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Industrial Systems Optimization Program
PY7 Evaluation Report

FINAL

Energy Efficiency/Demand Response Plan:
Plan Year 7
(6/1/2014-5/31/2015)

Presented to
Commonwealth Edison Company

April 8, 2016

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Acknowledgements This report has benefited strongly from the contributions of Michaels Energy staff who performed the fieldwork and related data analysis for each sampled project.

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E. Executive Summary

This report presents a summary of the findings and results from the impact evaluation of Commonwealth Edison Company's (ComEd) program year seven (PY7)[1] Industrial System Optimization Program. The Industrial Systems Optimization Program started in PY4 with compressed air systems and has expanded over the past three years to include process cooling and industrial refrigeration systems. The Industrial Systems Optimization Program offers a combination of technical assistance and financial incentives. Technical assistance includes an industrial systems study which assesses the performance of the facility's industrial compressed air, process cooling, and refrigeration systems to ensure efficient, economical operation. The study examines the systems' operating characteristics to help identify cost-effective energy saving measures, using a combination of capital investment and low or no cost measures.

E.1. Program Savings

Table E-1 summarizes the electricity savings from the Industrial Systems Optimization Program.

Table E-1. PY7 Total Program Electric Savings

Savings Category	Energy Savings (MWh)	Peak Demand Savings (MW)
Ex-Ante Gross Savings	17,608	2.281
Verified Gross Savings	15,089	2.202
Verified Net Savings	10,261	1.498

Source: ComEd tracking data and evaluation team analysis.

Based on the gross impact sample size of 10 projects in PY7, the evaluation results yielded an energy gross realization rate of 0.86 and a peak demand gross realization rate of 0.97. The relative precision for the gross impact results at a one-tailed 90 percent confidence level is plus or minus 10 percent for the energy realization rate and plus or minus 17 percent for the peak demand realization rate. To calculate verified net savings, the evaluation team used a deemed net-to-gross ratio (NTGR) of 0.68 for energy savings in accordance with the Illinois Stakeholder Advisory Group (SAG)-approved values. The deemed net-to-gross ratio (NTGR) of 0.68 for energy and demand savings is based on the PY5 NTG analysis. The evaluation research findings NTG ratio for future use is 0.80 for kWh and 0.81 for kW.

[1] The PY7 program year began June 1, 2014 and ended May 31, 2015.

E.2. Results Summary

Table E-2 summarizes the key metrics from PY7.

Table E-2. PY7 Results Summary

Participation	Units	PY7
Net Savings	MWh	10,261
Net Demand Reduction	MW	1.498
Gross Savings	MWh	15,089
Gross Demand Reduction	MW	2.202
Program Energy Realization Rate	%	0.86
Program Demand Realization Rate	%	0.97
Program NTG Ratio †	#	0.68
Projects Completed	#	25

Source: ComEd tracking data and Evaluation team analysis.
† Source: ComEd_NTG_History_and_PY7_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.3. Impact Estimate Parameters for Future Use

The evaluation team conducted NTG research on the PY7 participants. Those parameters are eligible for deeming for future program years. Table E-3 below includes the evaluation team's recommended NTGRs and spillover parameters for future use.

Table E-3. Impact Estimate Parameters for Future Use

Parameter	Value	Data Source
Energy Savings NTGR	0.80	PY7 Evaluation Research
Peak Demand Savings NTGR	0.81	PY7 Evaluation Research
Spillover	0	PY7 Evaluation Research

Source: Evaluation team analysis

E.4. Findings and Recommendations

The PY7 gross realization rate for the Industrial Systems Optimization Program of 0.86 for energy is lower compared to values from the evaluation of the PY5 and PY6 programs. The energy realization rates for PY6 and PY5 were 0.95 and 0.88, respectively. The PY7 project-level gross realization rates for energy ranged from 0.24 to 1.21. The two largest projects in the sample had project-level realization rates around 80% and it resulted in the low program-level gross realization rate for energy. There were also couple of projects with gross energy realization rates of less than 50%. The chief causes of the low realization rates were adjustments to ex-ante assumptions, normalizing the pre and post data and excluding data that does not represent standard operation.

Overall, the program team did a good job of ensuring all the implemented measures were installed and operating as planned. The program team continues to collect site specific pre- and post-metered data for all projects. There is room for improvement for this program and the evaluation findings and recommendations include strategies to provide for more accurate estimation of ex-ante savings.

