incentives participants to update the net-to gross ratios (NTGRs) for these offerings for future application in 2019. Consistent with prior program years, we developed the NTGRs using self-reported information from computer-assisted web interviewing (CAWI) surveys with program participants. We used participant survey responses to develop estimates of free-ridership (FR) and participant spillover (PSO). We applied our estimate of non-participant spillover (NPSO) from our PY7 research.

Key Findings

Table 35 presents the results of our PY9 NTG analysis for future application in 2019.

Table 35. Updated Standard Electric NTGRs from PY9 Research

Offering	Free-Ridership (FR)	Participant Spillover (PSO)	Non-Participant Spillover (NPSO)[a]	NTGR (1-FR+PSO+NPSO)
Instant Incentives	0.087	0.003	0.00	0.916

[a] From PY7 research.

NTGR Background

Net impact evaluation is generally described in terms of determining program attribution. Program attribution accounts for the portion of gross energy savings associated with a program-supported measure or behavior change that would not have been realized in the absence of the program. The program-induced savings, indicated as a NTGR, is made up of FR and SO and is calculated as (1 – FR + SO). FR is the portion of the program-achieved verified gross savings that would have been realized absent the program and its interventions. SO is generally classified into participant and non-participant spillover. PSO occurs when participants take additional energy-saving actions that are influenced by the program interventions but did not receive program support. NPSO spillover is the reduction in energy consumption and/or demand by customers who did not participate in the program yet were influenced by it.

The formula to calculate the NTGR is:

$$NTGR = 1 - FR + PSO + NPSO$$

The Illinois evaluation teams have worked with the ICC and the Illinois SAG to create a standard Illinois Statewide NTG approach for use in Illinois energy efficiency evaluation, measurement, and verification work. Per the NTG Methods attachment to the Illinois TRM,[8] all NTG data collection and analysis activities for program types covered by the attachment that began after June 1, 2016 must conform to the statewide NTG methods. This evaluation conforms with these requirements.

[8] Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 5.0. Volume 4: Cross-Cutting Measures and Attachments. Dated: February 11, 2016. Effective: June 1, 2016.

Free-Ridership (FR)

Methodology

Free-riders are program participants who would have installed the same energy-efficiency measure(s) or taken the same energy-saving actions without program support. FR estimates are based on a series of questions that explore the influence of the program on participants' purchasing decisions as well as actions the participant likely would have taken had the program not been available.

As prescribed by the Core Non-Residential Protocol in the NTG Methods attachment, we implemented six specifications of the FR algorithm for Instant Incentives projects included in the participant survey.[9] Each specification of the algorithm consists of three scores: (1) influence of program components (PC) score, (2) overall program influence (PI) score, and (3) no-program (NP) score (counterfactual), as well as a timing adjustment. Each sub-score serves as a separate estimator of FR and can take on a value of 0 to 1, where a higher score means a higher level of FR. The overall free-ridership score for a project is the average of the three scores, combined with a timing adjustment. Depending on the specification, the timing adjustment is applied to either the no-program score or the preliminary overall FR score (average of the three sub-scores). The FR score for each project thus ranges from 0 (no FR) to 1 (100% FR).

The three scores included in the algorithms, their variations, and the timing adjustment are described below.

1. **Influence of Program Components**. This score is based on a series of questions that ask respondents to rate the importance of program and non-program components in their decision to install the energy-efficient equipment, using a scale of 0 to 10 (where 0 is "Not at all important" and 10 is "Very important").

   PCs considered include such items as the availability of the incentive, information from program marketing materials, recommendations from market actors, and previous program experience. Non-PCs considered include previous experience with the incented equipment and corporate policy. Table 36 summarizes the PCs and non-PCs included in each offering's algorithm.

[9] In this appendix, we present results from all six specifications of FR for the Instant Incentives offering (both versions of Algorithm 1 through Algorithm 3), select one algorithm as our choice to calculate program free-ridership, and justify our choice of algorithm.

