



# ComEd Standard Program Evaluation Report

**FINAL**

**Energy Efficiency / Demand Response Plan:  
Plan Year 8 (PY8)  
(6/1/2015-5/31/2016)**

**Presented to  
Commonwealth Edison Company**

January 15, 2017

***Prepared by:***

Chelsea Lamar  
Navigant

Charles Ampong  
Navigant



[www.navigant.com](http://www.navigant.com)

**Submitted to:**

ComEd  
Three Lincoln Centre  
Oakbrook Terrace, IL 60181

**Submitted by:**

Navigant  
30 S. Wacker Drive, Suite 3100  
Chicago, IL 60606

**Contact:**

Randy Gunn, Managing Director  
312.583.5714  
Randy.Gunn@Navigant.com

Jeff Erickson, Director  
608.497.2322  
Jeff.Erickson@Navigant.Com

Robert Neumann Associate Director  
312.583.2176  
Rob.Neumann@Navigant.com

Disclaimer: This report was prepared by Navigant Consulting, Inc. ("Navigant") for ComEd based upon information provided by ComEd and from other sources. Use of this report by any other party for whatever purpose should not, and does not, absolve such party from using due diligence in verifying the report's contents. Neither Navigant nor any of its subsidiaries or affiliates assumes any liability or duty of care to such parties, and hereby disclaims any such liability.

## TABLE OF CONTENTS

<b>E. Executive Summary</b>	<b>1</b>
E.1. Program Savings	1
E.2. Program Savings by End-use Category	2
E.3. Impact Estimate Parameters for Future Use	2
E.4. Program Volumetric Detail	3
E.5. Results Summary	3
E.6. Findings and Recommendations	4
<b>1. Introduction</b>	<b>7</b>
1.1 Program Description	7
1.2 Evaluation Objectives	7
1.2.1 Impact Questions	7
1.2.2 Process Questions	8
<b>2. Evaluation Approach</b>	<b>9</b>
2.1 Overview of Data Collection Activities	9
2.1.1 Internet Survey with Participating Trade Allies and Contractors	10
2.2 Verified Savings Parameters	10
2.2.1 Verified Gross Program Savings Analysis Approach	11
2.2.2 Verified Net Program Savings Analysis Approach	12
2.3 Process Evaluation	12
<b>3. Gross Impact Evaluation</b>	<b>14</b>
3.1 Tracking System Review	14
3.2 Program Volumetric Findings	14
3.3 Gross Program Impact Parameter Estimates	15
3.4 Verified Gross Program Impact Results	15
<b>4. Net Impact Evaluation</b>	<b>18</b>
<b>5. Process Evaluation</b>	<b>20</b>
5.1 Trade Ally and Contractor Characteristics and Satisfaction	20
5.2 Wait List and Approval Process	22
5.3 Web Portal	26
<b>6. Findings and Recommendations</b>	<b>29</b>
<b>7. Appendix</b>	<b>32</b>
7.1 Evaluation Research Impact Approaches and Findings	32
7.1.1 Evaluation Research Gross Impact Findings	32
7.1.2 Trade Ally and Contractor Spillover	46
7.2 Survey Instruments	54

## LIST OF TABLES AND FIGURES

Figure 3-1. Number of Measures Installed by End-use Type .....	15
Figure 3-2. Percent of Verified Gross Savings by End-use Type .....	16
Figure 4-1. PY7-PY8 Yearly Net Savings Comparison.....	19
Figure 5-1. PY8 TA and Contractor Firmographics .....	21
Figure 5-2. TA and Contractor Satisfaction with Components of the PY8 Program.....	21
Figure 5-3. TA and Contractor Sources of Awareness of the PY8 Wait List .....	23
Figure 5-4. Share of TAs and Contractors by Extent of Wait List Exposure.....	23
Figure 5-5. TA and Contractor Agreement with Statements about PY8 Wait List .....	24
Figure 5-6. TA and Contractor Changes in Participation Due to Wait List (Among those with Wait-Listed Projects) .....	25
Figure 5-7. Smart Ideas TA Website Actions Taken During PY8 .....	27
Figure 5-8. TA Satisfaction with Smart Ideas TA Website Elements.....	27
Table E-1. PY8 Total Program Electric Savings .....	2
Table E-2. PY8 Program Results by Measure End-use .....	2
Table E-3. Impact Estimate Parameters for Future Use .....	3
Table E-4. PY8 Volumetric Findings Detail.....	3
Table E-5. PY8 Results Summary .....	4
Table 2-1. Primary Data Collection Activities.....	9
Table 2-2. Additional Resources .....	10
Table 2-3. Verified Savings Parameter Data Sources .....	10
Table 2-4. Profile of the PY8 Population and Gross Savings Verification Sample by End-Use Strata .....	12
Table 2-5. TA and Contractor Survey Sample Dispositions for Spillover and Process Analysis.....	13
Table 3-1. PY8 Volumetric Findings Detail .....	14
Table 3-2. Verified Gross Savings Parameters.....	15
Table 3-3. PY8 Verified Gross Impact Savings Estimates by Measure Type.....	16
Table 4-1. PY8 Verified Net Impact Savings Estimates by Program Channel .....	18
Table 7-1. Summary of Research Findings Gross Realization Rates and Savings Estimates .....	32
Table 7-2. Lighting Measure Level Results.....	33
Table 7-3. Non-Lighting Measure Level Results.....	35
Table 7-4. Profile of the PY8 Population and Gross Savings Verification Sample by End-Use Strata .....	40
Table 7-5. Profile of the PY8 Population and Gross Savings Verification Sample by End-use Type.....	41
Table 7-6. Profile of the PY8 Population and Gross Savings Sample by Business Type .....	41
Table 7-7. Navigant Comments on Projects with Zero Savings .....	43
Table 7-8. Research Finding Gross kWh Realization Rates and Relative Precision at 90% Confidence Level.....	45
Table 7-9. Summary of PY8 Trade Ally and Contractor Spillover Results .....	47
Table 7-10. PY8 Standard Program Trade Ally Spillover Evidence from the Trade Ally Web Survey .....	48
Table 7-11. Summary of Trade Ally and Contractor Survey Responses and PY8 Spillover Results (Count of TAs and Contractors) .....	50
Table 7-12. Adjusted Spillover Results for Future Application (Count of TAs and Contractors) .....	51
Table 7-13. Size Adjustment for Non-Incented, High Efficiency Installations .....	53

## E. EXECUTIVE SUMMARY

This report presents a summary of the findings and results from the impact and process evaluation of the ComEd PY8<sup>1</sup> Smart Ideas for Your Business® Standard Incentives Program (Standard program). ComEd offers prescriptive incentives for common energy efficiency measures under the Standard program to facilitate the implementation of cost-effective energy efficiency improvements for non-residential (commercial and industrial) customers. Eligible measures include energy-efficient indoor and outdoor lighting, HVAC equipment, refrigeration, Energy Management Systems (EMS), commercial kitchen equipment, variable speed drives, compressed air equipment and other qualifying products. DNV GL is the program implementation contractor, responsible for day-to-day operations of the program.

ComEd made some key changes in the Standard program in PY8. Beginning in mid-July 2015, ComEd had received many projects with pre-approvals so it placed all new projects on a wait list to ensure that they had adequate funding for those projects that received pre-approval.<sup>2</sup> ComEd terminated the Zero T12 Reward Bonus program by the end of the first quarter of PY8. This feature, which lasted for a year, offered bonus incentives to eligible ComEd customers who used ComEd Smart Ideas® standard incentives to replace or retrofit all T12 fixtures in their buildings. The Standard program continued (from PY7) offering incentives that bundled equipment and controls technologies, such as promoting indoor and outdoor Advanced Lighting System, as well as incentives for retrofit controls for Rooftop Units (RTUs) for space cooling.

Navigant engaged regularly with the ComEd program staff and the implementation contractor to ensure continuous discussions and resolution of critical impact issues ahead of delivery of the annual evaluation report. Navigant sampled in two waves and assigned projects into lighting and non-lighting end-use categories for sampling, analysis and reporting. Navigant's gross impact analysis approach did not vary from the previous years, but adjustments were made to reflect specific measure and project characterizations. Navigant verified savings for measures with deemed gross savings using the Illinois Statewide Technical Reference Manual (TRM version 4.0).<sup>3</sup> Navigant researched savings from non-deemed measures through engineering file reviews and onsite M&V, and Navigant made recommendations for additions or amendments to the TRM as appropriate. Navigant calculated PY8 verified net impact savings using the approved net-to-gross ratio (NTGR) deemed through Illinois Stakeholder Advisory Group (SAG) consensus.<sup>4</sup>

The PY8 evaluation included trade ally and contractor spillover studies. It also included trade ally and contractor process interviews to investigate how current program wait list placement and project pre-approval requirements affected their businesses, operations, marketing, and their overall satisfaction with the program participation.

### E.1. Program Savings

The gross and net electricity savings from the PY8 Standard program is summarized in Table E-1. As this table shows, the total verified net energy savings is 164,471 megawatt-hours (MWh), and verified net summer peak demand savings is 18.72 megawatts (MW).

<sup>1</sup> The PY8 program year began June 1, 2015 and ended May 31, 2016.

<sup>2</sup> ComEd began accepting PY8 Pre-Approval Applications on March 2, 2015. ComEd paid out incentives earmarked for the PY8 Standard Program by the end of December 2015. (Source: ComEd PY8 Changes to Standard.docx, received 2/16/2016).

<sup>3</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency Version 4.0, available at: <http://www.ilsag.info/technical-reference-manual.html>

<sup>4</sup> <http://ilsag.info/net-to-gross-framework.html>

**Table E-1. PY8 Total Program Electric Savings**

Savings Category	Energy Savings (MWh)	Demand Savings (MW)	Peak Demand Savings (MW)
Ex Ante Gross Savings	231,847	NA	31.70
Verified Gross Savings	230,289	61.52	25.82
Verified Net Savings	164,471	43.73	18.72

Source: ComEd tracking data and Navigant team analysis.

NA – not provided in the tracking system.

## E.2. Program Savings by End-use Category

The breakdown of electricity savings by end-use category is summarized in Table E-2. Many of the evaluated chiller projects had their demand savings significantly reduced. This reduction was due to a discrepancy in the calculation of demand savings between the Illinois TRM and the ComEd work papers. This contributed to the low realization rate on demand reduction (41 percent).

**Table E-2. PY8 Program Results by Measure End-use**

Savings Category	Lighting End-Use	Non-Lighting End-Use	PY8 Total
<b>Energy Savings (MWh)</b>			
Ex Ante Gross Savings	169,206	62,641	231,847
Ex Ante Gross Savings (% of total)	73%	27%	100%
Verified Gross Realization Rate ‡	1.04	0.86	0.99
Verified Gross Savings (MWh)	176,259	54,030	230,289
Net to Gross Ratio (NTGR) †	0.74	0.63	NA
Verified Net Savings (MWh)	130,432	34,039	164,471
<b>Coincident Peak Demand Savings (MW)</b>			
Ex Ante Gross Savings	23.22	8.48	31.70
Ex Ante Gross Savings (%)	73%	27%	100%
Verified Gross Realization Rate ‡	0.96	0.41	0.81
Verified Gross Savings (MW)	22.31	3.51	25.82
Net to Gross Ratio (NTGR) †	0.74	0.63	NA
Verified Net Savings (MW)	16.51	2.21	18.72
Verified Net MWh Savings (% of total)	79%	21%	100%

Source: ComEd tracking data and Navigant team analysis.

† A deemed value. Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2016-02-

26\_Final\_EMV\_Recommendations.xlsx, available on the IL SAG website: <http://ilsag.info/net-to-gross-framework.html>

‡ Realization rate is based on PY8 evaluation research findings. Reported program gross savings results have been rounded.

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

In the course of our PY8 research, the evaluation team did research on parameters used in impact calculations including those in the Illinois SAG NTG deeming process. Some of those parameters are eligible for deeming for future program years or for inclusion in future NTG deeming for this program. The evaluation team's parameters recommended for future use are shown in the following table.

**Table E-3. Impact Estimate Parameters for Future Use**

Parameter	Value	Data Source
TA and Contractor Spillover	2.0%	Trade Ally and Contractor Survey

*Source: Evaluation Analysis*

## E.4. Program Volumetric Detail

The evaluation team reviewed the PY8 Standard program tracking data and verified 1,645 participants in the PY8 program who implemented a total of 4,382 measures. The participants completed 2,487 projects, with lighting end-use projects exceeding non-lighting end-use projects by a margin of approximately three to one. Program participation detail is presented below in Table E-4.

**Table E-4. PY8 Volumetric Findings Detail**

Participation	Lighting End-Use	Non-Lighting End-Use	Total
Participants†	1,323	397	1,645
Total Measures‡	3,270	1,112	4,382
Installed Projects	1,949	538	2,487

*Source: ComEd tracking data and Navigant team analysis.*

† Based on participant company name and site address. Some 75 participants installed both lighting and non-lighting measures.

‡ This is a project-level measure count based on type of measure, not quantities installed.

## E.5. Results Summary

The following table summarizes the key metrics from PY8.

**Table E-5. PY8 Results Summary**

Participation	Units	PY8
Verified Net Savings	MWh	164,471
Net Peak Demand Reduction	MW	18.72
Net Demand Reduction	MW	43.73
Verified Gross Savings	MWh	230,289
Verified Gross Peak Demand Reduction	MW	25.82
Verified Gross Demand Reduction	MW	61.52
Program Energy Realization Rate (Lighting)†‡	%	104%
Program Energy Realization Rate (Non-Lighting)†‡	%	86%
Program NTG Ratio (Lighting)†	%	74%
Program NTG Ratio (Non-Lighting)†	%	63%
Ex Ante Gross Lighting Savings	% of Total	73%
Ex Ante Gross Non-Lighting Savings	% of Total	27%
Total Measures Completed	#s	4,382
Projects Completed	#s	2,487
Customers Touched	#s	1,645

Source: ComEd tracking data and Navigant team analysis.

† A deemed value. Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2014-02-28\_Final\_EMV\_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

## E.6. Findings and Recommendations

The PY8 Standard program achieved 230,289 MWh verified gross savings and 25.82 MW peak demand savings. The overall verified gross realization rate for the Standard program is 0.99 for energy savings and 0.81 for peak demand savings. The verified gross realization rate for all lighting measures is 1.04 for energy savings and 0.96 for peak demand savings. The verified gross realization rate for all non-lighting measures is 0.86 for energy savings and 0.41 for peak demand savings. The program overall net energy savings is 164,471 MWh, and net demand savings is 18.72 MW.

The following provides insight into some of the key program findings and recommendations.<sup>5</sup>

### Gross Savings Estimates and Realization Rates

**Finding 3.** Evaluation identified projects that involved equipment installed for new construction or renovation or as part of major system changes, which did not replace similar equipment. The evaluation team reviewed this project savings on a custom basis with a new construction or code compliance baseline.

**Recommendation 2.** Ensure projects are reviewed to identify equipment installed as part of new construction projects. Determine which measures from the work papers and the Illinois TRM are affected or ineligible when comparing to new construction baselines. When projects are

<sup>5</sup> The Executive Summary presents the most important of the Section 6 Findings and Recommendations. Findings and Recommendations in the Executive Summary are numbered to match Section 6 for consistent reference to individual findings and recommendations. Therefore, gaps in numbering may occur in the Executive Summary.



flagged as having a new construction baseline, have a reviewer trained in the nuances of the baselines and code requirements to determine the eligibility of each measure.

**Recommendation 3.** Projects involving major system changes or replacements should be reviewed by staff knowledgeable about the nuances of code requirements for systems and not just of the specific equipment components of the system at hand to determine eligibility in the Standard program. Additionally, these projects should be evaluated to determine if other programs, such as custom, to determine the appropriate savings levels for the system change as a whole.

**Finding 5.** Evaluation adjusted the savings for multiple variable speed drive projects or the measure disqualified due to the variable speed drive being installed on equipment other than HVAC fans, pumps, or chillers. HVAC VSDs are the only ones with savings defined in the Illinois TRM and the work papers and the only eligible ones per the Standard application.

**Recommendation 5.** For non-HVAC VSD measures not defined under the Standard program application, consider routing them through other programs (e.g., the Custom program) to determine if they are eligible there.

**Finding 6.** The realization rate for new Energy Management Systems (EMS) projects varies widely, ranging from -68 percent to over 200 percent with an average realization rate of 56 percent for our sample (three projects were found to have increased in energy usage after EMS implementation). EMS projects are all unique and a large variation is expected. The evaluation team is not able to provide many insights into why the realization rate for some EMS projects deviates significantly from 1.0. This is partly due to the lack of any pre-project description of how current system operates.

**Recommendation 6.** EMS projects may need more work with the customer to ensure that the advanced controls are programmed and go above and beyond what was being done previously. In addition, the EMS programmers should be giving training to site staff on how to properly use the EMS to prevent the undoing of advanced control strategies. It may be beneficial for the program if customers have to document their existing control strategy and how the new EMS will change these strategies.

## Process Evaluation (Trade Ally Participation)

**Finding 7.** TAs and contractors tend to be satisfied with their overall program experience. Strong areas of the Standard Program are communications with and trainings from Smart Ideas program staff as well as the measures offered. According to TAs and contractors, the time and resources it takes to complete project approval paperwork are the primary hurdles to a seamless experience. Overall, nearly all TAs and contractors plan to participate again in the future.

**Finding 8.** ComEd's PY8 wait list presented challenges for TA and contractors. While 20 percent of TAs and contractors ultimately completed all their wait-listed projects through the program, 32 percent did not complete any of them through the program. In addition, there is some sentiment among TAs and contractors who had wait-listed projects that ComEd could have done more to communicate with TAs and contractors at two key points: wait list inception, and during project pre-approval processes of individual projects. As a result of not knowing individual projects' expected wait-time to approval, it was difficult for TAs to convey the wait list's implications to their customers. Facing continued growth in demand for the Standard program, ComEd is already taking steps to manage customer expectations about incentive payment processing; for example, the November 2016 (PY9) issue of "The Wire" includes an article about program financial predictability, noting that ComEd will work with TAs to, "...improve the level of service expectations through consistency, [and] to maximize growth opportunities, provide the right approach for project needs, and accurately determine financial forecasting and budgeting processes."

**Recommendation 7.** In addition to the steps ComEd is already taking, TA and contractors' PY8 experiences highlight several additional steps that ComEd could also take. For example, if ComEd does not want to tell TAs how long their projects would be on the wait list (or cannot do so accurately), ComEd could develop a "fund-o-meter" within the TA portal, like the display that the program used in PY2 to display remaining funding. ComEd could also develop customer-facing materials to support TAs and contractors as they engage with their customers about the uncertainty inherent in the wait list.

**Finding 9.** Most PY8 TAs are aware of ComEd's Smart Ideas website for TAs, and about one-half of those aware of the website used it during PY8. The most popular website features are the copies of program materials and information about Smart Ideas programs, but roughly one-fifth of respondents also used the website's portal feature to submit program forms and monitor project status (e.g., pending review, approved, rebate processed). Overall, TAs are satisfied with the website as it stands, but several individual TAs offered suggestions about improving specific aspects of project tracking pages and boosting overall awareness of the website.

**Recommendation 8.** If ComEd is interested in increasing TA use of the website's project tracking capabilities, ComEd could consider the benefits of providing outreach on the portal's project tracking features, or of building additional project tracking functions suggested by TAs that have used the website. A focused TA outreach campaign could boost awareness of the website's project administration and tracking features, while adding additional project details to the project tracking pages could help streamline TAs' experiences with pre-application, approval, and incentive payment stages.

## 1. INTRODUCTION

### 1.1 Program Description

ComEd offers standard incentives for common energy efficiency measures under the ComEd Smart Ideas for Your Business® Standard Incentives Program (Standard program) to facilitate the implementation of cost-effective energy efficiency improvements for non-residential (commercial and industrial) customers. Eligible measures include energy-efficient indoor and outdoor lighting, HVAC equipment, refrigeration, commercial kitchen equipment, variable speed drives, Energy Management Systems (EMS), compressed air equipment and other qualifying products.

To participate, an eligible customer submits an application with project documentation, including project specification sheets and copies of dated invoices for the purchase and installation of the measures. The Standard program offers pre-determined incentives and a streamlined application to help facilitate participation. Lighting retrofit projects make up the largest percentage of ex ante gross energy savings for this program, 73 percent compared to 27 percent from non-lighting projects in PY8.