Gross Impacts

Finding 1. For Project 20021, the ex-ante baseline for several measures did not appear to capture standard operating conditions.

Recommendation 1. Make sure that the assumptions used for establishing baseline and efficient cases represent typical operation under current conditions. Carefully review data to verify that modeled equipment operation is consistent with observed conditions.

Finding 2. For Project 26239, the ex-ante analysis used the Compressed Air Express Workbook to determine savings even though post-retrofit logged data was available.

Recommendation 2. The spreadsheet tool is a reasonable, simple method for estimating savings due to compressed air demand reduction. It appears to be particularly useful for estimating savings during the investigation phase of compressed air system audits and simplifies savings estimates. However, if logged data is available, model calibration should be performed to ensure proper characterization of compressed air system operations. The availability of logged data represents a significant investment in time and expense during the incentive process. By leveraging and analyzing this data, the program will be able to improve the accuracy of savings estimates in the future.

Finding 3. The evaluation team adjusted the savings for the projects 18970, 20820, and 29486 as the pre- and post-conditions were not being normalized in each case.

Recommendation 3. Normalizing for the output of the equipment being analyzed and its power between the pre-case and post-case conditions is favored over production normalizing. If production information is sufficiently granular and a strong correlation can be established between production and power or energy use by the equipment being examined, normalizing for production is also acceptable.

1 Introduction

1.1 Program Description

The ComEd Smart Ideas for Your Business program provides incentives for business customers who upgrade their facilities with energy efficient equipment. This incentive program is available to all eligible, nonpublic, commercial and industrial customers in ComEd's service territory. ComEd's Smart Ideas for Your Business suite of energy efficiency programs includes an Industrial Systems Optimization Program. This program offers comprehensive studies of compressed air systems, industrial refrigeration systems, or process cooling systems.

The Industrial Systems Optimization portion of ComEd's Smart Ideas for Your Business Program included only compressed air systems in PY4. In PY5, the Industrial Systems Optimization Program was expanded to include the study of process cooling systems and industrial refrigeration systems, which continued through PY6 and PY7.

The Industrial Systems Optimization Program offers a combination of technical assistance and financial incentives. Technical assistance includes an industrial systems study which assesses the performance of the facility's industrial compressed air system, process cooling system and refrigeration system to ensure efficient, economical operation. This service examines the system's operating characteristics to help identify energy saving measures, using a combination of capital investments and low or no cost measures. In addition to the study, ComEd provides a one-time incentive to cover the costs of the equipment and installation of the Implementation Bundle. For the compressed air projects, the implementation bundle includes compressed air leak repair, installation of no-loss condensate drains, installations of high-efficiency air nozzles, and optimization of compressor operation controls. In addition to this, other measures not part of the Implementation Bundle may be eligible for a one-time incentive of $0.07 per annual kWh saved after proper implementation of recommendations identified through the Industrial Systems Optimization Program. Recommendations from the study are not eligible for any other ComEd incentive. Eligible annual kWh savings are determined through measurement and verification activities. The total incentive cannot exceed 100 percent of the total implementation costs and 100 percent of the total incremental costs for improvements recommended in the study.

The Industrial Systems Program also started offering the Compressed Air Leak Repair Program and the Compressed Air Express program. As part of the Compressed Air Leak Program, ComEd provides up to $12/hp incentive for leak survey and repairs. The Express program targets the smaller capacity systems and it offers measures like air leaks, no-loss drains, air nozzles, pressure reduction, controls optimization, outdoor air intake, LP drop filters, Variable Speed Drive (VSD) compressors, dew point optimization and adding blower air knives.

1.2 Evaluation Objectives

The evaluation team identified the following key researchable questions for PY7:

1.2.1 Impact Questions

1. Estimate the gross impacts from the program.
2. Identify opportunities for improvement to program impact calculations and estimates.
3. Estimate the net impacts from the program.
4. Provide up-front evaluation input for large or complex projects before the program finalizes applications and pays incentives.

2 Evaluation Approach

Program Year 7 (PY7) represents the third full year of implementation for the Industrial Systems Optimization Program. For the PY7 evaluation, the evaluation team developed gross program impact results based on detailed M&V analysis for nine projects and one other through desk review. PY7 NTGR used in the body of this report are deemed by SAG. The evaluation team then multiplied the verified gross savings estimates by the SAG deemed NTGR to determine the verified net energy and peak demand savings.