Table 36. Components and Assignments by Offering

Offering	Component	Type
Instant Incentives	Availability of the program discount	Program factors
	Recommendation from a distributor salesperson	
	Prior experience with the AIC Instant Incentives program (if applicable)	
	Informational materials from AIC highlighting the benefits of LEDs (if applicable)	
	Client requests for LEDs, in particular (if applicable)	Non-program factors
	Standard practice in business or industry	
	Corporate policy or guidelines	
	Other factors	
	Financial criteria (such as payback) (if applicable)	Either, depending on follow-up
	Previous experience with LEDs (if applicable)	

We estimate the PC score in two different ways, referred to as "Program Components FR Score A" and "Program Components FR Score B." Program Components FR Score A is based on ratings for program factors only. The FR score is calculated as:

Equation 3. Program Components FR Score A

$$PCS_A = 1 - \left(\frac{PF_{max}}{10}\right)$$

Greater importance of the PC means a lower level of FR. In this approach, if a respondent rated the program rebate 10 out of 10, the recommendation of program staff 8 out of 10, and the information from program materials 8 out of 10, the final Program Components FR Score A would be 0.

Program Components FR Score B is based on ratings for both program and non-program factors. The FR score is calculated as:

Equation 4. Program Components FR Score B

$$PCS_B = 1 - \left(\frac{PF_{max}}{PF_{max} + NPF_{max}}\right)$$

Greater importance of the PC relative to the importance of non-PCs means a lower level of FR. In this approach, if a respondent rated both the program rebate and corporate policy as a 10 out of 10, the final Program Components FR Score B would be a 0.5.

2. **Program Influence.** This score is based on a survey question asking the respondent 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 the program and other, non-program factors. This score is estimated as:

PI FR Score = 1 – (Points Given to Program / 100)

More points allocated to the program means a lower level of FR. For example, if a respondent gave the program 70 points out of 100, the PI FR score would be 0.30.

3. **No-Program Score.** This score is based on the likelihood that the exact same energy-efficient equipment would have been installed without the program, using scale of 0 to 10 (where 0 is "Not at all likely" and 10 is "Very likely") and is calculated as follows:

   NP Score = Likelihood to Install Same Equipment / 10

   A greater likelihood of participating without the program means a higher level of FR. For example, if the participant provides a likelihood rating of 7 to install the same equipment in the absence of the program, their NP FR score would be a 0.70.

   In some specifications of the algorithm for Instant Incentives, and both specifications for the Online Store offering, this score also incorporates a timing adjustment (discussed next) as follows:

   $$NP\ Score_{Adjusted} = (Likelihood\ to\ Install\ Same\ Equipment / 10) * Timing\ Adjustment$$

4. **Program Timing Adjustment.** The program timing adjustment is calculated in up to three ways in accordance with the NTG Methods attachment and incorporates information from one or two survey questions.

   - The first question asks (1) whether the installation would have been done at the same time without the program; and (2) if the installation would have been done later, how much later.
   - The second question asks the respondent to provide a likelihood, on a 0 to 10 point numeric scale, of implementing the same measure within 12 months of when it was actually implemented.

   The three timing adjustments are referred to as Timing Adjustment 1, Timing Adjustment 2, and Timing Adjustment 3, and are described below.

   Timing Adjustment 1

   Timing Adjustment 1 uses only the first question. In this adjustment, later purchases without the program means a lower level of FR. This adjustment is calculated on a 0 to 1 scale. A timing adjustment of 1 means that there is no evidence that the program changed the time frame in which the project would have been implemented, while a lower value of the timing adjustment means that the program caused the project to be implemented sooner. The timing adjustment provides the program with some credit for accelerating the project by reducing the level of FR. Timing Adjustment 1 is calculated as follows:[10]

   $$Timing\ Adjustment\ 1 = 1 - (Number\ of\ Months\ Expedited - 6) / 18$$

   Timing Adjustment 1 is used in two of the six specifications of the Instant Incentives algorithm and both specifications of the Online Store algorithm. It is multiplied by the NP FR score.

[10] Please note that the NTG Methods attachment prescribes a divisor of 42 and a "number of months expedited" that can range up to 48 months. In these implementations of the algorithm, we allow "number of months expedited" to range up to only 24 months and adjust the divisor appropriately in order to provide responses that are more realistic for the type of purchase (lighting products) captured in this assessment.