ComEd made some key changes in the Standard program in PY8. Beginning in mid-July 2015, ComEd had received so many projects with pre-approvals that it put all new projects on a wait list to ensure that they had adequate funding for those projects that received pre-approval.<sup>6</sup> ComEd terminated the Zero T12 Reward Bonus program by the end of the first quarter of PY8. This feature, which lasted for a year, offered bonus incentives to eligible ComEd customers who used ComEd Smart Ideas® standard incentives to replace or retrofit all T12 fixtures in their buildings. The Standard program continued (from PY7) offering incentives that bundled equipment and controls technologies, such as promoting indoor and outdoor Advanced Lighting System, as well as incentives for retrofit controls for Rooftop Units (RTUs) for space cooling.

### 1.2 Evaluation Objectives

The evaluation team identified the following key researchable questions for PY8:

#### 1.2.1 Impact Questions

1. What are the program's annual total verified gross savings? What are the verified gross savings from lighting measures? What are the verified gross savings from non-lighting measures?
2. What is the research estimate of gross savings (energy, peak demand, and total demand) for the Standard program, using field measurement and verification (M&V) and engineering research to estimate savings?
3. What are the program's verified net savings?
4. Are the ex ante per-unit gross impact savings correctly implemented by the tracking system and reasonable for this program?
5. What updates are recommended for the Illinois Technical Reference Manual (TRM)? What are the results of field data collection?

---

<sup>6</sup> ComEd began accepting PY8 Pre-Approval Applications on March 2, 2015. ComEd paid out incentives earmarked for the PY8 Standard Program by the end of December 2015, based on a kWh energy savings goal set by state legislation. (Source: ComEd PY8 Changes to Standard.docx, received 2/16/2016).

### 1.2.2 Process Questions

The PY8 evaluation included limited process research for the Standard program, addressing the following questions:

1. What are experiences and satisfaction among Trade Allies (TAs) and non-TA contractors with the program wait list and pre-approval process?
2. What are experiences and satisfaction among TAs with the Trade Ally Web Portal?
3. How effective are program quality control and quality assurance processes (desk review of program operations manual)?
4. What is the spillover rate among Trade Allies (TAs) and non-TA contractors participating in the Standard program?

## 2. EVALUATION APPROACH

The evaluation approach for the PY8 Standard program continued the gross impact, net impact, and process evaluation activities Navigant conducted from PY1 through PY7. For deemed measures, Navigant verified ex ante gross savings against the values and algorithms provided in the Illinois Statewide Technical Reference Manual (TRM v4.0). For non-deemed measures with custom variable inputs, Navigant conducted evaluation research through engineering desk review or onsite visits to verify gross impacts. In PY8, Navigant assigned projects into lighting and non-lighting end-use categories for sampling, analysis and reporting of gross and net impacts. Sampling was designed to achieve a 90/10 level of confidence and relative precision separately for lighting and non-lighting, for gross and net savings research. The net-to-gross ratio (NTGR) was deemed through a consensus process by the Illinois Stakeholder Advisory Group based on PY6 evaluation research.

The evaluation team conducted spillover research with Trade Allies (TAs) and non-TA contractors who completed projects through the Standard program during PY8 (hereafter referred to as “participating TAs and contractors”). Appendix 7.1.2.2 details the spillover research. The evaluation team also conducted a targeted process evaluation specific to the participating TAs and contractors. The process evaluation focused on participating TA and contractor experiences and satisfaction with the program’s wait list and pre-approval process in effect for most of PY8, as well as with ComEd’s web site for Smart Ideas TAs, called “Current” ([www.comed.com/tradeally](http://www.comed.com/tradeally)).

### 2.1 Overview of Data Collection Activities

The core data collection activities included verification of the program tracking data, on-site M&V of sampled projects, engineering file review of sampled projects, and a telephone interview with trade allies. The full set of data collection activities is shown in the following table. Table 2-1 and Table 2-2 provide the data collection activities conducted in support of the PY8 evaluation. Each activity is described in more detail in the subsections below.

**Table 2-1. Primary Data Collection Activities**

What	Who	Target Completes	Completes Achieved	When	Comments
Onsite M&V Audit	Participating Customers	32	32	March-October 2016	14 lighting and 18 non-lighting projects for gross impact analysis, PJM
Engineering Review	Participating Customers	83	83	March-Oct 2016	41 lighting and 42 non-lighting projects for gross impact analysis, PJM
Internet Survey	Participating Trade Allies & Contractors	594 (Census Attempt)	120	October 2016	Data collected for spillover analysis as well as PY8 process assessments
In Depth Interviews	Program Management and Implementers	>5	>5	May-Nov 2016	Discuss program performance and gross impact resolutions

**Table 2-2. Additional Resources**

Reference Source	Author	Gross Impacts
Illinois Technical Reference Manual (v4.0)	VEIC & IL TAC	X
IECC (2012)	International Code Council	X
ComEd PY8 Workpapers	ComEd/DNV-GL	X

## 2.1.1 Internet Survey with Participating Trade Allies and Contractors

The core data collection activity for spillover and process research was an internet survey with participating TAs and contractors. Based on the total number of PY8 TAs and contractors and given typical survey response rates, we attempted a census of all PY8 TAs and contractors and offered an incentive for completing the survey. The email invitation and three email reminders incentivized participation by advertising that a \$50 thank-you gift card would be provided to the first 30 participants who completed the survey, and that all subsequent participants were eligible for a drawing for one of five additional \$50 gift cards. The survey was fielded in October 2016 and resulted in 120 completed responses. The survey instrument used for this evaluation is included in Appendix 7.2.

## 2.2 Verified Savings Parameters

Verified gross and net savings (energy and coincident peak demand) resulting from the PY8 Standard program were calculated using algorithms as defined by the Illinois TRM version 4.0<sup>7</sup>. Table 2-3 below presents the sources for parameters that were used in the verified gross and net savings calculations and indicate which were examined through PY8 evaluation research and which were deemed.

**Table 2-3. Verified Savings Parameter Data Sources**

Gross Savings Input Parameters	Data Source	Deemed † or Evaluated?
Installed Quantities	Program tracking data analysis; PY8 evaluation on-site M&V	Evaluated
Deemed Lighting Measure Savings Parameters: Hours of Use (HOU), Peak Load Coincidence Factor, Energy and Demand Interactive Effects	Illinois TRM v4.0	Deemed
Lighting Measure Delta Watts (where deemed by the Illinois TRM)	Illinois TRM v4.0	Deemed
Lighting Measure Delta Watts not deemed by the Illinois TRM	Program documentation and PY8 M&V	Evaluated
Deemed HVAC, Food Service/Other, and Refrigeration Measures, principally: Electric Chillers, PTAC/PTHP, GREM Controls, HVAC VSDs, Air Compressor with Integrated VSD, EC Motors, Anti-Sweat Heater Controls	Illinois TRM v4.0	Deemed
Non-deemed Non-lighting Measures, principally: Industrial VSD, EMS Control Systems, Refrigeration Display Case/Doors; Refrigerated Cycling Dryers, Demand Control Ventilation, Laboratory measures	Program documentation and PY8 M&V	Evaluated
Gross Realization Rates	PY8 evaluation M&V and Program tracking data analysis	Evaluated
Lighting and Non-Lighting NTG Ratios	Illinois Stakeholder Advisory Group process	Deemed†

† Source: ComEd\_NTG\_History\_and\_PY8\_Recommendation\_2014-02-28\_Final\_EMV\_Recommendations.xlsx, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

<sup>7</sup> Source: <http://www.ilsag.info/technical-reference-manual.html>

## 2.2.1 Verified Gross Program Savings Analysis Approach

Two separate evaluation estimates of gross savings are presented in this report: a savings verification estimate presented in the body of the report that uses the TRM approach for measures covered by the TRM, and a research estimate that applies all evaluation research without regard to the TRM status of measures which are used for PJM reporting. The research estimates are presented only in Appendix 7.1. The savings verification process sought to verify eligibility, quantity, and compliance with claimed deemed per unit savings values defined in the Illinois Technical Reference Manual (v4.0). This process verified that the TRM was applied correctly and consistently by the program, that the measure level inputs to the algorithm were correct, and that the quantity of measures claimed through the program are correct and in place and operational. Gross impact evaluation of non-deemed measures involved retrospective evaluation adjustments to gross savings on custom variables. For measures with custom variables, ComEd provided work paper documentation of savings, but verified savings were based on engineering review, billing or interval data review, and on-site M&V (including metering) of sampled measures to determine eligibility and savings.

Other evaluation activities to verify gross energy savings and produce a research estimate of the Standard program involved the following steps:

1. Implemented a stratified random sampling design of lighting and non-lighting measures to select 115 projects (consisting of 55 lighting and 60 non-lighting projects) from the population of 2,487 Standard project applications and 4,382 Standard measures. Sampling was done in two waves with three sub-strata based on KWh size. Sample sizes were designed to provide a 90/10 confidence and precision level for program-level savings separately for lighting and non-lighting gross savings verification. Table 2-4 summarizes the sample selection for the M&V activities. Details of the sampling approach and disposition are provided in Appendix 7.1.1.
2. Conducted on-site visits and measurement and verification (M&V) activities on a sample of 32 Standard projects (14 lighting and 18 non-lighting) selected from the 115 projects to support deemed and non-deemed measure savings verification and measure-level research. On-site measurement and verification includes participant interviews, baseline assessment, installed equipment verification, and performance measurement. Measurement may include spot measurements, run-time hour data logging, review of participant energy management system trend data, and post-installation interval metering. Our approach to selecting M&V strategies follows the International Performance Measurement and Verification Protocol (IPMVP); Option A or Option B are typically selected.
3. Performed an engineering review of project files and energy savings estimates on the remaining 83 projects (41 lighting and 42 non-lighting) to support deemed and non-deemed measure savings verification and program-level research.
4. Conducted a quality control review of the research findings impact estimates and the associated draft site reports and implement any necessary revisions.
5. Produced an estimate of verified gross savings (kWh and kW) using the TRM for savings verification. Produced a research estimate of gross savings (kWh and kW) using all evaluation findings.
6. Produced a gross realization rate (which is the ratio of the evaluated gross savings to ex-ante gross savings as reported in the tracking system) for the sample and applied to the total program ex-ante gross savings, using sampling-based approaches that are described in greater detail in Appendix 7.1. Gross realization rates were produced for savings verification and the research estimate.

The product of the ex ante gross savings times the gross realization rate is an evaluation estimate of gross savings for the Standard program.



**Table 2-4. Profile of the PY8 Population and Gross Savings Verification Sample by End-Use Strata**

Population Group	Sampling Strata	Population			Sample		
		Number of Projects (N)	Ex Ante Claimed Gross Savings, MWh	kWh Weights	Number of Projects (n)	Ex Ante MWh	Sampled % of Population
Lighting Wave 1&2	1	84	59,535	0.35	19	18,780	32%
	2	286	56,937	0.34	18	2,946	5%
	3	1,579	52,735	0.31	18	860	2%
<b>Lighting Subtotal</b>		<b>1,949</b>	<b>169,206</b>	<b>1.00</b>	<b>55</b>	<b>22,586</b>	<b>13%</b>
Non-Lighting Wave 1&2	1	25	27,102	0.43	19	18,780	69%
	2	73	19,228	0.31	21	5,165	27%
	3	440	16,310	0.26	20	926	6%
<b>Non-Lighting Subtotal</b>		<b>538</b>	<b>62,641</b>	<b>1.00</b>	<b>60</b>	<b>24,871</b>	<b>40%</b>
<b>Program Total</b>		<b>2,487</b>	<b>231,847</b>	<b>1.00</b>	<b>115</b>	<b>47,457</b>	<b>20%</b>

Source: ComEd tracking data and Navigant team analysis.

## 2.2.2 Verified Net Program Savings Analysis Approach

Verified net energy and demand (coincident peak and overall) savings were calculated by multiplying the Verified gross savings estimates by a net-to-gross ratio (NTGR). In PY8, the NTGR estimates used to calculate the net verified savings were based on past evaluation research and defined through a negotiation process through SAG as documented in a spreadsheet.<sup>8</sup>

Evaluation research to produce NTG values (trade ally spillover) for future years is described in Appendix 7.

## 2.3 Process Evaluation

In PY8, the Navigant team conducted a limited process evaluation for the Standard program, focusing on TA and participating contractors' experiences and satisfaction with several PY8 processes. The process evaluation focused on participating TA and contractor experiences and satisfaction with the program's waitlist and pre-approval process in effect for most of PY8, as well as with ComEd's web site for Smart Ideas TAs, called "Current" ([www.comed.com/tradeally](http://www.comed.com/tradeally)).

We attempted a census of all TAs and contractors participating in the Standard program during PY8 and offered an incentive for completing the survey. The sampling unit was the unique contact person at each participating trade ally or contractor company. Based on a list of Standard program projects obtained from ComEd and processed by the Navigant team, the initial survey sample frame included 628 contacts who completed 2,487 projects. To prepare the sample frame for fielding, we removed 5 contacts not associated with a company name and 8 contacts who did not have a valid email address, as well as 21 duplicate contact records by name or email address. The final sample frame for the web survey consisted of 594 TA or contractor contacts at 426 companies. TAs were 65% of the sample frame.

The team completed 120 interviews in October, 2016. We asked all respondents a series of questions to estimate TA and contractor spillover, and a series of questions to support the process evaluation.

<sup>8</sup> Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>



Table 2-5 shows the final dispositions for the TA and contractor survey. The survey instruments used for this evaluation are included in Appendix 7.2.

**Table 2-5. TA and Contractor Survey Sample Dispositions for Spillover and Process Analysis**

Participation	Value
Population	628
Total Sample	594
Complete	120
Eligible - Incomplete	11
Ineligible	6
Undeliverable Emails	40
Undetermined Eligibility	418
Response Rate	23%

*Source: Evaluation analysis*

### 3. GROSS IMPACT EVALUATION

Results from PY8 evaluation activities to verify the Standard program impact savings are presented in this section. The Standard program in PY8 achieved overall verified gross savings of 230,289 MWh and 25.82 MW. These represent 99 percent gross realization rate on energy and 81 percent realization rate demand reduction. The verified gross savings for lighting end-use measures is 176,259 MWh at a gross realization rate of 1.04 for energy and 0.96 for demand savings. The verified gross savings for non-lighting measures is 54,030 MWh at a gross realization rate of 0.86 for energy and 0.41 for demand savings.

#### 3.1 Tracking System Review

Navigant received the final PY8 tracking data on August 19, 2016. Prior to that, Navigant received the first wave of the PY8 data in March, when the program had completed almost two-thirds of the planned participation, due to high volume of PY8 Pre-Approval Applications. Navigant conducted a consistency check on the Standard program tracking system to validate the PY8 data. The tracking system stores lookup values for per unit energy and demand savings and reported ex ante energy and demand savings. Navigant found that the values were in most part consistent with the Illinois TRM (v4.0) deemed values and with per unit savings values produced by DNV GL in the ComEd work papers for non-deemed measures and custom variables in the Standard program. We examined values for per unit energy savings and coincident peak demand at the measure level in the following manner:

- Reviewed project documentation at the measure-level for the sampled projects to verify participation and tracking system entries.
  - Checked documentation of invoiced quantities and installed measure characteristics and confirmed match with tracking system.
  - Confirmed compliance with eligibility and confirmed deemed measure input values using the Illinois Statewide Technical Reference Manual (IL-TRM v4.0).
- 1.
  2. Navigant presented early feedback to ComEd and DNV GL of our evaluation findings<sup>9</sup> on program ex ante savings calculations, Illinois Technical Reference Manual (TRM) compliance, work papers<sup>10</sup>, and tracking database issues for consideration during the PY9 work paper and ex ante savings review.

#### 3.2 Program Volumetric Findings

The evaluation team reviewed the PY8 Standard program tracking data and verified 1,645 participants in the PY8 program who implemented a total of 4,382 measures. The participants completed 2,487 projects, with lighting end-use projects exceeding non-lighting end-use projects by a margin of approximately three to one. The PY8 program participation detail is outlined in Table 3-1 below. The volumetric details by end-use type is presented visually in Figure 3-1.

**Table 3-1. PY8 Volumetric Findings Detail**

Participation	Lighting End-Use	Non-Lighting End-Use	Total
Participants†	1,323 (80%)	397 (20%)	1,645
Total Measures‡	3,270 (75%)	1,112 (25%)	4,382
Installed Projects	1,949 (78%)	538 (22%)	2,487

Source: ComEd tracking data and Navigant team analysis.

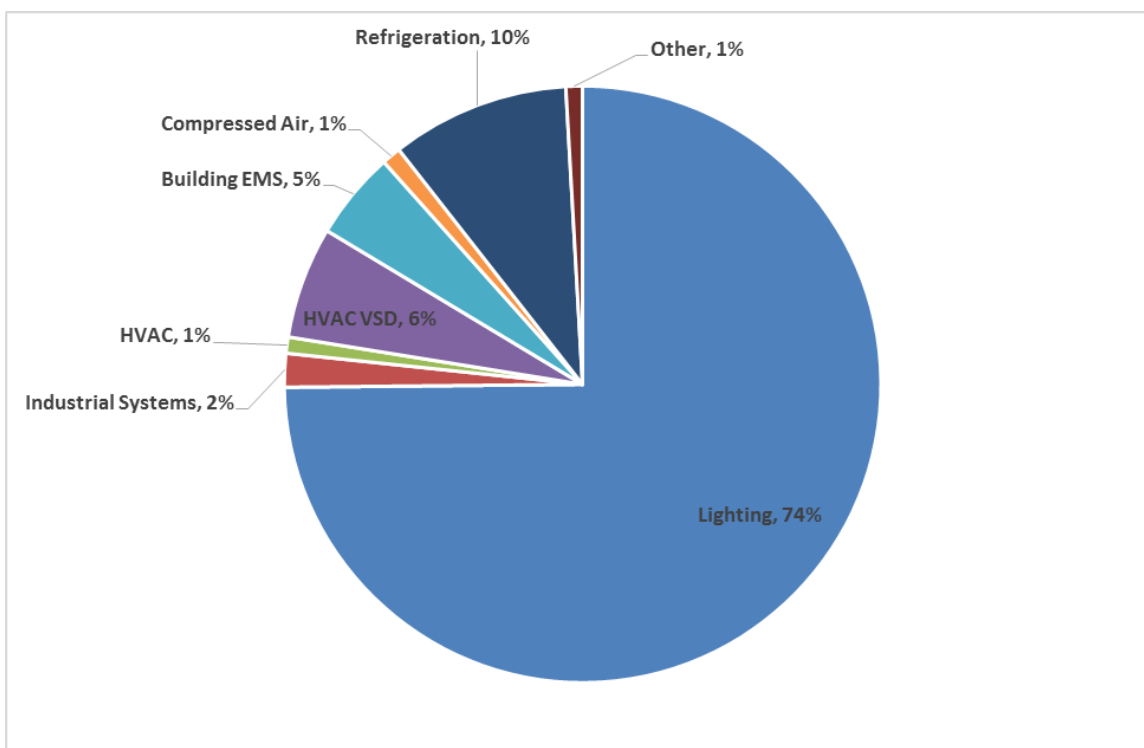
† Based on participant company name and site address. Some 75 participants installed both lighting and non-lighting measures.

‡ This is a project-level measure count based on type of measure, not quantities installed.

<sup>9</sup> ComEd PY8 Standard Program Early Impacts Memo-2016-11-07

<sup>10</sup> PY8 ComEd Measure Workpapers 12-3-15.pdf

Figure 3-1. Number of Measures Installed by End-use Type



Source: Evaluation Analysis

### 3.3 Gross Program Impact Parameter Estimates

The verified gross energy realization rate (defined as the ratio of the verified gross energy savings to ex ante gross energy savings as reported in the tracking system) was estimated as 104 percent for the lighting sample projects (at 90 confidence level and 7 percent relative precision for energy) and 86 percent realization rate for the non-lighting sample projects (at 90 confidence level and 15 percent relative precision for energy). The results are shown in Table 3-2.

Table 3-2. Verified Gross Savings Parameters

Population Group	Mean kWh RR†	Relative Precision at 90% Level of Confidence ± %	Mean KW RR	Relative Precision at 90% Level of Confidence ± %	Deemed or Evaluated?
Lighting	1.04	7%	0.96	7%	Evaluated
Non-Lighting	0.86	15%	0.41	27%	Evaluated
<b>Program Level</b>	<b>0.99</b>	<b>7%</b>	<b>0.81</b>	<b>7%</b>	<b>Evaluated</b>

Source: Evaluation analysis

† Verified Realization Rate on Ex-Ante Gross Savings.