Timing Adjustment 2

Timing Adjustment 2 uses both timing adjustment questions. In this adjustment, later purchases without the program means a lower level of FR, but the likelihood of implementing within a certain timeframe without the program is also taken into account. Like Timing Adjustment 1, this adjustment is calculated on a 0 to 1 scale, and a timing adjustment of 1 means that there is no evidence that the program changed the time frame in which the project would have been implemented, while a lower value of the timing adjustment means that the program caused the project to be implemented sooner. Timing Adjustment 2 is calculated as follows:[22]

Timing Adjustment 2 = 1 – ((Number of Months Expedited – 6) / 18)((10 – Likelihood of Implementing within 1 Year) / 10)*

Timing Adjustment 2 is used in two of the six specifications of the Instant Incentives algorithm and is multiplied by the average of the PC, PI, and NP scores.

Timing Adjustment 3

Timing Adjustment 3 uses only the second timing adjustment question. In this adjustment, decreased likelihood of implementing the project within 1 year without the program means a lower level of FR. This adjustment is calculated on a 0 to 1 scale. Timing Adjustment 3 is calculated as follows:

Timing Adjustment 3 = Likelihood of Implementing within 1 Year / 10

Timing Adjustment 3 is used in two of the six specifications of the Instant Incentives algorithm and is averaged with the NP FR score. If the average is greater than the NP FR score, the Timing Adjustment is discarded. If the average is smaller than the NP FR score, the average is used in place of the NP FR score.

This evaluation implemented and analyzed the following six specifications of the FR algorithm.

- **Approach 1A:** (PC FR Score A + PI Score + [NP Score * Timing Adjustment 1]) / 3
- **Approach 1B:** (PC FR Score B + PI Score + [NP Score * Timing Adjustment 1]) / 3
- **Approach 2A:** (PC FR Score A + PI Score + NP Score) / 3 * Timing Adjustment 2
- **Approach 2B:** (PC FR Score B + PI Score + NP Score) / 3 * Timing Adjustment 2
- **Approach 3A:** ((PC FR Score A + PI Score) / 2 + (MINIMUM((NP Score + Timing Adjustment 3) / 2 , NP Score)) / 2
- **Approach 3B:** ((PC FR Score B + PI Score) / 2 + (MINIMUM((NP Score + Timing Adjustment 3) / 2 , NP Score)) / 2

In each specification, one of the two variants of each PC score, PI score, and NP score are combined together with a timing adjustment. Table 37 summarizes the differences between the six FR specifications and which algorithm specifications were implemented for the analyses of the Instant Incentives Program.

Table 37. Free-Ridership Algorithm Specifications

Free-Ridership Algorithm Specification	Variant Used					Algorithm Implemented
	Program Components FR Score	Program Influence Score	No-Program Score	Adjusted No-Program Score	Overall Timing Adjustment	Instant Incentives Program
Approach 1A	A	✓		✓		✓
Approach 1B	B	✓		✓		✓
Approach 2A	A	✓	✓		✓	✓
Approach 2B	B	✓	✓		✓	✓
Approach 3A	A	✓		✓		✓
Approach 3B	B	✓		✓		✓

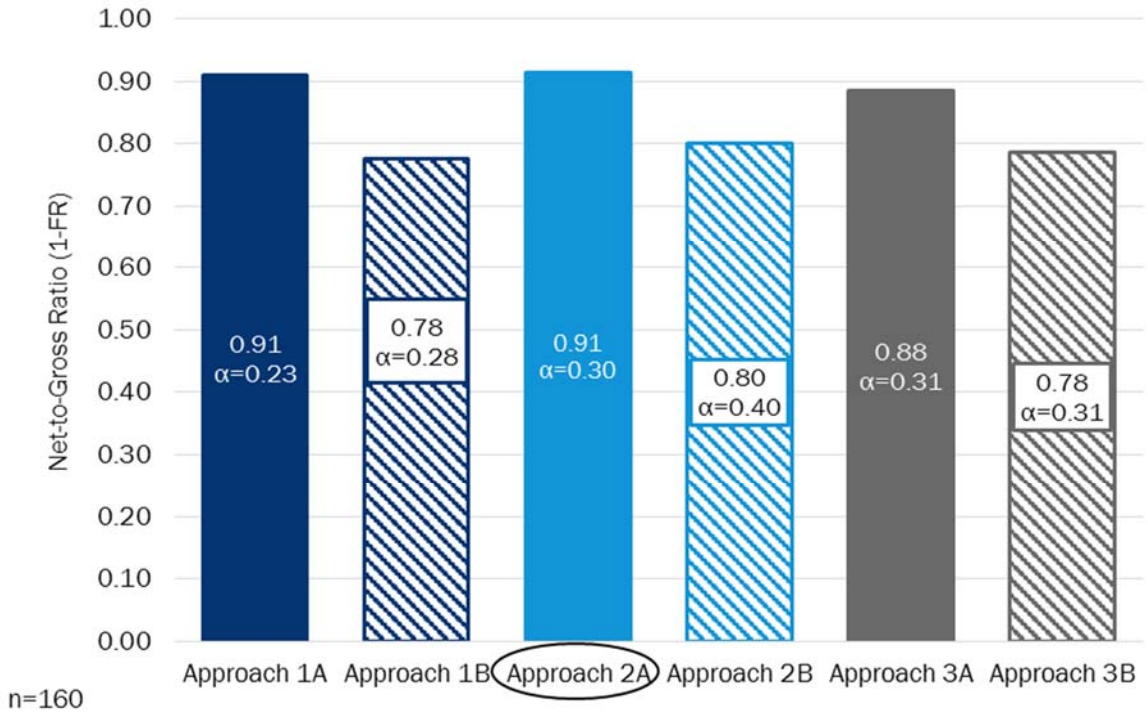
We used Cronbach's alpha as a tool to help us evaluate the different algorithm specifications for the Instant Incentives offering.[11] As each of the three scores incorporated into the final FR estimate serves as a separate estimate of FR, we used Cronbach's alpha to examine the internal consistency of the three scores for each specification, working from the basis that a higher degree of internal consistency is desirable for the algorithm. We also examined and compared FR results across algorithms.

Instant Incentives Results

Figure 16 presents our NTGR estimates for the Instant Incentives offering without SO included (i.e., calculated as 1 − FR) for each of the six specifications of the FR algorithm discussed above. The figures also show the associated Cronbach's alphas. A higher Cronbach's alpha means an increased internal consistency between the three scores developed. As discussed below, we chose Approach 2A as our specification for this evaluation. As we attempted a census of all participants for this evaluation, there are no error bounds around our estimates of the NTGRs for Instant Incentives.

[11] Cronbach's alpha is a test that examines the consistency of tests that measure the same construct.

Figure 16. Instant Incentives NTGR (1 – FR) and Cronbach's Alphas by Approach



A general rule of thumb is that a Cronbach's alpha of 0.7 or higher indicates an acceptable level of internal consistency. As can be seen, none of the six specifications of the algorithm meets this threshold. However, all six approaches are relatively close to this level, and no statistically significant differences between the Cronbach's alphas for the various specifications are present. The lower scores are likely a function of the larger sample of survey completes. When we examine the scores inside each algorithm specification, we find that the Program Components FR Score B is generally close to 0.5, regardless of other responses provided (such as responses to questions used to calculate the NP Score, as well as the timing adjustment). As such, we feel that an algorithm incorporating this score is not a reasonable choice for use, since it reduces the correlation between the two components in the NTGR algorithm, thus reducing the reliability of the resulting NTGR.

The evaluation team examined these results and chose Approach 2A (circled in the above figure) as the preferred FR approach for this evaluation of the Instant Incentives offering. This decision is based on our professional judgment that the mathematical approach that Approach 2A takes to the timing adjustment is appropriate. It should be noted (and can be seen in Figure 16) that Approach 1A produces a virtually identical result to Approach 2A in this case.

Participant Spillover

Methodology

PSO refers to the installation of energy-efficient measures by program participants who were influenced by the program but did not receive an incentive. An example of PSO is a customer who installed incented equipment in one facility and, as a result of the positive experience, installs additional equipment at another facility but does not request an incentive (outside SO). In addition, the participant may install additional equipment, without an incentive, at the same facility because of the program (inside SO).

We examined both inside and outside SO in projects from lighting end uses using participant responses to the CAWI surveys. We conducted an engineering analysis of participant responses to determine the savings associated with measures identified as SO.