### 3.4 Verified Gross Program Impact Results

The resulting total program verified gross savings is 230,289 MWh and 25.82 MW as shown in the following table. The table presents savings at the measure group level including groups where the estimate is not statistically significant at the 90/10 level.

Table 3-3. PY8 Verified Gross Impact Savings Estimates by Measure Type

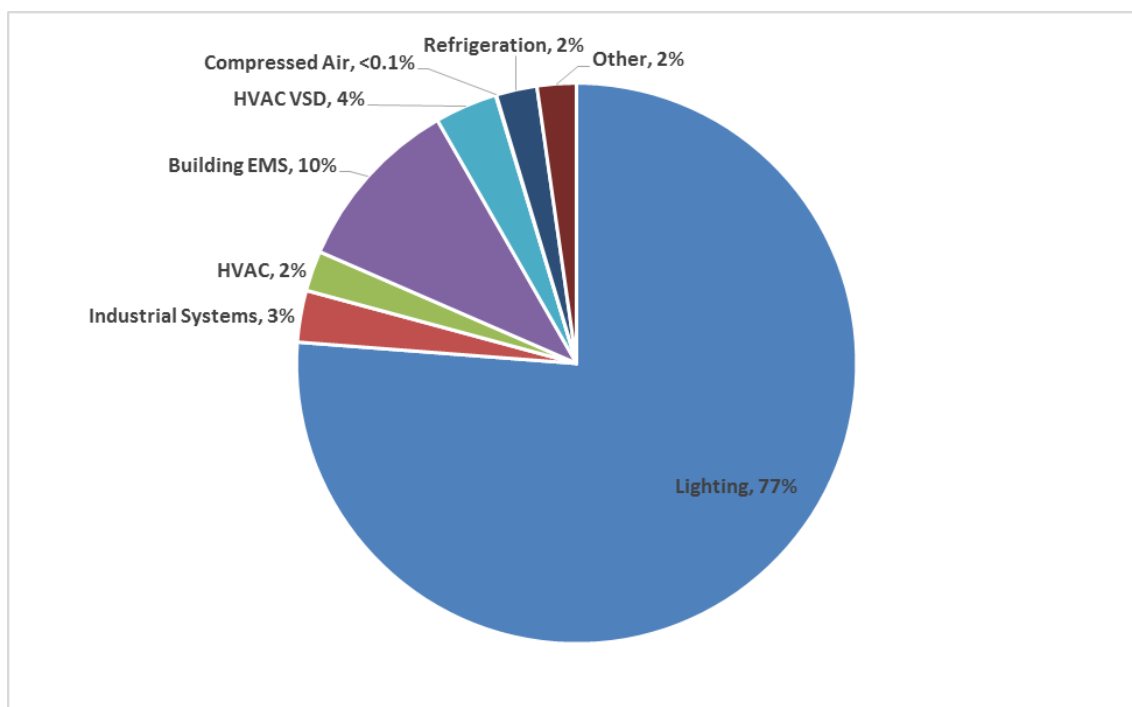
Program Group	Sample Size	Gross Energy Savings (MWh)	90/10 Significance	Gross Peak Demand Savings (MW)	90/10 Significance
<b>Lighting Measures</b>					
Ex-Ante Gross Savings		169,206		23.22	
Verified Gross Realization Rate ‡	55	1.04	Yes	0.96	Yes
Verified Gross Savings		176,259		22.31	
<b>Non-Lighting Measures</b>					
Ex-Ante Gross Savings		62,641		8.48	
Verified Gross Realization Rate ‡	60	0.86	No	0.41	No
Verified Gross Savings		54,030		3.51	
<b>PY8 Program Total</b>					
Ex-Ante Gross Savings		231,847		31.70	
Verified Gross Realization Rate ‡	115	0.99	Yes	0.81	Yes
Verified Gross Savings		230,289		25.82	

Source: Evaluation Team analysis.

‡ Verified through evaluation research.

The percentage of verified gross savings by end-use type is presented in Figure 3-2. Lighting end-use contributed 77 percent of the gross savings, followed by Energy Management Systems (EMS) with 10 percent. HVAC variable speed drives (VSDs) contributed four percent, and the remaining nine percent is shared among the other end-uses.

Figure 3-2. Percent of Verified Gross Savings by End-use Type



Source: Evaluation Analysis

## Key Findings include:

1. The evaluation team estimated higher realization rates for most lighting measures due to evaluation adjustment from using lighting logger and metered data to calculate site specific operating hours and savings. Others were changes to space type for certain projects due to information found in the site visit, or changes in occupancy sensor savings factor or actual wattages in the project files as opposed to deemed numbers for the linear fluorescent measures. Fifteen (15) lighting projects were verified with realization rates below 100 percent, 27 projects with 100 percent realization rate, and 13 others with over 100 percent realization rate.
2. Evaluation team identified 11 non-lighting projects which had either a measure disqualified due to code non-compliance or the entire project was verified with negative ex post savings. In general, out of the 60 non-lighting sample projects, 33 projects had realization rates adjusted below 100 percent, 3 with realization rate of 100 percent, and 24 with realization higher than 100 percent. The overall results affected the stratified and weighted gross savings realization rate for non-lighting sample (86 percent) and extrapolation to the population savings.
3. The evaluation team adjusted savings or disqualified multiple variable speed drive projects due to the variable speed drive being installed on equipment other than HVAC fans, pumps, or chillers. HVAC VSDs are the only ones with savings defined in the Illinois TRM and the work papers and the only eligible ones per the Standard application, or due to code non-compliance.
4. The evaluation team reduced the savings for many of the evaluated chiller projects, based on findings from billing and regression analysis. The reduction is due to a discrepancy in the calculation of demand savings between the Illinois TRM and the ComEd work papers. Specifically, the Illinois TRM calculates the peak demand savings based on the difference in the full load efficiency of the installed chiller and a baseline full load efficiency. The work papers calculate the peak demand savings based on the installed chiller part load (IPLV) efficiency compared to the allowable Path A part load (IPLV) efficiency values in the TRM.
5. The realized savings for new Energy Management Systems (EMS) projects varies widely, ranging from -68 percent to over 200 percent of the deemed savings with an average sampling realization rate of 56 percent. Three projects 29260, 30748 and 28973 were found to have increased in energy usage after EMS implementation. The evaluation team is not able to provide detailed insights into why some EMS projects are working well or why some are not working well. The reason is partly due to the lack of any pre-project description of how current system operates, or to compare the control strategies to determine why or why not savings are achieved.
6. Evaluation identified projects that involved equipment installed for new construction or renovation or as part of major system changes, which did not replace similar equipment. The evaluation team reviewed these project's savings on a custom basis with a new construction or code compliance baseline. For example, projects 28094 and 28095 involved comprehensive system changes including replacing the existing air-cooled DX cooling system with a new chilled water plant. Since the chilled water system did not exist prior to the completion of the project, the VFDs were deemed ineligible since they were required to be installed for the chilled water system to meet current code.
7. Projects 28094 and 28095 that replaced entire systems were broken up into their individual components and routed through the Standard program. This approach could likely result in a change of the allowable baseline. For such projects, it is appropriate to analyze the project as a system change instead of replacing the individual components. It would be more appropriate to route the project through the custom program, if it qualifies under that program.

## 4. NET IMPACT EVALUATION

### 4.1 PY8 Program Net Savings Estimate

SAG determined<sup>11</sup> that the NTG values for the PY8 Standard program should be deemed prospectively and used to calculate verified net savings. The deemed NTG ratio for lighting end-use is 0.74, and NTG ratio of 0.63 for non-lighting end-use measures.

Table 4-1 shows the PY8 verified net savings.

**Table 4-1. PY8 Verified Net Impact Savings Estimates by Program Channel**

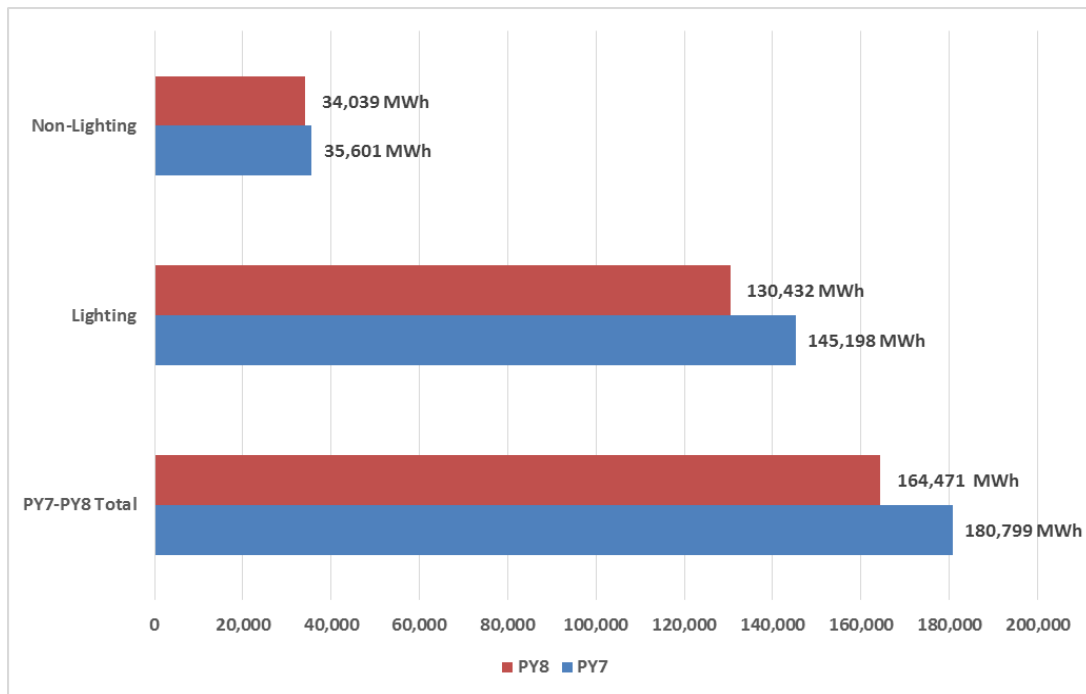
Program Group	Sample Size	Gross Energy Savings (MWh)	90/10 Significance	Gross Peak Demand Savings (MW)	90/10 Significance
Lighting Measures					
Ex-Ante Gross Savings	55	169,206	Yes	23.22	Yes
Verified Gross Realization Rate		1.04†		0.96†	
Verified Gross Savings		176,259		22.31	
NTGR		0.74		0.74	
Verified Net Savings (w/o Spillover)		130,432		16.51	
Non-Lighting Measures					
Ex-Ante Gross Savings	60	62,641	No	8.48	No
Verified Gross Realization Rate		0.86†		0.41†	
Verified Gross Savings		54,030		3.51	
NTGR		0.63		0.63	
Verified Net Savings (w/o Spillover)		34,039		2.21	
PY8 Program Total					
Ex-Ante Gross Savings	115	231,847	Yes	31.69	Yes
Verified Gross Realization Rate		0.99†		0.81†	
Verified Gross Savings		230,289		25.82	
NTGR		NA		NA	
Verified Net Savings		164,471		18.72	

Source: Evaluation Team analysis.

In Figure 4-1 we show how the PY8 Standard program net savings compares with the PY7 savings level. We found that overall the PY8 program impact in terms of savings, project and measure count was below the PY7 level.

<sup>11</sup> Source: ComEd PY5-PY6 Proposal Comparisons with SAG.xls, which is to be found on the IL SAG web site here: <http://ilsag.info/net-to-gross-framework.html>

Figure 4-1. PY7-PY8 Yearly Net Savings Comparison



Source: Evaluation Team analysis.

## 5. PROCESS EVALUATION

We evaluated two main topics in the PY8 process analysis: 1) TA and contractor experiences and satisfaction with the program wait list and pre-approval process, and 2) TA awareness and use of the ComEd web portal for TAs. We researched these topics using data from the PY8 Standard Program TA survey, described in Section 2.1 above.

Overall, we found the following:

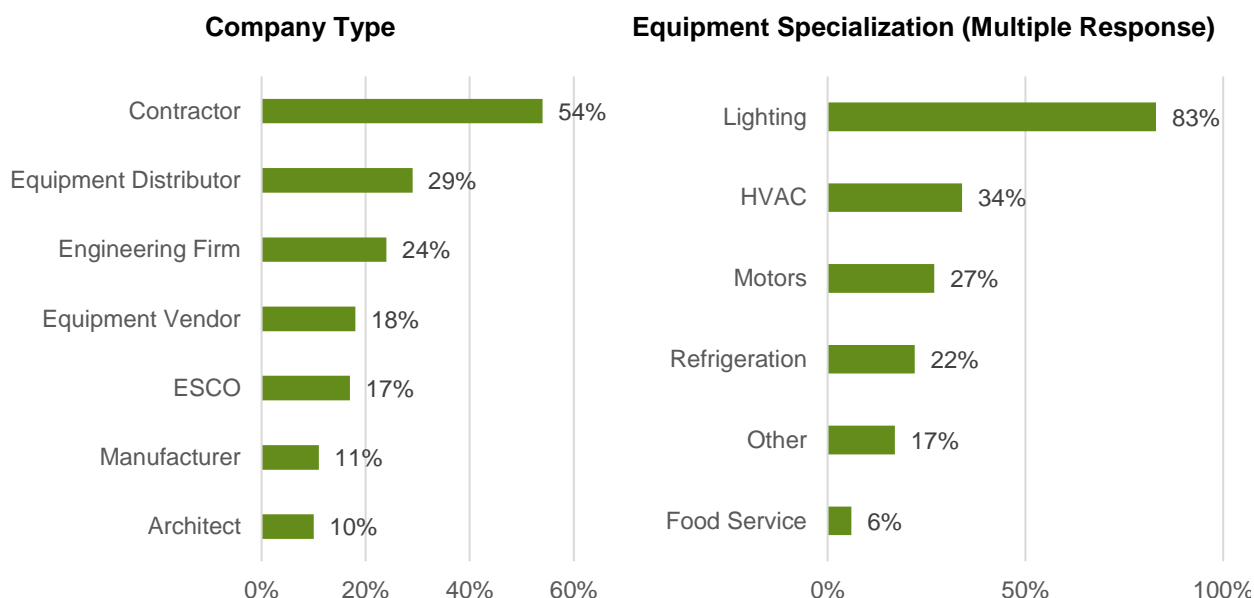
- TAs and contractors tend to be satisfied with their overall experiences in the Smart Ideas for Your Business Standard program. The TA and contractor survey data suggest that particular areas of satisfaction are trainings from ComEd staff, communications with ComEd staff, and the measures offered through the program. Nearly all PY8 TAs and contractors plan to participate again in the future, but suggest that there is room to streamline the program pre-approval process.
- The wait list that ComEd used in PY8 to manage program over-subscription presented a problem for many TAs and contractors. While most TAs and contractors understood the need for a wait list and felt that general information about the wait list was clearly communicated to them, some felt that these communications could have been timelier and could have included more project-specific details (namely, individual projects' expected wait-time to pre-approval).
- According to TAs and contractors, customers had difficulty understanding the funding uncertainty associated with the wait list. Overall, the majority of TAs and contractors expressed neutral to satisfied sentiments about the wait list, but one-third of TA and contractor respondents were dissatisfied. Should ComEd need a wait list again, ComEd could develop some wait list communication tools like those used in past years (e.g., a fund-o-meter for TAs) or develop customer-facing materials to support TAs and contractors as they engage with their customers about the uncertainty inherent in the wait list.
- Most TAs are aware of ComEd's website for trade allies. About one-half of the TAs that are aware of the website used it during PY8. The most popular website features are the copies of program materials and information about Smart Ideas programs. About one-fifth of TAs used the website to submit program pre-approval applications and to monitor their projects' current status (e.g., wait listed, pending review, approved, rebate processed). Satisfaction with these project tracking features is generally high, although several individual TAs offered targeted suggestions about enhancing the website's administrative and project tracking functions.

### 5.1 Trade Ally and Contractor Characteristics and Satisfaction

Based on survey results, most PY8 TAs and contractors (72 percent) work at companies specializing in one business category. As shown in Figure 5-1. below, most companies are contractors (54 percent), equipment distributors (29 percent), or engineering firms (24%). A slight majority of TA and contractor employees (55 percent) also report that their company focuses on one type of equipment, with most of the remainder working at a company that specializes in two or three types of equipment (31 percent). Most PY8 TA and contractor companies (83 percent) have expertise in lighting equipment, although specializations in HVAC, motors, and refrigeration are also common (Figure 5-1. ). In terms of TA and contractor company size, most companies working in the Standard program are either local (37 percent) or regional (35 percent) in scale; fewer are national (20 percent) or international (8 percent).



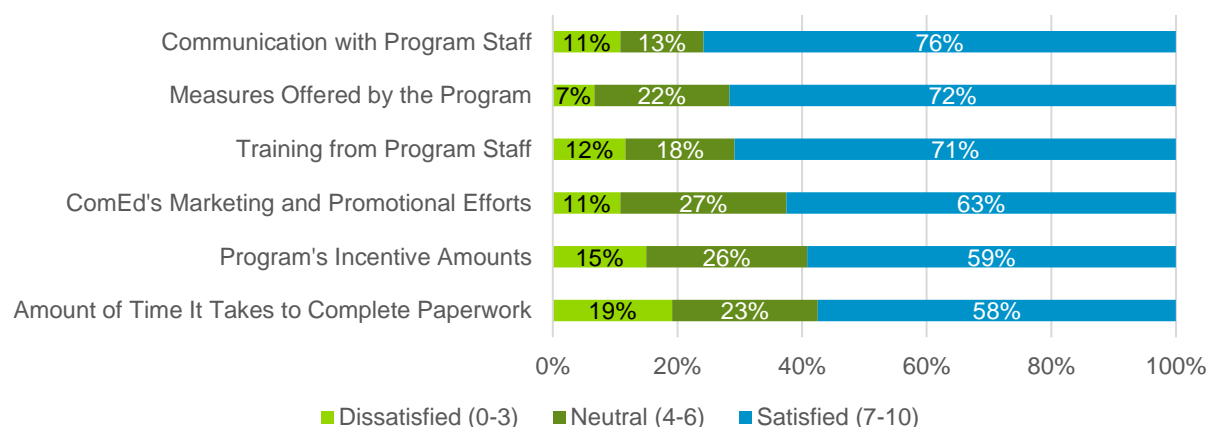
Figure 5-1. PY8 TA and Contractor Firmographics



Source: PY8 TA/Contractor survey. n=114 (Company Type); n=120 (Equipment Specialization).

As and contractors report high levels of satisfaction with their overall experiences participating in the Smart Ideas for Your Business Standard program (87 percent). Between one-half to two-thirds of TAs and contractors are satisfied<sup>12</sup> with individual aspects of the program (Figure 5-2). For example, most TAs and contractors are satisfied with communications with (76 percent) and trainings from (71 percent) Smart Ideas program staff as well as the measures offered through the Smart Ideas Standard program (72 percent). TAs and contractors are less-satisfied with the incentive amounts offered through the program (59 percent) and with the amount of time it takes to complete paperwork (58 percent). Time to complete paperwork is the area in which TAs and contractors are most often dissatisfied<sup>13</sup> (19 percent).

Figure 5-2. TA and Contractor Satisfaction with Components of the PY8 Program



Source: PY8 TA/Contractor survey. n=120.

<sup>12</sup> A rating of 7, 8, 9, or 10 on a 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied.

<sup>13</sup> A rating of 0, 1, 2, or 3 on a 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied.

On average, nearly all PY8 TAs and contractors (95 percent) plan to participate in the Smart Ideas for Your Business Program in the future. Few respondents are either unsure about whether they will participate again (n=5) or do not plan to participate again (n=1). Reasons for these responses include changes to the program's product requirements (2 of 6) and/or a desire to avoid the uncertainty and business impacts associated with the PY8 wait list (2 of 6).

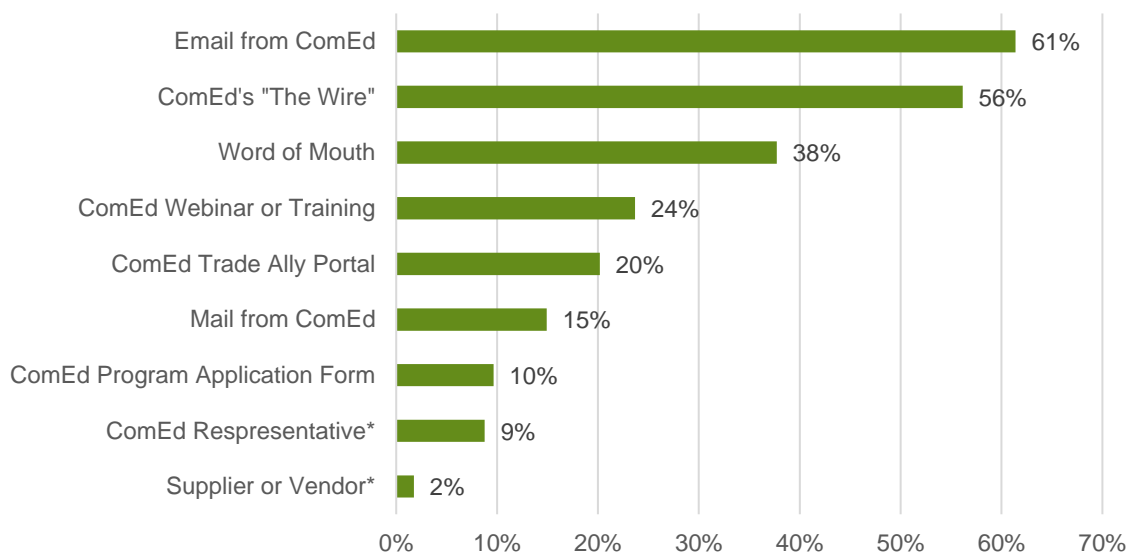
## 5.2 Wait List and Approval Process

The Smart Ideas for Your Business Standard program experienced strong demand in late PY7 and early PY8, resulting in the first wait list for the program since PY1 and PY2. ComEd started accepting PY8 Standard program pre-approval forms in March 2015 (three months before the start of PY8) based on elevated participation in PY7. While the PY7 oversubscription was a mark of success for the program's strong network of TAs and contractors, early applications for PY8 brought the program close to its reservation limit by mid-July 2015, just over one month after the program year started. To manage remaining funds and keep the program open for the remainder of the year, program staff decided to institute a wait list process starting in July 2015. In this system, ComEd placed all applications by TAs and contractors onto a wait list and granted funding on a first-come, first-serve basis as funds became available. According to program staff, ComEd chose not to inform or update the program's TAs or contractors of their projects' position on the wait list, but did post a general note within ComEd's TA portal indicating which specific pre-approval applications were wait listed.

The PY8 Standard program TA and contractor survey explored several topics surrounding the wait list process, including awareness of the wait list, how respondents learned about the wait list, whether respondents' participation in the program changed due to the wait list (and if so, how), and the respondents' satisfaction with various wait list characteristics.

Per program staff, ComEd communicated the wait list to TAs and customers by placing notices in the monthly marketing newsletter ("The Wire"); hosting special webinars about the wait list; modifying program forms to note that a wait list was in effect; providing tips to TAs about how to talk with customers about the wait list; and hosting bimonthly paperwork sessions. As a result, TA and contractor awareness of the wait list was very high (95 percent). Among those who were aware of the wait list, the three most common sources of awareness were email communication from ComEd (61 percent), "The Wire" newsletter (56 percent), and word of mouth (38 percent). Figure 5-3 below displays the ways in which TAs and contractors learned about the wait list.

Figure 5-3. TA and Contractor Sources of Awareness of the PY8 Wait List



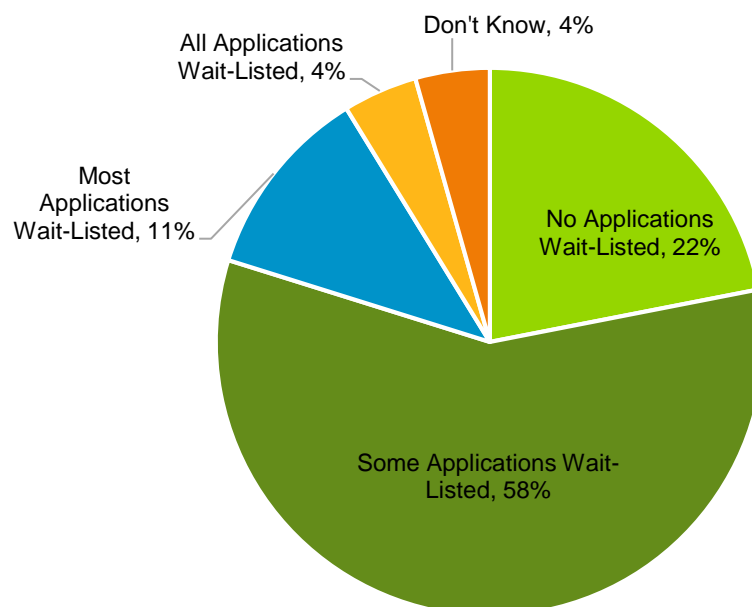
Source: PY8 TA/Contractor survey. n=114.

Note: This question allowed multiple choices, so the total percent will not sum to 100 percent.

\*These values were recoded from responses of "Other"

About three-quarters of TAs and contractors report that at least some of their applications were placed on the wait list (Figure 5-4). Most TAs and contractors (58 percent overall) recall that half or fewer of their PY8 applications were placed on the project wait list.

Figure 5-4. Share of TAs and Contractors by Extent of Wait List Exposure

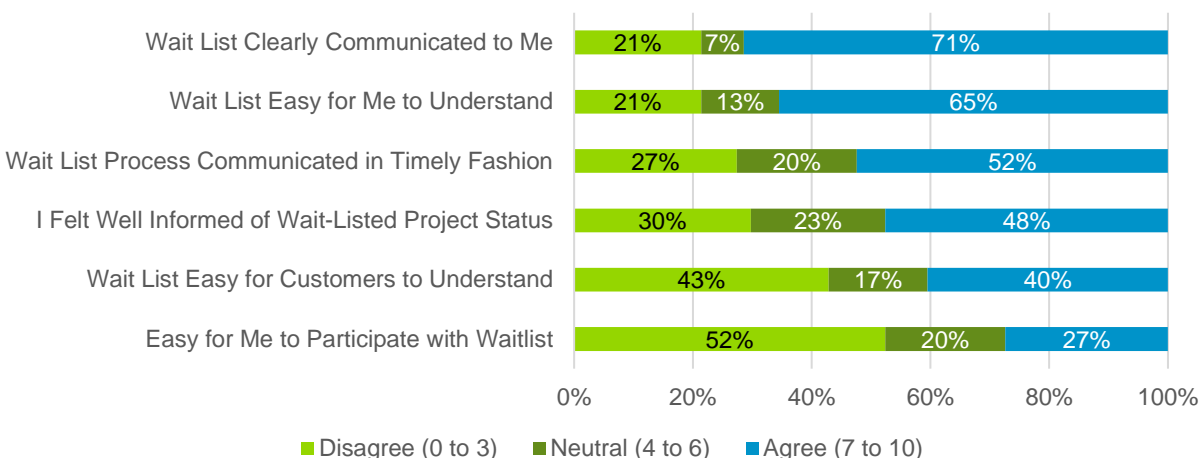


Source: PY8 TA/Contractor Survey. n=114.

Note: TAs and Contractors reported the share of their project pre-approvals placed on the wait list. "No Applications Wait-Listed" =0%; "Some Applications Wait-Listed" = 1% to 50%; "Most Applications Wait-Listed" =51% to 99%; "All Applications Wait-Listed" =100%.

TAs and contractors have mixed sentiments about the PY8 wait list. First, respondents are split in their overall satisfaction with their wait list experiences (36 percent are dissatisfied, 38 percent have neutral opinions, and 26 percent are satisfied; n=84). Second, TAs and contractors report that some aspects of the wait list worked while others did not (Figure 5-5, below). Many TAs and contractors understood the need for a wait list and felt that general information about the wait list was clearly communicated to them. For example, 71 percent felt that ComEd clearly communicated the wait list to them, and 65 percent felt that they easily understood the wait list concept. On the other hand, 52 percent of respondents stated that it was not easy for them to participate in the Standard program while the wait list was in place. In addition, large shares of TAs and contractors also expressed that customers were confused about the purpose and implications of the wait list, that the wait list process was not communicated in a timely fashion, and that they did not feel well-informed about the outlook for their wait-listed applications (e.g., their position on the wait list, or when their application would be taken off the wait list).

**Figure 5-5. TA and Contractor Agreement with Statements about PY8 Wait List**



Source: PY8 TA/Contractor Survey. n=84

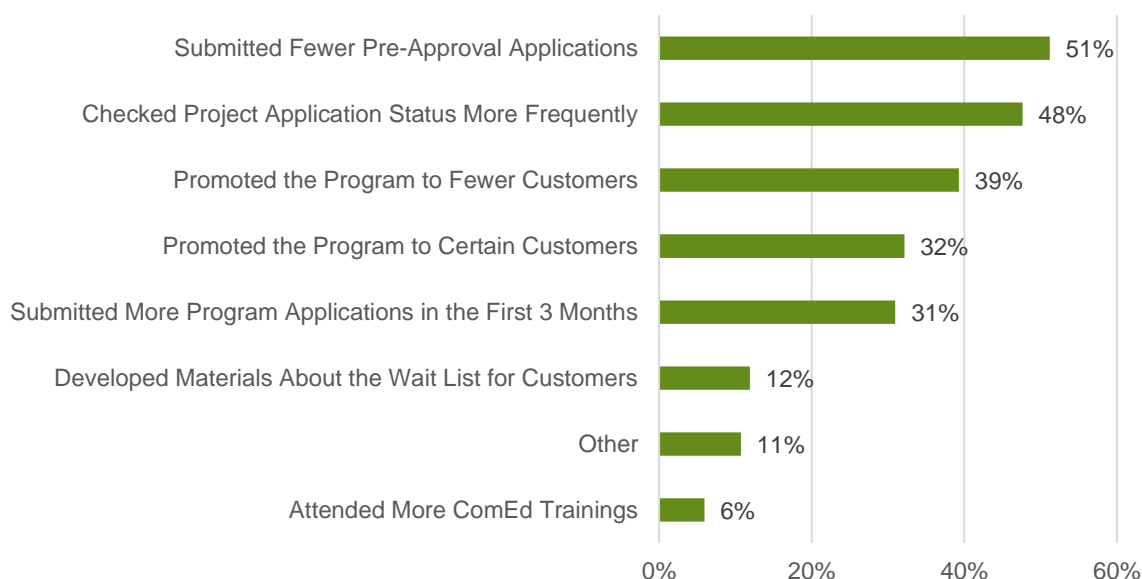
According to survey respondents, the main difficulty in participating during a wait list is simply the necessity of putting an interested customer's project on hold until funding becomes available through the program. In response to follow-up questions exploring the source of TA and contractor dissatisfaction, respondents tended to express that they did not feel informed about the wait list at its inception, and did not feel well-informed of the position of their wait-listed projects on the wait list throughout the rest of the year.

Almost one in five TAs and contractors (19 percent) mentioned that not knowing their projects' position on the wait list presented a challenge to communicating with their customers about the wait list. Moreover, 12 percent of TAs and contractors thought that ComEd and program implementer staff did not know the answers to their questions regarding their wait list status, especially early in the wait list process. These funding uncertainties and communication challenges introduced uncertainty into the business activities of some TAs, contractors, and customers. As one TA stated, their inability to tell a customer when their project would be moved off the wait list led the customer to believe that "... we [the TA] were using this as a sales technique to try and force them [the customer] to move forward [with the project] immediately." Another TA stated that "There was absolutely no feedback from ComEd about status of projects submitted to the wait list...we couldn't figure out any timelines for project approval or installation. We couldn't forecast on any projects installing and billing."

All 84 interviewed TAs and contractors who had wait-listed projects undertook at least one adaptation to their usual course of business in the Standard program (Figure 5-6). The most common change that TAs

and contractors with wait-listed projects made was to submit fewer pre-approval applications (51 percent). TAs and contractors with wait-listed projects also checked on project application status more frequently than they had in previous years (48 percent).<sup>14</sup> While 19 percent of TAs and contractors ultimately completed all their wait-listed projects through the program, 32 percent report that they did not complete any of their customers' wait-listed projects through the program during PY8.

**Figure 5-6. TA and Contractor Changes in Participation Due to Wait List (Among those with Wait-Listed Projects)**



Source: PY8 TA/Contractor Survey. n=84

Note: This question allowed multiple choices, so the total percent will not sum to 100 percent.

Altogether, the challenges, adaptations, and outcomes reported by TAs and contractors may be inherent in any year that a wait list is needed to manage program funding. Moreover, the high awareness of the wait list (95 percent) speaks well for ComEd's efforts to educate TAs and contractors about the wait list, especially given that all project types were wait-listed starting early in the program year.<sup>15</sup> Nonetheless, some TA and contractor respondents felt that ComEd could have done more during PY8 to maintain customer confidence and interest in the program. To alleviate future problems inherent in a wait list, TAs and contractors suggest that ComEd:

**Continue to strive to communicate with the Standard program's TAs and contractors about the wait list as soon as possible.** ComEd achieves high satisfaction ratings for their overall communications with TAs and contractors. While ComEd made TAs and contractors aware of the wait list via several channels, TAs and contractors were less satisfied with the ways in which ComEd informed TAs and contractors that a wait list was in effect. Individual TAs and contractors suggested providing materials that are more detailed and timely, as well as including more information about the need for a wait list and what the wait list processes will be.

**To the extent possible, TAs and contractors would appreciate more information from ComEd throughout the program year about where their projects are on the wait list.** Multiple TAs and contractors were displeased with the lack of information surrounding the likelihood and timing of a project

<sup>14</sup> The Evaluation Team did not ask survey participants how they checked on project status, but they may have either contacted ComEd directly or used the ComEd TA website (if a trade ally).

<sup>15</sup> ComEd used wait lists for the Standard program in PY1 and PY2. In these years, a relatively small share of participants were aware of the wait list (63% and 38%, respectively).

receiving pre-approval, which includes some TAs who logged in to the ComEd TA website. Thus, TAs and contractors are looking for more details beyond an indication that the project is wait-listed. Individual TAs suggested that if ComEd cannot divulge a project's position on the wait list, ComEd could still give TAs and contractors some indication of the amount of total funding left. In PY2, ComEd used a "fund-o-meter" to display the share of available funding reserved. Reinstating this visual aid could provide TAs and contractors with a general idea of the likelihood that their projects will receive funding.

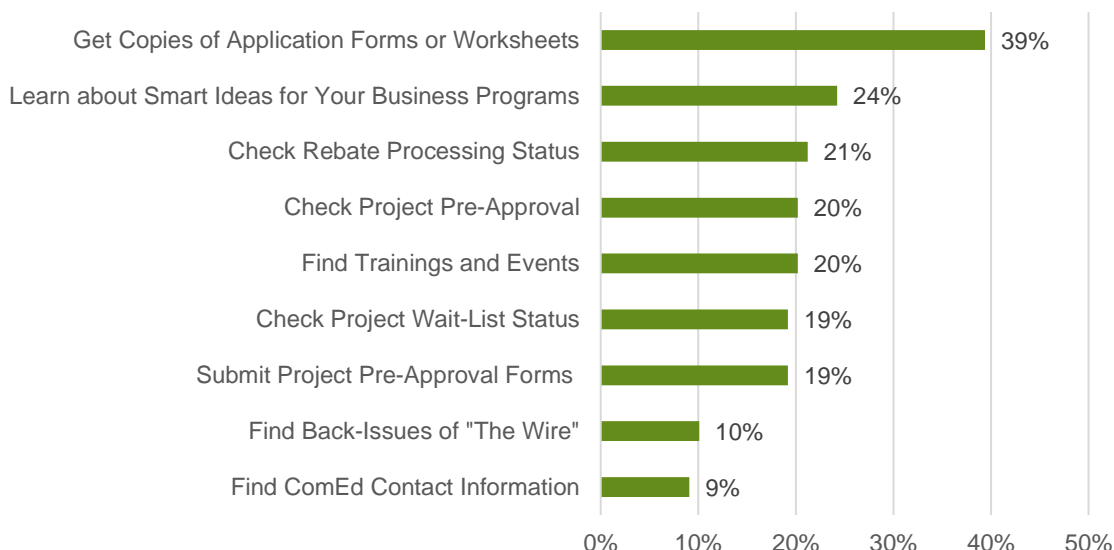
**ComEd could support TAs by providing better training and tools to communicate with their customers.** To help the TAs convey programmatic uncertainty to their customers, ComEd provided tips on how to talk with customers about the wait list. Based on TA and contractor responses, it may be valuable to do additional follow-up in to how these materials could be improved if there is another wait list (e.g., refining the explanation about why a wait list is needed and indicating who to call with questions). Alternatively, ComEd could directly distribute these materials to customers who are on the Standard program's wait list. Taking these steps could help minimize the negative impact of the wait list, seen in PY8, on TA and customer trust in the ComEd Standard program.

### 5.3 Web Portal

ComEd offers an informational website to support Smart Ideas TAs and provide information to non-TA contractors about how they can become a TA ([www.comed.com/tradeally](http://www.comed.com/tradeally)). The publicly-available portion of the website lists information about offerings in the Smart Ideas program portfolio; describes the benefits of being a TA; and provides contact information, notices about program trainings, and copies of program forms and manuals. Registered TAs can also log into the website's portal to complete administrative tasks like submitting project pre-approval forms and checking on rebate processing status.

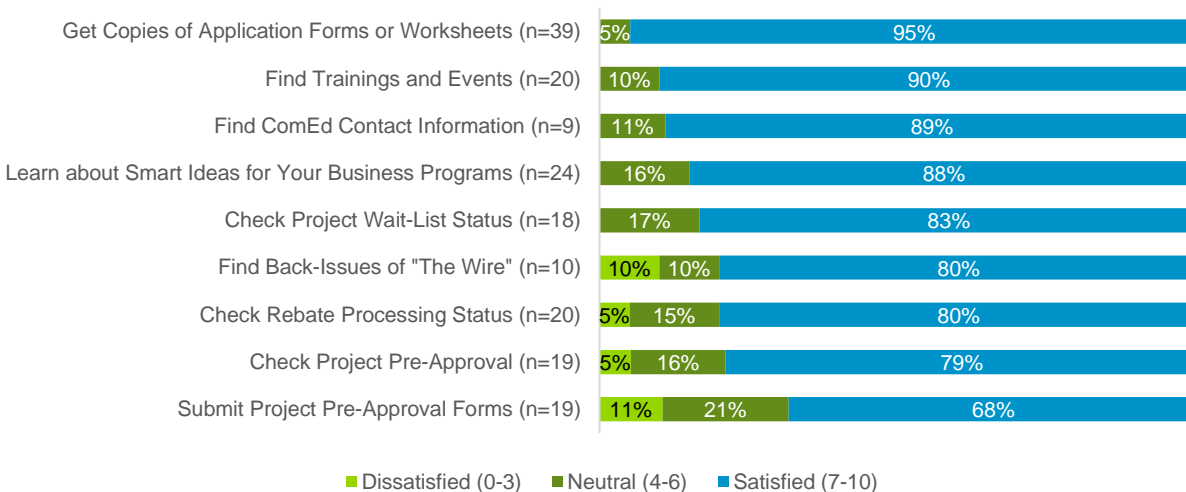
The PY8 Standard program TA and contractor survey included a limited exploration of several topics surrounding the website, including awareness of the website, use of it during PY8, and typical uses of the website in general. Because the Web Portal is mainly targeted towards registered TAs, results in this section are based on responses by TAs only. Overall, 80 percent of TAs are aware of the website, which speaks well for ComEd's efforts to promote the website. Among TAs who are aware of the website, about one-half (53 percent) recall visiting the website during PY8 or logging into the portal (49 percent).

Most frequently, TAs use the website to obtain copies of program application forms or worksheets (39 percent of TAs overall) and to learn about Smart Ideas programs (24 percent) (Figure 5-7). According to program implementation staff, ComEd commonly receives questions from TAs throughout the program year about their projects' approval and payment status. Although approval and payment statuses are available on the web portal, just one-fifth of TAs used the web portal to complete project administrative tasks like submitting pre-approval forms (19 percent), checking on approval status (20 percent), and monitoring rebate processing status (21 percent) (Figure 5-7).

**Figure 5-7. Smart Ideas TA Website Actions Taken During PY8**


Source: PY8 TA/Contractor Survey (TA responses only). n=99.