After calculating the SO savings reported by participants in our sample, we use Equation 5 to develop the program PSO rate.

Equation 5. Participant Spillover Rate

$$PSO\ Rate = \frac{Total\ SO_{Participant\ Sample}}{Total\ Ex\ Post\ Gross\ Program\ Savings_{Participant\ Sample}}$$

Instant Incentives Results

Based on results from the Instant Incentives CAWI survey, SO was present for eight survey respondents. Our engineering analysis of SO completed by these participants determined total spillover savings of 21.23 MWh and 4.3 kW for the participant sample. These savings are presented in Table 38.

Table 38. Instant Incentives Participant Spillover Measures and Savings

Spillover Measure	Quantity	Total MWh	Total MW
Standard LEDs	56	7.72	0.002
Specialty LEDs	52	12.45	0.002
Linear LEDs	23	1.07	0.0002
Total	**131**	**21.23**	**0.004**

Dividing the estimated total SO in our sample (21.23 MWh; 0.004 MW) by total program gross savings of the overall participant sample (6,903 MWh; 1.47 MW) yields a SO rate of 0.31% and 0.29% for energy and demand, respectively, as shown in Equation 6.

Equation 6. PY9 Instant Incentives Participant Spillover Rate

$$PSO\ \%_{Energy} = \frac{Total\ participant\ sample\ SO\ (MWh)}{Total\ participant\ sample\ savings\ (MWh)} = \frac{21.23\ MWh}{6{,}903\ MWh} = 0.31\%$$

$$PSO\ \%_{Demand} = \frac{Total\ participant\ sample\ SO\ (MW)}{Total\ participant\ sample\ savings\ (MW)} = \frac{0.004\ MW}{1.47\ MW} = 0.29\%$$

Appendix D. In-Service Rate Results

As part of our PY9 research, the evaluation team calculated program-specific in-service rates (ISRs) for the Instant Incentives program. To collect data for ISR calculations for the Instant Incentives program, we fielded an ISR battery as part of the participant survey for the program. This appendix describes the survey data and ISR algorithm that the evaluation team used to calculate the ISR for the Instant Incentives program. A copy of the survey instrument is provided in Appendix A.

Key Findings

Table 39 presents the results of the evaluation team's ISR analysis for the PY9 Instant Incentives program. For PY9, we found a 77.9% ISR for the Instant Incentives program overall. The maximum 3-year ISR assumes 98% of purchased bulbs will be installed over that time period, following the IL-TRM V5.0's 3-year timeline for counting carryover savings in C&I programs.

Table 39. Bulb In-Service Rates for PY9 Instant Incentives Program

Offering	% Verified	% Installed	First-Year ISR	Cumulative ISR After 3 Years
Program-wide	99%	80.4%	77.9%	98%

Instant Incentives

To calculate the PY9 Instant Incentives ISR, we used the responses from 150 completed surveys covering 208,591 products. We used a series of questions at the beginning of the survey to confirm each respondent was the most knowledgeable person about their business's participation in the Instant Incentives program. As discussed in the Instant Incentives survey instrument in Appendix A, the evaluation team calculated ISRs and NTGRs only for the LED products (standard LEDs, specialty LEDs, and linear LEDs) as there were no purchases of CFLs or occupancy sensors in PY9. Therefore, respondents were asked to first verify or update the quantities of each LED product that they purchased, as recoded in program-tracking data. Next, respondents were asked to report the percentage of received products that were currently installed, differentiating between those installed inside AIC service territory and those installed outside AIC service territory. Finally, respondents were asked what percentage of installed LEDs have subsequently been removed. We combined these survey responses to estimate an overall ISR for each product that a survey respondent purchased, according to Equation 7 below.

Equation 7. Instant Incentives In-Service Rate Algorithm

$$ISR = (\%\, Verified) \times (\%\, Installed) \times (\%\, In\ AIC\ Territory) \times \big(1 - (\%\, Removed)\big)$$

Seven respondents reported purchasing quantities that were between 50 and 9,760 units more than was recorded in program-tracking data, which in each instance represents verified quantities that are at least 130% more than the ex ante program-tracking data quantities. Looking at both ex ante program-tracking data quantities and the percentage of verified quantities relative to ex ante quantities, we excluded these seven respondents from the ISR analysis for several reasons. First, a discrepancy of this magnitude is markedly uncharacteristic of the AIC C&I Standard Program as a whole, which has supported realization rates at or above 100% in the past several years. Consistent with this perspective, these seven respondents were the only PY9 Instant Incentives participants to provide verification rates well over 100%. It is also possible that these participants have some recall biases, such as thinking of purchases made just before or after the PY9 program year.