Most TAs are satisfied<sup>16</sup> with their ability to complete tasks using the Smart Ideas website (Figure 5-8). For example, nearly all TAs who used the website to find copies of application forms or worksheets are satisfied with their ability to do so (95 percent). A large majority of TAs are also satisfied with their ability to find trainings and events (90 percent) and ComEd contact information (89 percent) on the website, and to learn about Smart Ideas for Your Business programs generally (88 percent). TAs also tend to be satisfied with more project-specific aspects of the website, like submitting project pre-approval forms (68 percent), checking on project application statuses (75 percent pre-approval; 83 percent wait-list), and on rebate processing status (80 percent).

**Figure 5-8. TA Satisfaction with Smart Ideas TA Website Elements**


Source: PY8 TA/Contractor Survey (TA responses only).

Note: Satisfaction with elements was asked of respondents who used the element in PY8.

<sup>16</sup> A rating of 7, 8, 9, or 10 on a 0 to 10 scale, where 0 is very dissatisfied and 10 is very satisfied.



To gauge TAs' level of use of project-specific features of the portal, we asked TAs who reported logging in to the project portal in PY8 how often they had used it to complete various tasks. Responses suggest that most TAs log in to the portal between one and three times per project to check project pre-approval status (94 percent, n=20), wait list status (100 percent, n=19), and rebate processing status (100 percent, n=21). Depending on whether TAs are completing multiple activities at each log-on, these figures suggest that TAs use the website between three to nine times per project. For TAs that complete multiple Standard program applications each program year, the website may play a large role in how smooth the program pre-approval process works.

Although TA survey responses indicate that many of the website's existing features work well overall, individual TAs (n=16) offered specific suggestions about improving several of the website's main features. For example, TAs noted that:

*"It can be a little difficult to see the status of the projects. The navigation feels a little dated and clunky."*

*"In addition to Reservation Approved Date, you need to add the Reservation Expiration Date on the website – this is vital, since I don't know when most reservations expire."*

*"I did not know you could check the status of your applications and what applications you have currently with ComEd. If this is true I will be logging in today and using it for that reason."*

Among these individual TAs, suggestions included streamlining the overall website navigation (5 of 16), adding more project tracking data to project pages in the portal (5 of 16), or requests for more training from ComEd about the web portal's features (5 of 16). Specific suggestions related to project tracking data and outreach and training included:

**Provide additional project-level details to enhance project tracking functions.** For the website to fully serve as a central hub of information, some TAs would like to see more information at their fingertips. Specifically, several TAs suggested adding several items to the project site, including: expected time on the wait list (if one is in effect), digital copies of the reservation approval, the reservation expiration date, the name of the ComEd engineer handling the case, and incentive check numbers (once final checks are sent). One TA suggested that while web forms currently default to a past program year, it would be more helpful to re-set the default so that the current program year is displayed, therefore saving TAs time on each application. The TA also suggested that allowing TAs to sort project lists by project name in addition to project ID is more in-line with the way TAs think about their projects and could also save time and limit frustration. TAs offering these suggestions noted that the additional information could help them to better avoid expired reservations, to better gauge customers' timelines to project completion, and to minimize administrative time.

**Provide training on the portal's project tracking features.** A limited number of respondents would like to hear more from ComEd about the website's availability and key functions. This group of TA respondents noted that they had difficulty locating application forms, determining how to log in to the website, and working with the website's basic layout, which signals an opportunity for more outreach on specific aspects of the website. Additionally, some TAs suggest that multiple people per TA company would appreciate access to the portal rather than just one "lead" person. Although only a few TA respondents (5 of 99) explicitly stated a desire to learn more from ComEd about the website and how to use it, expanding low-cost communications and trainings about the website could help many TAs better use the website and further streamline TAs' experiences with pre-application, approval, and incentive payment stages. Additional lower-cost outreach activities could include a tour of the portal at the annual kick-off meeting, or including a website tip-of-the-month feature in "The Wire" newsletter, and others.



## 6. FINDINGS AND RECOMMENDATIONS

The following provides insight into key program findings and recommendations.

### Gross Savings Estimates and Realization Rates

**Finding 1:** The evaluation team estimated higher realization rates for most lighting measures due to adjustments we made using lighting logger and metered data to calculate site specific operating hours and savings. Other changes were to space type for certain projects due to information found in the site visit, changes to occupancy sensor savings factor, and using actual wattages in the project files. Fifteen (15) lighting projects were verified with realization rates below 100 percent, 27 projects with 100 percent realization rate, and 13 others with over 100 percent realization rate. Navigant notes that ComEd is already addressing the occupancy sensor and space type issues in PY9.

**Finding 2:** The evaluation significantly reduced many of the evaluated chiller projects due to a discrepancy in the calculation of demand savings between the Illinois TRM (v4.0) and the ComEd work papers. The Illinois TRM calculates the peak demand savings based on the difference in the full load efficiency of the installed chiller and a baseline full load efficiency. The baseline full load efficiency is set based on the chiller types, size, and if the chiller meets Path A or Path B compliance. The work papers calculate the peak demand savings based on the installed chiller part load (IPLV) efficiency compared to the allowable Path A part load (IPLV) efficiency values. In addition, a small number of chiller projects were disqualified due to the full load efficiency not meeting the TRM requirements.

**Recommendation 1.** Calculate the energy and demand savings for all chiller projects using the approach set forth in the Illinois TRM. This includes verifying that all chillers meet both the full load and part load (IPLV) requirements and selecting the correct baseline efficiencies using Path A or B compliance. Navigant notes that ComEd is addressing these issues in PY9.

**Finding 3.** Evaluation identified projects that involved equipment installed for new construction or renovation or as part of major system changes, which did not replace similar equipment. The evaluation team reviewed this project savings on a custom basis with a new construction or code compliance baseline.

**Recommendation 2.** Ensure projects are reviewed to identify equipment installed as part of new construction projects. Determine which measures from the work papers and the Illinois TRM are affected or ineligible when comparing to new construction baselines. When projects are flagged as having a new construction baseline, have a reviewer trained in the nuances of the baselines and code requirements to determine the eligibility of each measure.

**Recommendation 3.** Projects involving major system changes or replacements should be reviewed by staff knowledgeable about the nuances of code requirements for systems and not just of the specific equipment components of the system at hand to determine eligibility in the Standard program. Additionally, these projects should also be evaluated to determine if other programs, such as custom, are more appropriate to determine the appropriate savings levels for the system change as a whole.

**Finding 4.** Projects that replaced entire systems (e.g. 28094 and 28095) were broken up into their individual components and routed through the Standard program. This approach could result in a change of the allowable baseline.

**Recommendation 4.** Projects that change an entire system should be reviewed carefully to ensure that breaking the system into the individual components does not change the baseline. It may be more appropriate to analyze the project as a system change instead of replacing the individual components.

**Finding 5.** Evaluation adjusted the savings for multiple variable speed drive projects or the measure disqualified due to the variable speed drive being installed on equipment other than HVAC fans, pumps, or chillers. HVAC VSDs are the only ones with savings defined in the Illinois TRM and the work papers and the only eligible ones per the Standard application.

**Recommendation 5.** For non-HVAC VSD measures not defined under the Standard program application, consider routing them through other programs (e.g., the Custom program) to determine if they are eligible there.

**Finding 6.** The realization rate for new Energy Management Systems (EMS) projects varies widely, ranging from -68 percent to over 200 percent with an average realization rate of 56 percent for our sample (three projects were found to have increased in energy usage after EMS implementation). EMS projects are all unique and a large variation is expected. The evaluation team is not able to provide many insights into why the realization rate for some EMS projects deviates significantly from 1.0. This is partly due to the lack of any pre-project description of how current system operates.

**Recommendation 6.** EMS projects may need more work with the customer to ensure that the advanced controls are programmed and go above and beyond what was being done previously. In addition, the EMS programmers should be giving training to site staff on how to properly use the EMS to prevent the undoing of advanced control strategies. It may be beneficial for the program if customers have to document their existing control strategy and how the new EMS will change these strategies.

## Process Evaluation (Trade Ally Participation)

**Finding 7.** TAs and contractors tend to be satisfied with their overall program experience. Strong areas of the Standard Program are communications with and trainings from Smart Ideas program staff as well as the measures offered. According to TAs and contractors, the time and resources it takes to complete project approval paperwork are the primary hurdles to a seamless experience. Overall, nearly all TAs and contractors plan to participate again in the future.

**Finding 8.** ComEd's PY8 wait list presented challenges for TA and contractors. While 20 percent of TAs and contractors ultimately completed all their wait-listed projects through the program, 32 percent did not complete any of them through the program. In addition, there is some sentiment among TAs and contractors who had wait-listed projects that ComEd could have done more to communicate with TAs and contractors at two key points: wait list inception, and during project pre-approval processes of individual projects. As a result of not knowing individual projects' expected wait-time to approval, it was difficult for TAs to convey the wait list's implications to their customers. Facing continued growth in demand for the Standard program, ComEd is already taking steps to manage customer expectations about incentive payment processing; for example, the November 2016 (PY9) issue of "The Wire" includes an article about program financial predictability, noting that ComEd will work with TAs to, "...improve the level of service expectations through consistency, [and] to maximize growth opportunities, provide the right approach for project needs, and accurately determine financial forecasting and budgeting processes."

**Recommendation 7.** In addition to the steps ComEd is already taking, TA and contractors' PY8 experiences highlight several additional steps that ComEd could also take. For example, if ComEd does not want to tell TAs how long their projects would be on the wait list (or cannot do so accurately), ComEd could develop a "fund-o-meter" within the TA portal, like the display that the program used in PY2 to display remaining funding. ComEd could also develop customer-facing materials to support TAs and contractors as they engage with their customers about the uncertainty inherent in the wait list.

**Finding 9.** Most PY8 TAs are aware of ComEd's Smart Ideas website for TAs, and about one-half of those aware of the website used it during PY8. The most popular website features are

the copies of program materials and information about Smart Ideas programs, but roughly one-fifth of respondents also used the website's portal feature to submit program forms and monitor project status (e.g., pending review, approved, rebate processed). Overall, TAs are satisfied with the website as it stands, but several individual TAs offered suggestions about improving specific aspects of project tracking pages and boosting overall awareness of the website.

**Recommendation 8.** If ComEd is interested in increasing TA use of the website's project tracking capabilities, ComEd could consider the benefits of providing outreach on the portal's project tracking features, or of building additional project tracking functions suggested by TAs that have used the website. A focused TA outreach campaign could boost awareness of the website's project administration and tracking features, while adding additional project details to the project tracking pages could help streamline TAs' experiences with pre-application, approval, and incentive payment stages.

## 7. APPENDIX

### 7.1 Evaluation Research Impact Approaches and Findings

#### 7.1.1 Evaluation Research Gross Impact Findings

Two separate evaluation estimates of gross savings are presented in this report: a savings verification estimate presented in the body of the report (Section 3) that uses the TRM approach for measures covered by the TRM, which sought to verify eligibility, quantity, and compliance with claimed deemed per unit savings values defined in the TRM. Gross impact evaluation of non-deemed measures involved collecting data from supporting project documentation and on-site measurement and verification (M&V) to estimate site-specific measure savings for custom variables. The research estimates that applies all evaluation research without regard to the TRM status of measures are presented in this Appendix.

Table 7-1 summarizes the evaluation research findings gross program impacts derived for the PY8 Standard program.

**Table 7-1. Summary of Research Findings Gross Realization Rates and Savings Estimates**

Population Group	MWh, Ex Ante Gross Savings	MWh, Research Finding Gross Savings	MWh RR	MW, Ex Ante Gross Savings	MW, Research Finding Gross Savings	MW RR
Lighting	169,206	186,650	1.10	23.22	22.60	0.97
Non-Lighting	62,641	55,696	0.89	8.48	3.61	0.43
<b>Total</b>	<b>231,847</b>	<b>242,346</b>	<b>1.05</b>	<b>31.70</b>	<b>26.21</b>	<b>0.83</b>

Source: Evaluation analysis

The tables below presents the verified gross realization rate (for energy savings and demand), the percent of sample energy savings, and any notes or recommendations Navigant had to address discrepancies by measure. Navigant has also assigned a priority (high, medium or low) based on evaluation risk and percent of program savings. Note that these percentages were weighted in order to calculate the overall program level gross realization rates presented in the body of the report.

**Table 7-2. Lighting Measure Level Results**

Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
DLC Qualified Interior LED Luminaires	31.45%	97%	95%			
DLC Qualified Outdoor LED Luminaires	24.78%	99%	NA	The differences are attributable to changes in business type; e.g., reported as 24/7 garage, but found as parking lot dawn to dusk lighting during site visit	ComEd could consider including some additional detail on the building types on the application	Low
Exterior DLC Qualified LED Luminaires	1.81%	82%	NA			
DLC Qualified Parking Garage LED Luminaires - Garage/24-7	4.00%	90%	54%			
2' Lamp and Ballast	0.93%	105%	114%	The differences for the linear fluorescent measures are attributed to evaluation using the actual wattages as opposed to a deemed valued presented in the workpaper	None - the Standard program is moving to watts reduced methodology for these measures	NA
3' Lamp and Ballast	0.09%	201%	218%			
4-foot Lamp and Ballast	1.10%	169%	173%			
Remove 4-foot Lamp	0.52%	53%	44%			
Remove 4-foot Lamp with reflector	1.98%	88%	85%			
Remove 8-foot Lamp	0.02%	1956%	1253%			
Remove 8-foot Lamp with reflector	0.20%	131%	129%			
One 8-ft T12 Lamp to two 4-ft HP T8 Lamps and Ballast	0.36%	37%	33%	The difference is due to changes in the baseline and efficient wattages evaluation made based on the project files.	None	NA
Sensor Controlled Parking Garage Bi-Level Fixture	10.91%	94%	111%			

Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
Total Existing Fixture Watts less Total New Fixture Watts	10.45%	95%	95%	Most project level RR = 1; change is attributable to some corrections to baseline or efficient wattages based on information from the project files.	None	NA
Occupancy Sensors	9.39%	91%	100%	The difference in kWh is attributed to evaluation using actual ESF values as opposed to the average used in the workpaper	None - the new version of the TRM uses only one ESF value	NA
Occupancy Sensors - Exterior/Garage	0.05%	124%	178%			
Exterior Advanced lighting control system	0.06%	85%	NA	The difference is attributable to the workpaper using a rounded value for the deemed savings number.	For additional accuracy, ComEd could consider adding an additional significant figure to the deemed savings value for this measure	Low
Exterior/Garage Induction - Watts Reduced - Exterior	0.05%	71%	NA	The differences are attributable to changes in business type; e.g., reported as 24/7 garage, but found as parking lot dawn to dusk lighting during site visit	ComEd could consider including some additional detail on the building types on the application	Low
Exterior/Garage Induction - Watts Reduced - Garage/24-7	0.64%	100%	100%			
Exterior/Garage Pulse Start or Ceramic, 201W - 350W - Exterior	0.81%	425%	NA			
LED Refrigerated Case Lighting - Closed Case	0.03%	289%	353%	The differences attributed to evaluation using the actual wattages as opposed to a deemed valued presented in the workpaper	None - the Standard program is moving to watts reduced methodology	NA
LED Refrigerated Case Lighting - Open Case	0.39%	97%	103%			

Source: Evaluation analysis.

**Table 7-3. Non-Lighting Measure Level Results**

Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
Existing Digital EMS	28.62%	75%	NA			
Non-Programmable Electronic Thermostat	0.38%	77%	NA			
Non-Programmable Pneumatic Thermostat	12.23%	4%	NA	EMS measure - The realized savings for new EMS projects varies widely ranging from -100% to over 200% of the deemed savings with an average sampling realization rate of 56%. Each project used billing analysis to calculate savings	EMS projects may need more involvement with utility staff to work with the customer to ensure that the advanced controls are programmed and go above and beyond what was being done previously	Medium
Hotel Guest Room Energy Management System (Electric Heat/AC)	2.26%	16%	8%			
Programmable Thermostat	0.75%	126%	NA			
Water Cooled Chiller Centrifugal	0.58%	99%	15%			
Water Cooled Chiller Centrifugal/	0.40%	25%	10%			
Water Cooled Chiller Centrifugal/19XRV	0.88%	20%	7%	Many of the evaluated chiller projects had the demand savings significantly reduced. This reduction is due to a discrepancy in the calculation of demand savings between the Illinois TRM and the ComEd Workpapers. Specifically, the Illinois TRM calculates the peak demand savings based on the difference in the full load efficiency of the installed chiller and a baseline full load efficiency.	Calculate the energy and demand savings for all chiller projects using the approach set forth in the Illinois TRM.	Medium
Water Cooled Chiller Centrifugal/ACW150BT30 44-2	0.37%	23%	2%			
Water Cooled Chiller Centrifugal/Dakin WMC400D	0.79%	0%	0%			
Water Cooled Chiller Centrifugal/YKN8NRK3-DDG	2.49%	102%	4%			
Water Cooled Chiller Reciprocating/Dakin WMC400D	0.78%	0%	0%			

Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
Water Cooled Chiller Scroll/Screw Chiller	2.26%	45%	21%			
Air Compressor with Integrated VSD	3.06%	91%	97%	Evaluation changed the savings methodology to match with TRM v4	None - the difference is addressed in the PY9 version of the ComEd workpapers	NA
New or Retrofit Freezer Display Case w/Doors	3.32%	100%	100%	No comments - Realization rate = 1	NA	NA
Pool Pump VSD	3.00%	127%	69%			
Install VFD on Other Pump	1.37%	230%	NA			
Install VFD on Other Fan	0.82%	0%	0%			
Install VFD on Other Fan	0.82%	0%	0%			
Install VFD on Process Pump	0.76%	251%	NA			
SFA-IGV-BI-Supply Fan - BI w/Inlet Guide Vanes	1.35%	268%	63%	Multiple variable speed drive projects had savings adjusted or a measure disqualified due to the variable speed drive being installed on equipment other than HVAC fans, pumps, or chillers.	Where possible, identify non-HVAC VSDs and route them through the Custom program to determine if they are eligible there.	Medium
SFA-ONF-FC-Supply Fan - FC w/On/Off	0.53%	216%	59%			
SFA-ONF-BI-Supply Fan - Misc w/On/Off	0.36%	0%	0%			
RFA-ONF-FC-Return Fan - FC w/On/Off	0.29%	233%	64%			
CTF-ALL-ALL-Cooling Tower Fan - w/All Types	0.27%	33%	34%			
RFA-IGV-BI-Return Fan - BI w/Inlet Guide Vanes	0.25%	269%	65%			
PM-ALL-ALL-Other Pump - w/All Types	0.11%	112%	126%			



Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
SFA-DD-FC-Supply Fan - FC w/Discharge Damper	0.11%	261%	144%			
RFA-ONF-BI-Return Fan - BI w/On/Off	0.07%	133%	67%			
SFA-ONF-BI-Supply Fan - BI w/On/Off	0.07%	133%	67%			
CDWP-ALL-ALL-Condenser Water Pump - w/All Types	2.82%	99%	67%			
CHWP-MISC-ALL-Chilled Water Pump - w/Other Base Control	2.76%	83%	75%			
WSP-ALL-ALL-Water Supply/Waste Water Pump - w/All Types	0.07%	67%	67%			
Air-Side Economizer	2.80%	0%		Measures were disqualified because the customer already had air-side economizers installed.	The application does provide specifications for the air-side economizer measure. ComEd could consider asking for additional information on baseline conditions for this measure on the application.	Low
New or Retrofit Cooler Display Case w/Doors	2.13%	100%	100%	No comments - Realization rate = 1	NA	NA
Demand-Control Ventilation - Office	1.04%	116%	NA	No comments - Realization rate ~ 1	NA	NA
Reduce/Optimize Air Change per Hour (ACH) Rate - Unoccupied - Chiller	0.80%	100%	100%	No comments - Realization rate ~ 1	NA	Low

Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
Reduce/Optimize Air Change per Hour (ACH) Rate - Occupied - Chiller	0.40%	100%	100%			
Constant Volume to Variable Air Volume Fume Hood - Chiller - 18' - 50-79%	0.73%	100%	100%	No comments - Realization rate = 1	NA	NA
Low Pressure Drop High Efficiency (Non-HEPA) Air Filters	0.64%	100%	100%	No comments - Realization rate = 1	NA	NA
EC motor Reach-In	0.60%	114%	154%	TRM values slightly higher than the ComEd workpaper values	NA	NA
Floating Head Pressure Control - Remote Condenser - Medium Temperature	0.41%	100%	100%	No comments - Realization rate = 1	NA	NA
Anti-sweat control system	0.38%	160%	NA	TRM values slightly higher than the ComEd workpaper values	NA	NA
Strip Curtains - Freezer Door	0.21%	30%	30%	The savings were adjusted using the Illinois TRM method and the actual square footage of the doorways strip curtains were installed on.	None - this issue is addressed in the ComEd PY9 workpapers	NA
Strip Curtains - Cooler Door	0.18%	14%	14%			
EC Motor Walkin	0.20%	98%	121%	No comments - Realization rate ~ 1	NA	NA
Chilled Water Reset Controls - Water-cooled chillers	0.14%	0%	0%	Disqualified due to code.	ComEd might increase review process for projects which may trigger code.	Low
Floating Head Pressure Control - Remote Condenser - Low Temperature	0.09%	100%	100%	No comments - Realization rate = 1	NA	NA

Measure	% of sample savings	kWh Realization Rate	kW Realization Rate	Comments	Recommendation	Priority
Fume Hood Occupancy Controls - Chiller - VAV - 50-79% - 18'	0.09%	100%	100%	No comments - Realization rate = 1	NA	NA
Night Covers - VORCM	0.09%	100%	NA	No comments - Realization rate = 1	NA	NA
Refrigerated Dryer - Digital Scroll	0.07%	0%	0%	Operating as non-cycling dryers	NA	NA
Low Pressure Drop Filters	0.04%	75%	67%	Change in deemed hours value	NA	NA
Refrigerated Dryer - Thermal Mass	0.04%	100%	100%	No comments - Realization rate = 1	NA	NA
PTAC/GE AZ61H09DAB	0.04%	43%	35%	Change in baseline to new construction instead of an existing unit	NA	NA
PTAC/GE AZ61H12DAB	0.03%	91%	73%			
PTAC/PTAC Friedrich #PDE07K3SF	0.02%	71%	49%			
No-Loss Condensate Drains	0.03%	204%	195%	Change from deemed value to TRM methodology	NA	NA
ENERGY STAR Glass Door Refrigerator	0.01%	100%	100%	No comments - Realization rate = 1	NA	NA
Solid Door Freezers - ENERGY STAR	0.00%	100%	100%	No comments - Realization rate = 1	NA	NA

Source: Evaluation analysis.

## Sampling Design (Savings Verification and Research Estimate)

The sample draw for PY8 gross impact evaluation was designed to provide a 90/10 level confidence and relative precision for gross impact realization rate results for lighting measures, non-lighting measures, and the overall program. Strata were defined by project size (separately for lighting and non-lighting projects) based on ex-ante gross energy savings boundaries that placed about one-third of program-level savings into each stratum.

For lighting projects, stratum 1 consisted of large projects with project-level ex-ante energy savings greater than 393,000 kWh, stratum 3 consisted of small projects with ex-ante gross energy savings less than 111,000 kWh, and stratum 2 consisted of the medium sized projects in between. Similarly, for non-lighting projects, stratum 1 consisted of large projects greater than 634,000 kWh, stratum 3 consisted of small projects less than 134,000 kWh, and stratum 2 consisted of the medium sized projects in between.

Sampling was done in two waves that were roughly proportional to the populations they represented. The first wave of sampling was conducted on projects with a status of paid in a March 25, 2016 database extract when the program had completed almost two thirds of the PY8 participation target. The second and final wave of sample projects was drawn from August 19, 2016 tracking system extract of projects paid after the March 25, 2016 extract.

Table 7-4 below provides the sample selection by end-use category and stratification. Overall the sample represented 22 percent (49,931 MWh) of the population ex ante savings of 231,847 MWh. A total of 55 lighting projects were selected, including 50 projects in wave 1 and 5 projects in wave 2. Sixty (60) non-lighting end-use projects were selected including 45 projects in wave 1 and 15 projects in wave 2.

**Table 7-4. Profile of the PY8 Population and Gross Savings Verification Sample by End-Use Strata**

Population Summary					Sample		
Population Group	Sampling Strata	Number of Project (N)	Ex Ante Claimed Gross Savings, MWh	kWh Weights	Number of Project (n)	Ex Ante MWh	Sampled % of Population
Lighting Wave 1&2	1	84	59,535	0.35	19	18,780	32%
	2	286	56,937	0.34	18	2,946	5%
	3	1,579	52,735	0.31	18	860	2%
<b>Lighting Subtotal</b>		<b>1,949</b>	<b>169,206</b>	<b>1.00</b>	<b>55</b>	<b>22,586</b>	<b>13%</b>
Non-Lighting Wave 1&2	1	25	27,102	0.43	19	21,254	78%
	2	73	19,228	0.31	21	5,165	27%
	3	440	16,310	0.26	20	926	6%
<b>Non-Lighting Subtotal</b>		<b>538</b>	<b>62,641</b>	<b>1.00</b>	<b>60</b>	<b>27,345</b>	<b>44%</b>
<b>Program Total</b>		<b>2,487</b>	<b>231,847</b>	<b>1.00</b>	<b>115</b>	<b>49,931</b>	<b>22%</b>

Source: ComEd tracking data and Navigant team analysis.

Table 7-5 below provides a comparison of the population profile to the sample, analyzed by measure technology types for sampled projects that align with end uses. The project count of the sample provides an indication of the end-use distribution of sampled projects due to the weighting approach of sampled projects to develop the population mean for the realization rate. The sample reflects the dominance of lighting.

**Table 7-5. Profile of the PY8 Population and Gross Savings Verification Sample by End-use Type**

Population Summary				Sample			
Population Group	Number of Project (N)	Ex Ante Claimed Gross Savings, MWh	MWh Weights	Number of Project (n)	Ex Ante MWh	Sample MWh Weights	Sampled MWh % of Population
LIGHTING	1,949	169,206	73%	55	22,586	45%	13%
HVAC_VSD	82	9,758	4%	11	3,008	6%	31%
COMP_AIR	9	104	0%	-	-	0%	0%
BUILDING_EMS	200	27,519	12%	20	13,462	27%	49%
IS_VSD	71	6,494	3%	8	1,951	4%	30%
REFRIG	120	6,366	3%	8	2,868	6%	45%
HVAC	28	6,270	3%	6	2,664	5%	42%
OTHER	28	6,130	3%	7	3,393	7%	55%
TOTAL	2,487	231,847	100%	115	49,931	100%	22%

Source: Utility tracking data and Navigant analysis.

Navigant compared the sample building type distribution to the program population to check if the sample reasonably represents the population distribution. Navigant used an iterative approach to draw a sample until we were able to capture a reasonable representation of building type distribution at the conclusion of wave 2. This approach did not support 90/10 gross impact realization rate results at the business type level, but nonetheless provided useful information for the most prominent building types. Details are shown in Table 7-6 below.

**Table 7-6. Profile of the PY8 Population and Gross Savings Sample by Business Type**

Population Group	Gross MWh, Population	Population MWh Weights	Project Count, Sample	Number of Project (n)	Gross MWh, Sample	Sample MWh Weights
Light Industry	201	8%	9	8%	1,925	4%
Heavy Industry	80	3%	6	5%	6,185	12%
Office	285	11%	22	19%	15,873	32%
College / University	40	2%	3	3%	883	2%
Restaurant	254	10%	4	3%	309	1%
Hotel/Motel	54	2%	4	3%	788	2%
Medical	53	2%	4	3%	1,522	3%
Retail/Service	645	26%	19	17%	6,334	13%
Warehouse	248	10%	13	11%	5,187	10%
Grocery	183	7%	14	12%	3,383	7%
K-12 School	51	2%	1	1%	185	0%
Miscellaneous	393	16%	16	14%	7,357	15%
Total	2,487	100%	115	100%	49,931	100%

Source: Utility tracking data and Navigant analysis.

## Engineering Review of Project Files

For each selected project, the M&V team performed an in-depth application review to assess the engineering methods, parameters and assumptions used to generate all ex-ante impact estimates. For

each measure in the sampled project, engineers estimated ex post gross savings based on their review of documentation and engineering analysis.

To support this review, ComEd provided project documentation in electronic format for each sampled project. Documentation included some or all of scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, and vendor proposals), pre-inspection reports and photos (when required), post inspection reports and photos (when conducted), calculation spreadsheets, a project summary report, and important email and memoranda.

### **On-Site Data Collection**

The Monitoring and Verification (M&V) team completed on-site surveys for a subset of 32 of the 115 customer applications sampled, including 14 lighting and 18 non-lighting projects. For most projects on-site sources include interviews that are completed at the time of the on-site, visual inspection of the systems and equipment, EMS data downloads, spot measurements, and short-term monitoring (e.g., less than four weeks).

The M&V team developed an analysis plan for each project selected for on-site data collection. Each plan explains the general gross impact approach used (including monitoring plans), provides an analysis of the current inputs (based on the application and other available sources at that time), and identifies sources that will be used to verify data or obtain newly identified inputs for the ex post gross impact approach.

The engineer assigned to each project first calls to set up an appointment with the customer. During the on-site audit, the engineer collects data identified in the analysis plan, including monitoring records (such as instantaneous spot watt measurements for relevant equipment, measured temperatures, data from equipment logs and EMS/SCADA system downloads), equipment nameplate data, system operation sequences and operating schedules, and, of course, a careful description of site conditions that might contribute to baseline selection.

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

### **Site-Specific Impact Estimates**

After all of the field data is collected, including any monitoring data, the M&V team develops annual energy and demand impacts based on the on-site data, monitoring data, application information, and, in some cases, billing or interval data. Each program engineering analysis is based on calibrated engineering models that make use of hard copy application review and on-site gathered information surrounding the equipment installed through the program (and the operation of those systems).

Energy and demand savings calculations are accomplished using methods that include short-term monitoring-based assessments, simulation modeling (e.g., DOE-2), bin models, application of ASHRAE methods and algorithms, analysis of pre- and post-installation billing and interval data, and other specialized algorithms and models.

For this study, summer peak hours are defined as non-holiday weekdays between 1:00 PM and 5:00 PM Central Prevailing Time (CPT) from June 1 to August 31. Winter peak hours are defined as non-holiday weekdays between 6:00AM and 8:00AM CPT, and between 5:00PM and 7:00PM CPT, from January 1

and February 28. This is in accordance with the PJM manual 18, *PJM Capacity Market*, effective October 16, 2015.<sup>17</sup>

Peak demand savings for both baseline and post retrofit conditions are the average demand kW savings for the 1 PM to 5 PM CPT weekday time period for summer, and 6 AM to 8 AM CPT and 5 PM to 7 PM CPT weekday time period for winter.<sup>18</sup> If this energy savings measure is determined to have weather dependency then the summer peak kW savings are based on the zonal weighted temperature humidity index (WTHI) standard, and the winter peak kW savings are based on the zonal wind speed-adjusted temperature (WWP) standards posted by PJM (there is also PJM Zonal Winter Weather Standards similar to summer WTHI). The zonal WTHI and WWP are the mean of the zonal WTHI values or WWP values on the days in which PJM peak load occurred in the past sixteen years (1998-2014). This mean ComEd WTHI value is 81.6 demand savings for summer is the difference in kW between the baseline and post retrofit conditions. Similarly, the ComEd WWP value is 14.5 demand savings for winter is the difference in kW between the baseline and post retrofit conditions.

After completion of the engineering analysis, the M&V team prepares a site-specific draft impact evaluation report that summarizes the M&V plan, the data collected at the site, and all of the calculations and parameters used to estimate savings. Each draft site report underwent engineering review and comment, providing feedback to each assigned engineer for revisions or other improvements. Each assigned engineer then revised the draft reports as necessary to produce the final site reports.

## Research Evaluation Findings for the Gross Impact Sample

The results of the on-site M&V and engineering file reviews determined the measure-level verified gross savings for the sampled projects. The findings for adjustments made to the research savings are summarized below.

1. Evaluation team identified 11 non-lighting projects had either a measure disqualified due to code non-compliance or the entire project was verified with negative ex post savings. The results affected the stratified and weighted research findings gross savings realization rate for non-lighting sample (89 percent). Details of the ineligible measures are outlined in Table 7-7 below.
2. The M&V team made changes to custom engineering calculations in those cases where the measures were not deemed by the TRM (v4.0).
3. In 13 of the 115 sampled projects the difference between the verified and research energy savings was greater than 7 percent. The vast majority of the difference in research and verified savings is due to using actual metered data found while on-site. The overall hours of operation or full load hours found on-site were slightly less than assumptions made in the work papers or TRM (v4.0) in PY8.
4. Other adjustments made are similar to the verified savings (see Table 7-2 and Table 7-3).

**Table 7-7. Navigant Comments on Projects with Zero Savings**

Project Number	Measure Description	Major Issue
26593	Non-Programmable Pneumatic Thermostat	DQed - EMS does not control equipment
28094	Air-Side Economizer	DQed - Had Airside economizers before
28094	CDWP-ALL-ALL-Condenser Water Pump - w/All Types	DQed - Code triggered and VSD required
28094	Chilled Water Reset Controls - Water-cooled chillers	DQed - Code triggered and controls required

<sup>17</sup> Manual 18b, page 65-67: (<https://www.pjm.com/~media/documents/manuals/m18.ashx>)

<sup>18</sup> The Winter Weather Standard is the dry bulb temperature adjusted (by 0.5 °F) for wind speed above 10 mph. The measurements were for Hour Ending 19:00 on RTO peak days."

Project Number	Measure Description	Major Issue
28094	CHWP-MISC-ALL-Chilled Water Pump - w/Other Base Control	DQed - Code triggered and VSD required
28094	CTF-ALL-ALL-Cooling Tower Fan - w/All Types	DQed - Code triggered and 2-speed motor at min required
28094	Water Cooled Chiller Reciprocating/Dakin WMC400D	DQed - Doesn't meet code requirements
28095	Air-Side Economizer	DQed - Had Airside economizers before
28095	CDWP-ALL-ALL-Condenser Water Pump - w/All Types	DQed - Code triggered and VSD required
28095	Chilled Water Reset Controls - Water-cooled chillers	DQed - Code triggered and controls required
28095	CHWP-MISC-ALL-Chilled Water Pump - w/Other Base Control	DQed - Code triggered and VSD required
28095	CTF-ALL-ALL-Cooling Tower Fan - w/All Types	DQed - Code triggered and 2-speed motor at min required
28095	Water Cooled Chiller Centrifugal/Dakin WMC400D	DQed - Doesn't meet code requirements
28324	Pool Pump VSD	DQed - Not Pool pumps. They are booster pumps for water slides and lazy river. VSDs don't modulate
29325	CTF-ALL-ALL-Cooling Tower Fan - w/All Types	DQed - Not HVAC VSDs - installed on refrigerated warehouse
29325	SFA-ONF-BI-Supply Fan - Misc w/On/Off	DQed - Not HVAC VSDs - installed on evaporator fans in refrigerated warehouse
31265	CTF-ALL-ALL-Cooling Tower Fan - w/All Types	DQed - This is a new cooling tower and by code must have a 2-speed fan which is not an eligible baseline for this measure.
31388	Install VFD on Other Fan	DQed - Not defined by the work papers and is not an HVAC fan.
28973	VSDs and Non-Programmable Pneumatic Thermostat	Multi-variable linear regression analysis using multiple variables to model energy usage of facility. Energy consumption was then modeled using TMY3 weather data. Total weather-normalized model showed energy consumption decreased -867,381 kWh from pre-installation levels, representing -5.9% of annual pre-install facility use.
29260	Existing Digital EMS	Bills show increased usage, producing 739,368 negative savings. Navigant allocates zero savings in the post verification findings.
30748	Existing Digital EMS	The total weather-normalized model showed that energy consumption decreased -23,044 kWh from pre-installation levels

Source: Utility tracking data and Navigant analysis.

DQed means disqualified

## Research Findings Realization Rate for the PY8 Standard Program

The M&V team used a stratified ratio estimation technique to estimate evaluation research findings gross energy savings for the Standard program. The research findings use all available data collected through M&V to make a gross savings estimate, without being constrained by algorithms or assumptions defined in the Illinois TRM. The stratified ratio estimation technique follows the steps outlined in the California Evaluation Framework<sup>19</sup>. These steps are matched to the stratified random sampling method that was used to create the sample for the program savings verification effort. A standard error was used to estimate the error bound around the estimate of evaluation research findings gross energy savings realization rate. The research findings gross realization rates and relative precision at 90 percent confidence interval for lighting and non-lighting end-uses are summarized in Table 7-8 below.

<sup>19</sup> TecMarket Works, et al., *The California Evaluation Framework*, Chapter 13, Sampling. June 2004



**Table 7-8. Research Finding Gross kWh Realization Rates and Relative Precision at 90% Confidence Level**

Population Group	Sampling Strata	Mean kWh RR	Relative Precision at 90% Level of Confidence $\pm$ %	Mean KW RR	Relative Precision at 90% Level of Confidence $\pm$ %
Lighting	1	1.14	18%	0.93	8%
	2	1.10	28%	0.99	13%
	3	1.06	10%	1.00	16%
<i>Lighting Overall</i>		1.10	10%	0.97	7%
Non-Lighting	1	0.69	29%	0.61	28%
	2	0.98	33%	0.35	43%
	3	1.12	39%	0.40	67%
<i>Non-Lighting Overall</i>		0.89	20%	0.43	26%
PY8 Program Overall		1.05	9%	0.83	7%

Source: Utility tracking data and Navigant analysis.

## Research findings:

1. The savings verification and research findings results share the same evaluation adjustments on the following parameters: eligibility, quantities, business type, and measure type. They differ on these evaluation adjustments: savings per eligible unit installed. Where the verification savings per unit relies on deemed values and ComEd savings documentation, the research findings incorporate all available site-specific data gathered and evaluation engineering judgments to estimate the actual savings at each site evaluated. This research data includes customer interviews, spot measurements, analysis of equipment trend data, short term metering and data logging, and engineering review of equipment specifications. On some measures where site data was not collected (generally the file review sample), the research findings often concluded the deemed value or DNV GL PY8 work papers provided the best available assumptions.
2. The research findings has higher gross realization rate on energy savings for lighting end-use (1.10) when compared with savings verification (1.05) because lighting hours of use on some projects were slightly higher than the deemed assumption, based on metering from on-site visits. Other adjustments were made to baseline assumptions based on additional information found on-site or in the project files. This research-based adjustment was not applied in the savings verification estimate of TRM measures.
3. The research findings estimate a higher realization rate on energy savings for the non-lighting end-use (0.89) when compared with savings verification (0.86) for reasons including using trend data analysis for some eligible HVAC variable speed drive measures and regression modelling for some EMS decreased the energy savings below deemed estimates.
4. Our estimate of the research findings realization rate estimate on peak demand reduction for lighting (1.97) was slightly higher to the savings verification realization rate (0.96), this is from adjustments to quantity and space type.
5. We estimated a slightly higher research realization rate on peak demand reduction for non-lighting (0.43) when compared with savings verification peak demand reduction realization rate (0.41) due to the net sum of lower evaluation research adjustments on several measures, primarily HVAC variable speed drives and chillers. Generally, the low demand reduction is due to

a discrepancy in the calculation of demand savings between the Illinois TRM and the ComEd work papers for chillers.

### 7.1.2 Trade Ally and Contractor Spillover

The evaluation team conducted spillover research with the Standard program participating Trade Ally (TA) and contractors. The primary objective of the spillover analysis was to determine the program's influence on non-incented installations of energy efficient measures.<sup>20</sup> The spillover study provides an update to the TA spillover estimate last generated in PY6 as part of Cross-Cutting C&I portfolio research. For this PY8 effort, the Navigant team followed the approach for estimating program spillover that the team developed as part of PY6 Cross-Cutting Evaluation Research,<sup>21</sup> with one revision to the algorithm made to meet requirements of the Illinois Statewide NTG Methodologies (IL-NTG Methods), documented in Version 5.0 of the Illinois Technical Reference Manual (TRM).<sup>22</sup> The PY8 TA spillover estimate therefore follows the current recommended Core Non-Residential Spillover Protocol.

The evaluation team used an internet survey of PY8 TAs and contractors to gather data for this evaluation. We identified spillover candidates through questions asked in the survey and determined savings for qualifying projects to develop a quantitative estimate of spillover, relative to total PY8 savings. The spillover method captures spillover as reported by TAs and contractors, which may include spillover at PY8 participant facilities and at non-participant facilities. Table 7-9 summarizes the spillover survey results and resulting PY8 spillover value.

For survey respondents who completed projects that qualified for spillover, we quantified savings from the reported spillover installations, calculated a spillover rate among all survey respondents, and extrapolated the spillover rate back to the population to estimate total SO savings in PY8. Dividing TA and contractor SO by the total PY8 savings produces a spillover rate (2.0 percent) that is normalized to the entire Standard program and recommended for inclusion in a prospectively applied NTG ratio.