After removing these outliers, the evaluation team recommends applying the program-wide first-year ISR of 77.9% to PY9 Instant Incentives measures. Results are shown in Table 40 below.

Table 40. First-Year Instant Incentives In-Service Rate

Measure (number of respondents)	Product Count (Ex Ante)	% Verified	% Installed	% in AIC Service Territory	% Removed	First-Year ISR
Standard LEDs (n=17)	5,383	100%	80%	100%	0.1%	80.3%
Specialty LEDs (n=20)	3,097	100%	96%	99%	0.3%	95.0%
Linear LEDs (n=132)	200,111	99%	80%	98%	0.0%	78.5%
Program-Wide (n=150)	208,591	99%	80%	98%	0.0%	77.9%

While most PY9 participants reported that they installed 100% of their Instant Incentives LED products—and installed them at locations within the AIC service territory—the survey-based first-year ISR is below 100% due to 39 respondents who purchased large quantities of lighting and reported installing just 5%–98% of their lighting by the time of the survey. Most of the respondents with individual ISRs below 100% noted that they plan to install some of the bulbs in the coming year.

Based on these self-reported plans for future installations within one year, it seems likely that participants will eventually install most of the lighting equipment they purchased through the Instant Incentives Program. We recommend that the program capture future installations following the IL-TRM V5.0's 3-year approach for counting carryover savings in C&I programs. This approach is based on evaluations of a midstream lighting program. This approach assumes that 98% of received bulbs will eventually get installed, and assumes that "[…] 54% of future installs occur in year 2 and 46% in year 3. The 2nd and 3rd year installations should be counted as part of those future program year savings." We also recommend these ISRs for inclusion in future versions of the IL-TRM.

Table 41. Instant Incentives First-, Second-, and Third-Year In-Service Rates

% Verified	First-Year ISR	Second-Year Installations[a]	Third-Year Installations[a]	3-Year Total ISR[b]
100%	77.9%	10.9%	9.2%	**98.0%**

[a] As a percentage of % Verified. Second- and third-year installations are additive to first-year installations.
[b] Three-year cumulative installations are 98% of the verified bulbs.

Appendix E. Cost-Effectiveness Inputs

Table 42 presents total gross impacts for AIC cost-effectiveness calculations. These values differ from those included in the main report due to the inclusion of heating penalties for lighting measures. This approach was taken based on discussions with AIC and past agreements between AIC and ICC staff that heating penalties would not be included in savings calculations for goal attainment. Overall, the application of waste heat factors reduces total gross gas savings by 1,231,515 therms.

Table 42. PY9 Standard Program Gross Impacts (Including Heating Penalties)

	MWh	MW	Therms
Total Gross Savings without Heating Penalty	124,727	18.71	3,264,361
Core Program Heating Penalty	-	-	-547,933
Instant Incentives Heating Penalty	-	-	-658,046
Online Store Heating Penalty	-	-	-25,535
Green Nozzle Heating Penalty	-	-	-
Laminar Flow Restrictor Heating Penalty	-	-	-
Total Gross Savings with Heating Penalty	**124,727**	**18.71**	**2,032,847**

Lighting Heating Penalty

The inclusion of waste heat factors for lighting is based on the concept that heating loads are increased to supplement the reduction in heat that was once provided by the existing lamp type. The program-tracking database does not provide the heating fuel type; therefore, the evaluation team applied gas heat waste heat factors as specified in the IL-TRM V5.0 (when heating fuel is unknown). The total heating penalty for lighting measures in the Standard Program is 1,231,515 therms.

For more information, please contact:

Hannah Howard
Managing Director

510 444 5050 tel
510 444 5222 fax
harnold@opiniondynamics.com

1 Kaiser Plaza, Suite 445
Oakland, CA 94612