---

<sup>20</sup> Spillover refers to energy savings caused by the presence of an energy efficiency program that is not captured by the program. The IL-NTG Methods define spillover as, "... energy savings associated with energy-efficient equipment installed by consumers who were influenced by an energy efficiency program, but without direct intervention (e.g., financial or technical assistance) from the program."

<sup>21</sup> "C&I Cross-Cutting Evaluation PY6 C&I Spillover Report." Presented to Commonwealth Edison Company [June 17, 2015].

<sup>22</sup> Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 5.0, Volume 4: Cross-Cutting Measures and Attachments, effective June 1<sup>st</sup>, 2016.

**Table 7-9. Summary of PY8 Trade Ally and Contractor Spillover Results**

	Standard Program Spillover for Future Application
<b>PY8 TA and Contractor Survey Sample Results</b>	
Completed Internet Surveys	120
# of Responding TAs and Contractors with Spillover	19
Estimated Spillover among Survey Respondents (in MWh)	1,380
Spillover as % of Responding TA and Non-TA Contractor Savings	2.2%
<b>Estimated Spillover for All Standard Program TAs and Contractors</b>	
Estimated Spillover (in MWh)	4,691
Estimated Spillover as % of PY8 Gross Savings	2.0%
<i>Spillover among TAs only</i>	<i>1.8%</i>
<i>Spillover among contractors only</i>	<i>0.2%</i>

*Source: Evaluation Team analysis.*

The remainder of this Appendix details spillover elicitation methods and quantitative estimation approaches.

## 7.1.2.1 Spillover Elicitation Methods

As noted above, we collected data for this research using a web survey of participating TAs and contractors. The spillover portion of the web survey asked a series of questions to determine whether projects completed by TAs and contractors qualified as spillover.

The TA and contractor web survey asked a series of questions to determine if any high efficiency installations completed by respondents outside of the Standard program qualified as spillover. We considered non-incented high efficiency installations of equipment by TAs and contractors to be PY8 spillover if the six conditions listed in Table 7-10 were met.

**Table 7-10. PY8 Standard Program Trade Ally Spillover Evidence from the Trade Ally Web Survey**

Qualifier	Description	Conditions to satisfy qualifier
1	The percentage of the Trade Ally's installations that are high efficiency <u>and/or</u> the total volume of high efficiency installations increased since the contractor became a trade ally.	SO1d = 2 or 3, AND/OR SO1e = 2 or 3
2	The Trade Ally rated the SIFYB program as important to at least one of these increases.	SO2c = 8, 9 or 10 AND/OR SO3c = 8, 9 or 10
3	The Trade Ally installed at least some high efficiency equipment in PY6 that did not receive an incentive.	SO4c > 0% OR (SO4c = 998 and SO6a = 1)
4	The Trade Ally's recommendation was influential in the customers' choice of high efficiency equipment over standard efficiency equipment in instances where equipment qualified for, but did not receive an incentive from ComEd.	SO7a = 8, 9, 10
5	The open-ended response about why customers with eligible projects do not receive an incentive does not contradict findings from other qualifiers that the non-incented high efficiency installations can be considered spillover.	SO7b supports that the non-incented high efficiency installations can be considered spillover.
6	<i>Supplemental qualifier to account for unique features of the PY8 program that are not likely to influence spillover in future years.</i> The open-ended response about why customers with eligible projects do not receive an incentive does not indicate that the non-incented high efficiency installations are due to either the Standard Program not having available funding or due to the wait list.	SO7b does not indicate that the non-incented high efficiency installations are due to either lack of program funding or the PY8 wait list.

Source: Evaluation analysis.

## Qualifier 1 Question

- SO1. Since you [DISPLAY IF trade\_ally\_flag=1 "became a Smart Ideas trade ally"] [DISPLAY IF trade\_ally\_flag=0 "started completing Smart Ideas projects"], have any of the following aspects changed and if so, by how much? [1= Did not increase; 2= Increased Somewhat; 3= Increased Greatly]
- d The percentage of jobs in which you install high efficiency equipment in ComEd's service territory
  - e The total volume of high efficiency equipment you install in ComEd's service territory

## Qualifier 2 Questions

[ASK SO2a if SO1d=2 or 3; ASK SO3a if SO1e=2 or 3]  
 SO2a/SO3a. Did the Smart Ideas Standard program (including the program incentive and any training, information or other support that the program provided) contribute at all to this increase? [1=Yes; 2=No; 8=Don't Know]

[ASK SO2c IF SO2a=1 or 8; ASK SO3c if SO3a=1 or 8]  
 SO2c/SO3c. On a scale of 0 to 10, where 0 is "not at all important" and 10 is "very important," how important was the SMART IDEAS STANDARD PROGRAM in this increase? [SCALE 0-10; 98=Don't know]

## Qualifier 3 Questions

SO4. *Approximately what percentage of your total equipment installations (in terms of dollars) was... (Please provide your best estimate, if unsure of exact percentages.) [0% TO 100%; 998=DON'T KNOW]*

- a *Standard Efficiency*
- b *High Efficiency – that DID RECEIVE an incentive from ComEd*
- c *High efficiency - that DID NOT RECEIVE an incentive from ComEd*

*[ASK IF SO4c=998]*

SO6a. *In the last year, did any of your customers in ComEd's service territory install equipment that was eligible for a ComEd Smart Ideas incentive but that did NOT receive an incentive? [1=Yes; 2=No; 8=Don't Know]*

## Qualifier 4 Question

SO7a. *How influential was your recommendation on your customers' choice of high efficiency equipment over standard efficiency equipment? (0= Not at all influential; 10= Very influential) [SCALE 0-10; 98=Don't know]*

## Qualifier 5 Question

SO7b. *Why do you think that customers' projects that qualify for an incentive choose not to participate in the Smart Ideas Standard program? [OPEN END]*

We coded open-ended responses to SO7b to determine whether the participant's answers conflicted with findings from other qualifiers that the project is spillover. Based on this value we either retained or excluded respondent's additional projects from spillover calculations.

Table 7-10 summarizes survey responses and identifies why trade allies did not qualify for PY8 spillover, based on the first five qualifiers outlined above.

**Table 7-11. Summary of Trade Ally and Contractor Survey Responses and PY8 Spillover Results (Count of TAs and Contractors)**

	Total	Trade Allies	Contractors
<b>Completed Interviews</b>	<b>120</b>	<b>99</b>	<b>21</b>
Respondent did not experience increase in percentage or total volume of high efficiency installations	-26	-22	-4
Program did not have significant influence on the increase in high efficiency installations (rating of <8, on a scale from 0 to 10)	-18	-14	-4
<b>Program had a significant influence on the increase in percentage or total volume of high efficiency installations (rating of 8, 9, or 10, on a scale from 0 to 10)</b>	<b>76</b>	<b>63</b>	<b>13</b>
All installed high efficiency equipment received an incentive	-29	-21	-8
<b>Installed at least some eligible equipment that did not receive an incentive</b>	<b>47</b>	<b>42</b>	<b>5</b>
Respondent's recommendation was not influential on customers' choice of non-incented high efficiency equipment (rating of <8, on a scale from 0 to 10)	-9	-8	-1
<b>Respondent's recommendation was influential on customers' choice of non-incented high efficiency equipment (rating of 8, 9 or 10, on a scale from 0 to 10)</b>	<b>38</b>	<b>34</b>	<b>4</b>
Open-ended response contradicted that the non-incented high efficiency installations can be considered spillover (e.g., not an electric savings project installed in ComEd territory; project did not actually move forward; other rationales)	-11	-11	0
<b># of Respondents with Spillover</b>	<b>27</b>	<b>23</b>	<b>4</b>
<b>Estimated Spillover (in MWh)</b>	<b>2,903</b>	<b>2,715</b>	<b>187</b>
<b>Spillover as % of Respondent Savings</b>	<b>4.5%</b>	<b>4.9%</b>	<b>2.2%</b>
<b>Spillover as % of Verified PY8 Gross Savings (representative of PY8 only)</b>	<b>4.2%</b>	<b>3.8%</b>	<b>0.4%</b>

## Supplemental Qualifier 6 Question

*SO7b. Why do you think that customers' projects that qualify for an incentive choose not to participate in the Smart Ideas Standard program? [OPEN END]*

Nearly one-third of TAs and contractors whose non-incented projects qualified for spillover reported that they completed these projects outside of the program due (in full or part) to the funding shortfall in PY8 and associated wait list. The evaluation team included those projects in the PY8 spillover estimate, but a spillover rate which includes PY8 wait-listed projects completed outside the program is not likely to reflect spillover rates in years where there is no wait list. To provide the program with a spillover rate that can be used for prospective application, we developed an additional qualifier (#6) that adjusts the PY8 spillover rate—based on qualifiers 1 through 5—downward such that it only captures spillover savings related to core program features (e.g., TA trainings and webinars, the TA web portal, and marketing materials).

To be retained in the prospective spillover estimate, the respondent's open-ended response to question SO7b could *not* indicate that the non-incented high efficiency installations were completed outside of the program due to either the Standard program not having available funding or due to the wait list. Spillover associated with routine Standard program procedures (e.g., pre-approval processes) was retained in full for both the PY8 and prospective spillover estimates (100 percent). Participants reporting that the wait list or funding shortfall was one of several contributors to the non-incented installations were retained at partial credit (50%), and participants attributing the PY8 spillover fully to wait list issues were not retained (0%). The table below summarizes adjustments to the PY8 spillover rate for prospective application.

Table 7-12. Adjusted Spillover Results for Future Application (Count of TAs and Contractors)

	Total	Trade Allies	Contractors
<b># of Respondents with PY8 Spillover</b>	<b>27</b>	<b>23</b>	<b>4</b>
Supplemental Qualifier. Open-ended response indicated that the non-incented high efficiency installations were due in full to the unique aspects of the PY8 Standard Program not expected to persist in future years or to impact future spillover (lack of program funding, wait list)	-8	-7	-1
<b># of Respondents with Spillover Not Solely Due to the PY8 Wait List*</b>	<b>19</b>	<b>16</b>	<b>3</b>
<b>Estimated Spillover (in MWh)</b>	<b>1,380</b>	<b>1,278</b>	<b>102</b>
<b>Spillover as % of Respondent Savings</b>	<b>2.2%</b>	<b>2.3%</b>	<b>1.2%</b>
<b>Spillover as % of Verified PY8 Gross Savings (for Prospective Application)</b>	<b>2.0%</b>	<b>1.8%</b>	<b>0.2%</b>

Notes: \*Includes 15 participants whose spillover is attributable to core Standard program factors and 4 respondents who attributed spillover savings to a mix of core program factors and the PY8 wait list and funding shortfall. The latter 4 respondents receive 50% credit for spillover as detailed above.

### 7.1.2.2 Estimation of Spillover Savings

For the TAs and contractors that met the five main qualifying conditions (see Table 7-10, above), we determined savings from the respondent's non-incented high efficiency installations using Equation 7-1 below. Data inputs to this formula are from the online survey and the PY8 program tracking database; they are further described below.

#### Equation 7-1

$$\text{Savings of Non-Incented High Efficiency Equipment} = \frac{1 - \% \text{ Eligible Equipment Installations That Received Incentive}}{\% \text{ Eligible Equipment Installations That Received Incentive}} * \text{Savings from Program Database} * \text{Size Adjustment}$$

#### Percentage of Eligible Equipment Installations That Received Incentive

We used survey questions SO4b and SO4c to determine the share of high efficiency installations that received an incentive (Equation 7-2).

3.

#### Equation 7-2

$$\% \text{ of Eligible Equipment Installations That Received Incentive} = \frac{6. \text{ SO4b}}{7. \text{ SO4b} + \text{SO4c}}$$

### Questions

SO4. Approximately what percentage of your total equipment installations (in terms of dollars) was... (Please provide your best estimate, if unsure of exact percentages.) [0% TO 100%; 998=DON'T KNOW]

- a Standard Efficiency
- b High Efficiency - that DID RECEIVE an incentive from ComEd
- c High efficiency - that DID NOT RECEIVE an incentive from ComEd

If the respondent was unable to provide the percentage of total equipment installations that was high efficiency and did not receive an incentive, we used responses from questions SO6a and SO6b as well as the number of projects in the PY8 database to estimate this percentage (Equation 7-3).<sup>23</sup>

### Equation 7-3

$$\% \text{ of Eligible Equipment Installations That Did Not Receive Incentive} = \frac{10. \text{ SO6b}}{11. \text{ SO6b} + \text{Number of PY8 projects from Program Database}}$$

### Questions

SO6a. In the last year, did any of your customers in ComEd's service territory install equipment that was eligible for a ComEd Smart Ideas incentive but that did NOT receive an incentive?

- 1. Yes
- 2. No
- 8. Don't know

[ASK IF SO6a=1]

SO6b. Approximately, how many of your projects in ComEd's service territory last year were eligible for a ComEd Smart Ideas incentive but did not receive an incentive?

If the respondent was unable to SO6a and/or SO6b, we assumed the percentage of eligible installations that did not receive an incentive was equal to the average percentage among all respondents (44%).

### Size Adjustment

High efficiency projects that did not receive an incentive may not be of the same size as those that did receive an incentive. We therefore developed an adjustment to account for this possibility. We adjusted the average size of a respondent's projects in the PY8 database up or down using responses to survey questions SO8a, SO8b, and SO8c, as shown in Table 7-13 below.

<sup>23</sup> If the respondent said none of their customers were eligible for an incentive but did not receive the incentive [SO6a], we set SO6b to 0.



**Table 7-13. Size Adjustment for Non-Incented, High Efficiency Installations**

Non-incented, high efficiency projects are ... compared to incented ones (SO8a)	How much smaller/larger? (SO8b/SO8c)	Analysis Adjustment Value
Smaller	Less than a quarter of the size	12.5%
	A quarter of the size	25%
	Half the size	50%
	Three quarters of the size	75%
	More than three quarters of the size	87.5%
	Don't Know	29% (Average of all respondents SO8a = "Smaller")
About the Same Size	n/a	100%
Larger	Less than one and a quarter times the size	112.5%
	One and a quarter times the size	125%
	One and a half times the size	150%
	One and three quarters times the size	175%
	Twice the size	200%
	More than twice the size	212.5%
Don't Know	Don't know	188% (Average of all respondents SO8a = "Larger")
	Don't Know	77% (Average of all respondents)

## Questions

SO8a. In terms of cost, how large are projects that qualify for an incentive but did NOT receive one? Would you say they are...

1. Smaller than projects that received an incentive
2. About the same size as projects that received an incentive
3. Larger than projects that received an incentive
8. Don't know

[ASK IF SO8a=1]

SO8b. Approximately, how much smaller would you say are high efficiency projects that DID NOT receive a Smart Ideas incentive compared to projects that DID receive a Smart Ideas incentive?

1. More than three quarters of the size
2. Three quarters of the size
3. Half the size
4. A quarter of the size
5. Less than a quarter of the size
8. Don't know

[ASK IF SO8a=3]

SO8c. Approximately, how much larger would you say are eligible projects that DID NOT receive a Smart Ideas incentive compared to projects that DID receive a Smart Ideas incentive?

1. Less than one and a quarter times the size
2. One and a quarter times the size
3. One and a half times the size

## 7.2 Survey Instruments

### ComEd PY8 Standard Program Evaluation Participating Trade Ally Internet Survey FINAL

#### 7.2.1.1 Background

The evaluation team will field this survey with ComEd trade allies and contractors that participated in the ComEd Standard Program during PY8. The three primary goals of this survey are to:

- Access the level of spillover due to the program's effects on participating trade ally representatives' business practices
- Understand the impact of the program's waitlist process on participating trade ally representatives' business practices
- Assess the participant trade ally representatives' overall satisfaction with the ComEd Standard Program during PY8

We will administer this survey as an internet survey.

#### 7.2.1.2 Sample Variables

NAME	The name of the trade-ally or contractor contact-person that is listed in the ComEd database
trade_ally_flag ally	Flag for whether the contact-person completed projects as a trade ally
company_name	The name of the company that is listed in the ComEd database
COUNT	The number of projects that the contact-person completed
Customer_Company_Name1	The name of the customer with the highest savings attributable to contact-person
Customer_Company_Name2	The name of the customer with the 2 <sup>nd</sup> highest savings attributable to contact-person
Customer_Company_Name3	The name of the customer with the 3 <sup>rd</sup> highest savings attributable to contact-person
Customer_Company_Name4	The name of the customer with the 4 <sup>th</sup> highest savings attributable to contact-person
Customer_Company_Name5	The name of the customer with the 5 <sup>th</sup> highest savings attributable to contact-person

#### 7.2.1.3 Variables Calculated in the Survey

TOTAL_%	Variable to verify that respondent's answers in SO4 sum to 100%
TOTAL_%_2	Variable to verify that respondent's answers in Q5 sum to 100%

## 7.2.1.4 Landing Page

Thank you for agreeing to participate in this survey about ComEd's Smart Ideas for Your Business Standard Program. We are interested in your personal experiences with the program and the impact it may have had on the work that you complete at <company\_name>. ComEd will use the information from this survey to improve the energy efficiency programs and services it offers to its business customers.

All responses will remain confidential and will only be reported in aggregate with other responses.

If you experience any technical issues with this survey, please contact Opinion Dynamics, the company administering this survey, at [\[CONTACT DETAILS\]](#).

## 7.2.1.5 Screening/Background

- SC1. Our records indicate that you completed approximately <COUNT> project(s) [\[DISPLAY IF trade\\_ally\\_flag=1 "as a trade ally"\]](#) through ComEd's Smart Ideas for Your Business Standard (formerly known as Prescriptive) Program between June 2015 and May 2016.

Our records indicate that [\[DISPLAY IF COUNT >5 "some of"\]](#) your project(s) were completed for the following customers:

Customer Company Name
<Customer_Company_Name1>
<Customer_Company_Name2>
<Customer_Company_Name3>
<Customer_Company_Name4>
<Customer_Company_Name5>

Do you recall completing these [\[DISPLAY IF COUNT >5 ", and other,"\]](#) project(s) [\[DISPLAY IF trade\\_ally\\_flag=1 "as a trade ally"\]](#) at <company\_name>?

1. Yes
2. No
8. Don't know

### [\[ASK IF SC1=2 or 8, ELSE SKIP TO SC4\]](#)

- SC2. Is there someone else within <company\_name> who might know more about these Smart Ideas Standard Program project(s)?

1. Yes
2. No [\[THANK AND TERMINATE\]](#)

### [\[ASK IF SC2=1\]](#)

- SC3. We would like to contact the person who is knowledgeable about these projects completed through your company for the Smart Ideas Standard Program. Could you give us this person's name and email address?

1. Yes [\[SPECIFY, THANK AND TERMINATE\]](#)
2. No [\[THANK AND TERMINATE\]](#)

- SC4. How many years has <company\_name> completed projects [\[DISPLAY IF trade\\_ally\\_flag=1 "as a trade ally"\]](#) through ComEd's Smart Ideas Standard Program?

1. Less than a year
2. One year

3. Two years
4. Three years
5. Four years
6. Five years or more
8. Don't know

SC5. How many years have you worked at <company\_name> [DISPLAY IF trade\_ally\_flag=1 "as a trade ally in"] [DISPLAY IF trade\_ally\_flag=0 "and completed projects through"] ComEd's Smart Ideas Standard Program?

1. Less than a year
2. One year
3. Two years
4. Three years
5. Four years
6. Five years or more
8. Don't know

## 7.2.1.6 Spillover

The next few questions are about the influence of the Smart Ideas Standard Program on the projects that you complete.

SO1. Since you [DISPLAY IF trade\_ally\_flag=1 "became a Smart Ideas trade ally"] [DISPLAY IF trade\_ally\_flag=0 "started completing Smart Ideas projects"], have any of the following aspects changed and if so, by how much?

		1 - Did not Increase	2 - Increased Somewhat	3 - Increased Greatly
A	Your knowledge of high efficiency options	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B	Your comfort level in discussing the benefits of high efficiency with your customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C	The percentage of sales situations in which you recommend high efficiency equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D	The percentage of jobs in which you <u>install</u> high efficiency equipment in ComEd's service territory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E	The total volume of high efficiency equipment you <u>install</u> in ComEd's service territory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[ASK IF ANY IN SO1d-e=2 OR 3, ELSE SKIP TO PROCESS MODULE]

[ASK IF SO1d=2 or 3, ELSE SKIP TO SO3A]

You noted that the **PERCENTAGE OF JOBS** in which you install high efficiency equipment has increased.

SO2a. Did the Smart Ideas Standard Program (including the program incentive and any training, information, or other support that the program provided) contribute at all to this increase?

1. Yes
2. No
8. Don't know

[ASK IF SO2a=1]

SO2b. In what ways did the Smart Ideas Standard Program contribute to this increase? [OPEN END]

[ASK IF SO2a=1]

SO2c. On a scale of 0 to 10, where 0 is “not at all important” and 10 is “very important,” how important was the **SMART IDEAS STANDARD PROGRAM** in this increase? [SCALE 0-10; 98=Don't know]

SO2d. Did any other factors, not related to the program, contribute at all to this increase? (Other factors might include changes in codes and standards, customers requesting specific equipment, increased customer awareness, federal tax rebates and credits).

1. Yes
2. No
8. Don't know

[ASK IF SO2d=1]

SO2e. What other factors contributed to this increase? [OPEN END]

[ASK IF SO2d=1]

SO2f. On a scale of 0 to 10, where 0 is “not at all important” and 10 is “very important,” how important were these other factors in this increase? [SCALE 0-10; 98=Don't know]

[ASK IF SO1e=2 or 3, ELSE SKIP TO SO4]

You noted that the **TOTAL VOLUME OF HIGH EFFICIENCY EQUIPMENT** you install in ComEd's service territory has increased.

SO3a. Did the Smart Ideas Standard Program (including the program incentive and any training, information or other support that the program provided) contribute at all to this increase?

1. Yes
2. No
8. Don't know

[ASK IF SO3a=1]

SO3b. In what ways did the Smart Ideas Program contribute to this increase? [OPEN END]

[ASK IF SO3a=1]

SO3c. On a scale of 0 to 10, where 0 is “not at all important” and 10 is “very important,” how important was **the SMART IDEAS STANDARD PROGRAM** (including the program incentive and any training, information or other support that the program provided) in this increase? [SCALE 0-10; Don't know]

SO3d. Did any other factors, not related to the program, contribute at all to this increase? (Other factors might include changes in codes and standards, customers requesting specific equipment, increased customer awareness, federal tax rebates and credits.)

1. Yes
2. No
8. Don't know

[ASK IF SO3d=1]

SO3e. What other factors contributed to this increase? [OPEN END]

[ASK IF SO3d=1]

SO3f. On a scale of 0 to 10, where 0 is “not at all important” and 10 is “very important,” how important were these other factors in this increase? [SCALE 0-10; Don't know]

For the next question, please think about all of your jobs in ComEd's service territory between June 1, 2015 and May 31, 2016.

SO4. Approximately what percentage of your total equipment installations (in terms of dollars) was standard efficiency versus high efficiency?

*Standard efficiency products meet the Federal minimum standard for energy consumption, but are no more energy-efficient than the standard requires.*

*Remember, please think about your jobs in ComEd's service territory between June 1, 2015 and May 31, 2016*

Please provide your best estimate, if unsure of exact percentages. [0% TO 100%; 998=DON'T KNOW]

- a. Standard Efficiency
- b. High Efficiency - that DID RECEIVE an incentive from ComEd
- c. High Efficiency - that DID NOT RECEIVE an incentive from ComEd

[CALCULATE "TOTAL %" SO4a+SO4b+SO4c]; IF NONE OF SO4a-c=998, show error message if TOTAL<>100%: The equipment breakdown you just provided sums to <TOTAL%>%. Please revise your answer so that it sums to 100%. If you are unable to provide an estimate for a particular equipment type, please select 'don't know'.

[ASK IF SO4c=998]

SO6a. In the last year, did any of your customers in ComEd's service territory install equipment that was eligible for a ComEd Smart Ideas incentive but that did NOT receive an incentive?

- 1. Yes
- 2. No
- 8. Don't know

[ASK IF SO6a=1]

SO6b. Approximately, how many of your projects in ComEd's service territory last year were eligible for a ComEd Smart Ideas incentive but did not receive an incentive? [NUMERIC OPEN END; 998=DON'T KNOW]

[SKIP TO PROCESS MODULE, IF SO4b=0% OR 100% OR SO4c=0% OR 100% OR SO6a=2,8]

For the following questions, please think about the [SHOW IF SO4c<>998: SO4c% of] installations you completed in ComEd's service territory that were HIGH EFFICIENCY BUT THAT DID NOT RECEIVE AN INCENTIVE from ComEd.

SO7a. How influential was your recommendation on your customers' choice of high efficiency equipment over standard efficiency equipment?

Not at all Influential 0	1	2	3	4	5	6	7	8	9	Very Influential 10
--------------------------------	---	---	---	---	---	---	---	---	---	---------------------------

SO7b. Why do you think that customers' projects that qualify for an incentive choose not to participate in the Smart Ideas Standard Program? [OPEN END]

SO8a. In terms of cost, how large are projects that qualify for an incentive but did NOT receive one? Would you say they are...

- 1. Smaller than projects that received an incentive
- 2. About the same size as projects that received an incentive
- 3. Larger than projects that received an incentive
- 8. Don't know

## [ASK IF SO8a=1]

SO8b. Approximately, how much smaller would you say are high efficiency projects that DID NOT receive a Smart Ideas incentive compared to projects that DID receive a Smart Ideas incentive?

*For example, if the average cost of high efficiency projects that did NOT receive an incentive is \$15,000 and the average cost of projects that DID receive an incentive is \$20,000, your answer would be  $\$15,000 / \$20,000 = 75\%$ , or "three quarters of the size".*

1. More than three quarters of the size
2. Three quarters of the size
3. Half the size
4. A quarter of the size
5. Less than a quarter of the size
8. Don't know

## [ASK IF SO8a=3]

SO8c. Approximately, how much larger would you say are eligible projects that DID NOT receive a Smart Ideas incentive compared to projects that DID receive a Smart Ideas incentive?

*For example, if the average cost of high efficiency projects that did NOT receive an incentive is \$25,000 and the average cost of projects that DID receive an incentive is \$20,000, your answer would be  $\$25,000 / \$20,000 = 125\%$ , or "one and a quarter times the size".*

1. Less than one and a quarter times the size
2. One and a quarter times the size
3. One and a half times the size
4. One and three quarters times the size
5. Twice the size
6. More than twice the size
8. Don't know

### 7.2.1.7 Process – Wait List

The next series of questions is about the application wait list that ComEd used for the Smart Ideas Standard Program between July 2015 and May 2016. The wait list was a first-come, first-serve list based on the date ComEd received Smart Ideas for Your Business project pre-approval applications.

### Exposure to Wait List

Q1a. Before this survey, were you aware that there was a wait list for ComEd's Smart Ideas Standard Program between July 2015 and May 2016?

1. Yes
2. No
8. Don't know

## [SKIP TO P0 IF Q1a=2,8]

Q1b. Which, if any, of the following options describe how you learned about the Smart Ideas Standard program wait-list? [MULTIPLE CHOICE; ROTATE]

1. An email from ComEd
2. Mail from ComEd
3. The ComEd Trade Ally web portal
4. A ComEd webinar or training
5. "The Wire," the ComEd newsletter for Trade Allies
6. Word of mouth
7. Information on the Smart Ideas for Your Business application form
00. Some other way, specify: \_\_\_\_\_ [OPEN END]

Q2. To the best of your knowledge, about how many of your projects were wait-listed between July 2015 and May 2016?

1. None of them (0%)
2. Some of them (1% to 50%)
3. Most of them (51% to 99%)
4. All of them (100%)
8. Don't Know

[SKIP TO P0 IF Q2=1,8]

Q3. How would you rate your overall satisfaction or dissatisfaction with the wait list process?

Strongly dissatisfied 0	1	2	3	4	5	6	7	8	9	Strongly satisfied 10
-------------------------------	---	---	---	---	---	---	---	---	---	-----------------------------

Q4. Below are a few statements about the wait list process. For each statement, please indicate your level of agreement. [ROTATE]

Strongly disagree 0	1	2	3	4	5	6	7	8	9	Strongly agree 10	Not Applicable 96
---------------------------	---	---	---	---	---	---	---	---	---	-------------------------	-------------------------

- a. The wait list process was clearly communicated to me.
- b. The wait list process was easy for my customers to understand.
- c. The wait list process was easy for me to understand.
- d. It was easy for me to participate in the Smart Ideas Standard program while the wait list was in effect.
- e. The wait list process was communicated to me in a timely fashion.
- f. I felt well informed about the status of my wait-listed projects.

[ASK IF Q4b or Q4c <7]

Q4cc. Based on some of your previous responses, the wait list process was not that easy to understand. Please explain why. [OPEN END]

[ASK IF Q4d <7]

Q4dd. Based on your previous response, the wait list process may have presented some barriers to your participation in the Smart Ideas Standard Program. Please explain why. [OPEN END]

[ASK IF Q4a or Q4e or Q4f <7]

Q4ee. Based on your previous response, communications about the wait list process may not have been very clear or timely. Please explain why. [OPEN END]



## APPENDIX A. IMPACT OF WAIT LIST

Q5. To the best of your knowledge, of your customers' wait-listed projects, what percent were: [OPEN  
END 0% TO 100%; Q5\_1, Q5\_2, Q5\_3 MUST SUM TO 100%]

- A. Never completed
- B. Completed with a ComEd program incentive
- C. Completed without a ComEd program incentive
- DK. Don't Know

[CALCULATE "TOTAL\_%\_2" Q5\_1+Q5\_2+Q5\_3]; IF NONE OF Q5=998, show error message if  
TOTAL<>100%: The percentage of your customers' wait-listed projects you just provided sums to  
<TOTAL\_%\_2>%. Please revise your answer so that it sums to 100%. If you are unable to provide an  
estimate for a particular equipment type, please select 'Don't Know'.

- Q6. For this question, please first think about your typical involvement with the Smart Ideas Standard Program. Relative to this typical involvement with the program, which of the following changes did you make as a result of the wait list? Please check all that apply. [ROTATE]
- 01. Developed materials for our customers specifically about the wait list process
  - 02. Promoted the program to fewer customers
  - 03. Promoted the program to only certain types of customers
  - 04. Submitted fewer pre-approval applications
  - 05. Submitted more program applications within the first 3 months of the program year to get on the waitlist earlier
  - 06. Checked on project application status more frequently
  - 07. Attended more ComEd trainings
  - 00. [DO NOT ROTATE] Changed something else, SPECIFY

### 7.2.1.8 Process – Web Portal

We are now going to ask you a few questions about the marketing and promotion materials for the Smart Ideas for Your Business program.

P0. Please look at the following screenshot of the ComEd trade ally web portal. If you are taking this survey on a mobile phone, scroll left and right to see the whole image.

smart ideas

CURRENT

THE WEB SITE FOR SMART IDEAS TRADE ALLIES

HOME

CONTRACTORS

DISTRIBUTORS

ENGINEERING FIRMS

DESIGN FIRMS

PROJECT STATUS

MARKETING AND EVENTS

Login

HOME

Programs

[Standard Incentives](#)
[Custom Incentives](#)
[BILD Program](#)
[Business Products](#)
[Discounts Program](#)
[Small Business](#)
[Industrial Systems](#)
[Retro-Commissioning](#)
[New Construction](#)

What's New

[Comprehensive Energy Savings](#)
[Training and Events](#)

Wire Newsletter

[Wire Newsletter](#)
[Sign Up for The Wire](#)

The ComEd Smart Ideas® Energy Efficiency program offers a suite of services and incentives to help business customers reach their energy efficiency goals. Trade allies are [contractors](#), [distributors](#), and [engineering and design](#) firms that help ComEd customers implement energy efficiency improvements and apply for energy efficiency program incentives. Trade allies integrate these incentives into their business models, adding value that can increase sales. A company interested in becoming a trade ally has multiple opportunities to participate.

There are many benefits to being a trade ally. Trade allies receive training and networking opportunities, marketing materials and a company listing in the searchable [Trade Ally directory](#) on the ComEd web site. Some programs pay incentives directly to trade allies for energy assessments, technical assistance or other services provided to customers. Other programs pay incentives to customers to reduce the cost of energy efficiency improvements, making customers more likely to proceed with the work.

Want to learn how you can become a trade ally? Click on the tab above that best describes your business to find out which programs are right for you. You can also jump directly to programs using the links on your left.

LinkedIn



ComEd marketing is promoting the energy efficiency program on [LinkedIn](#). If your company uses social media, we encourage you to follow ComEd and share the content with your customers and colleagues as a way to promote your own business. If you're not using social media yet, sharing our content is an easy way to get started.

Documents

[PY9 Program Overview \(PDF\)](#)
[Trade Ally Brochure \(PDF\)](#)
[Trade Ally Application \(PDF\)](#)
[Trade Ally Disciplinary Process \(PDF\)](#)
[Smart Meters FAQ](#)

Helpful Links

[ComEd Energy Efficiency Program](#)
[www.ComEd.com/BizIncentives](#)
[Illinois DCEO](#)
[www.IllinoisEnergy.org](#)

Contact Us

ComEd Energy Efficiency Program

700 Commerce Dr., Suite 330

Oak Brook, IL 60523

Phone: 855-433-2700

Fax: 630-480-3438

[SmartIdeasBiz@ComEd.com](mailto:SmartIdeasBiz@ComEd.com)

Privacy Statement

© Commonwealth Edison Company, 2016

The ComEd Energy Efficiency Program is funded by ComEd in compliance with Illinois law.

ComEd

powering lives

An Exelon Company

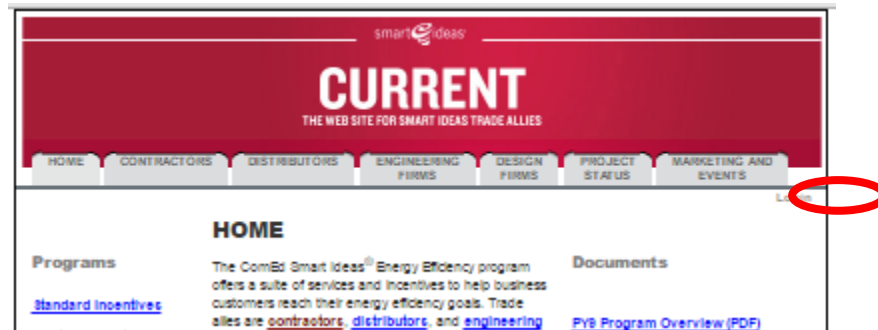
Have you seen this website before?

1. Yes

2. No

[ASK IF P0=1]

P1. Thinking of the program year between June 2015 and May 2016, did you ever log into the ComEd trade ally web portal?



01. Yes
02. No
03. Not sure

[ASK IF P01= 1 OR P1=1 ELSE SKIP TO S1]

P2a. Thinking of the program year between June 2015 and May 2016, did you ever use the ComEd trade ally web portal for any of the following reasons? Please check all that apply. [MULTIPLE RESPONSE, UP TO 10] [ROTATE] [ANCHOR 00 and 98 LAST]

01. To submit project pre-approval forms
02. To check project pre-approval
03. To check project wait list status
04. To check rebate processing status
05. To find back-issues of "The Wire" Newsletter
06. To find contact information for ComEd staff
07. To learn about the different Smart Ideas for Your Business programs
08. To find trainings and events
09. To get copies of application forms or worksheets
00. For some other reason, SPECIFY: \_\_\_\_\_
98. Not sure

[ASK IF P2a=02]

P2b. For the typical Smart Ideas project that you completed between June 2015 and May 2016, about how often did you log in to the ComEd trade ally web portal to check on project **pre-approval** status?

1. About once per project
2. Between 2 and 3 times per project
3. Between 4 and 5 times per project
4. More than 5 times per project
8. Not Sure

[ASK IF P2a=03]

P2c. For the typical Smart Ideas project that you completed between July 2015 and May 2016, about how often did you log in to the ComEd trade ally web portal to check on project **wait-list** status?

1. About once per project
2. Between 2 and 3 times per project
3. Between 4 and 5 times per project
4. More than 5 times per project
8. Don't Know

[ASK IF P2a=04]

P2d. For the typical Smart Ideas project that you completed between June 2015 and May 2016, about how often did you log into the ComEd trade ally web portal to check on project **incentive processing** status?

1. About once per project
2. Between 2 and 3 times per project
3. Between 4 and 5 times per project
4. More than 5 times per project
8. Don't Know

[ASK IF P2a <> 98]

P3. How would you rate your overall satisfaction or dissatisfaction with your ability to do the following on the ComEd trade ally web portal. . .?

Strongly dissatisfied 0	1	2	3	4	5	6	7	8	9	Strongly satisfied 10
-------------------------------	---	---	---	---	---	---	---	---	---	-----------------------------

[LIST RESPONSES FROM P2a]

P4. How, if at all, could ComEd improve the Trade Ally web portal? [Open End]

## 7.2.1.9 Process – Overall Program Satisfaction

S1. How would you rate your overall satisfaction or dissatisfaction with the following?

Strongly dissatisfied 0	1	2	3	4	5	6	7	8	9	Strongly satisfied 10
-------------------------------	---	---	---	---	---	---	---	---	---	-----------------------------

- a. The measures offered by the Smart Ideas Standard Program
- b. The incentive amounts offered by the Smart Ideas Standard Program
- c. The amount of time it takes you to complete project paperwork
- d. Communication with Smart Ideas Standard program staff
- e. Training from Smart Ideas Standard program staff
- f. ComEd's marketing and promotional efforts

S2a. Do you plan to participate [DISPLAY IF trade\_ally\_flag=1 "as a Trade Ally"] in the Smart Ideas for Your Business Standard Program again in the future?

1. Yes
2. No

8. Unsure

[ASK IF S2a = 2]

S2b. Why do you not plan to participate in the Smart Ideas for Your Business Standard Program in the future? [OPEN END]

[ASK IF S2a = 8]

S2c. Why are you unsure whether you will participate in the Smart Ideas for Your Business Standard Program in the future? [OPEN END]

S3. How satisfied or dissatisfied are you with your participation in the Smart Ideas Standard Program overall?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied or dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
8. Don't Know

## 7.2.1.10 Firmographics

You are almost done. The last few questions are general questions about your company.

F1. What is your business category? Select all that apply.

01. Contractor
02. Engineering
03. ESCO or Energy Service Company
04. Equipment Vendor
05. Architect
06. Manufacturer
07. Equipment Distributor
00. Other [SPECIFY]
98. Don't Know

F2a. What type of equipment, if any, is your company's area of expertise? Select all that apply.

[MULTIPLE RESPONSE]

01. Lighting
02. HVAC
03. Refrigeration
04. Motors
05. Food service
00. Other [SPECIFY]
96. No area of expertise
98. Don't Know

[ASK IF F2a HAS MULTIPLE RESPONSES]

F2b. What is the MAIN area of expertise?

01. Lighting
02. HVAC
03. Refrigeration
04. Motors
05. Food service
00. Other [SPECIFY]
98. Don't Know

- F3. Approximately how many TOTAL COMMERCIAL OR INDUSTRIAL PROJECTS does your company implement in a typical year in ComEd's service territory? [NUMERIC OPEN END, 1-9000; 9998=Don't know]
- F4. Would you consider your company to be local, regional, national, or international in size?
1. Local
  2. Regional
  3. National
  4. International
  8. Don't Know
- F5. What are the key business sectors your company serves? Select all that apply. [MULTIPLE RESPONSE]
1. K-12 School
  2. College/University
  3. Grocery
  4. Medical
  5. Hotel/Motel
  6. Light Industry
  7. Heavy Industry
  8. Office
  9. Restaurant
  10. Retail/Service
  11. Warehouse
  12. Property Management/Real Estate
  13. Government
  14. Commercial
  00. Other [SPECIFY]
  98. Don't Know
- O1. Do you have any final thoughts about your experience [DISPLAY IF trade\_ally\_flag=1 "serving as a Trade Ally"] in the ComEd Smart Ideas for Your Business Standard Program that you would like to share? If so, feel free to share them in the space below. [OPEN END, 2=I don't have anything else I would like to share]

## 7.2.1.11 Final Screen

This concludes this survey. Thank you again for your participation! Gift cards to the first 35 respondents will be awarded based on the date and time this survey is submitted. To be eligible to receive a \$50 gift card, please provide your name, phone number, and mailing address:

Note that by choosing not to provide your contact information, you are opting not to receive the gift card.

Your Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Street Address: \_\_\_\_\_

Zip Code: \_\_\_\_\_

City: \_\_\_\_\_

Please click the SUBMIT button to submit your responses.

[Respondents will be directed to the ComEd trade ally website]

<https://www.comed.com/tradeally>