Self-reported data from surveys for eighteen projects informed net-to-gross ratio (NTGR) results for future use. For NTG purposes, the evaluation team aimed for a census of 25 projects and ultimately was able to complete telephone surveys for 18 of the 25 projects.

2.1 *Overview of Data Collection Activities*

The core data collection activities included on-site audits and desk reviews in support of gross impact analysis, and telephone surveys in support of NTG analysis. The full set of data collection activities is shown in the following table.

Table 2-1.Primary Data Collection Activities

What	Who	Target Completes	Completes Achieved	When	Comments
Onsite M&V Audit	Participants	~3	9	August – November 2015	Sampled projects from Stratum 1 and 2.
Desk Reviews	Participants	~7	1	August – November 2015	Strata 3 Project. Reviews include engineer conducted telephone interviews.
Telephone Survey	Participants	Census (25 participants)	18	October – November 2015	Data collection supporting NTG research analysis.
Telephone Survey	Technical Service Providers	Census (11 TSPs)	8	September – November 2015	Data collection supporting NTG research analysis.

2.2 *Verified Savings Parameters*

The following table presents the parameters that were used in the verified gross and net savings calculations and indicates which were examined through evaluation activities and which were deemed.

Table 2-2. Verified Savings Parameter Data Sources

Gross Savings Input Parameters	Data Source	Deemed † or Evaluated?
Gross Energy Savings Realization Rate	PY7 Analysis	Evaluated
Gross Peak Demand Savings Realization Rate	PY7 Analysis	Evaluated
kWh Net-to-Gross Ratio (NTGR)	SAG †	Deemed
kW Net-to-Gross Ratio (NTGR)	SAG †	Deemed
Net Energy Savings	PY7 Analysis	Evaluated
Net Peak Demand Savings	PY7 Analysis	Evaluated

† Source: ComEd_NTG_History_and_PY7_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

2.2.1 Verified Gross Program Savings Analysis Approach

The objective of the gross program savings evaluation is to verify the veracity and accuracy of the PY7 ex-ante gross savings estimates in the Industrial Systems Optimization Program tracking system. The PY7 evaluation activities included on-site M&V analysis for nine projects and desk reviews for one project. The savings reported for the completed PY7 projects were evaluated using the methods outlined directly below.

On-site data collection included verification of measure installation, system operation and specific details of any variation between observed ex-ante and ex post findings. On-site audits also entailed collection of customer-stored data to support downstream M&V calculations. Measurement data obtained from the sites, including spot measurements, run-time hour data logging, and post-installation interval metering. The information collected on-site was used to calibrate site-specific analyses. Customer-supplied data from energy management systems (EMS) or supervisory control and data acquisition (SCADA) systems were also obtained when available.

Desk reviews involved review of project documentation provided by the program, an engineering review of the algorithms and an audit of ex-ante calculation models used by the program to estimate energy and peak demand savings. The engineering audit of program calculations determined if the inputs for the program calculations were reasonable and acceptable or if they needed any revisions based on evaluation findings. In addition to the desk review, the evaluation team completed telephone interview with the site contacts and the information collected during the interviews was used to verify the savings estimates. The evaluation team asked the site contact to provide post-installation operating data electronically. The evaluation used that information collected to inform savings calculations.

The evaluation team performed engineering calculations to derive verified gross kWh and kW savings based on data collected during the on-site visit or the desk review process. The team included in the engineering reviews a preliminary judgment to identify those assumptions with higher uncertainty or potential to influence the program savings estimates. The team used data obtained from the sampled sites to verify measure installation, determine installed measure characteristics, assess operating hours and relevant modes of operation, identify the characteristics of the replaced equipment, support the selection

of baseline conditions and perform ex-post savings calculations. The peak kW savings calculation methodology the evaluation used was consistent with PJM peak summer demand requirements[2] for each project. The final step involved discussion of project-level results with the implementation teams and ComEd's program staff to ensure that both the evaluation team and the implementation teams are in agreement about their understanding of the project scope and details.

The evaluation team then estimated verified gross savings for each sample site and, using sample weights, extrapolated from the sample to the population to calculate verified gross savings for the population. Additional details on the sampling approaches are provided below.

2.2.2 Verified Net Program Savings Analysis Approach

The primary objective of the net savings analysis was to determine the program's net effect on customers' electricity usage. After gross program impacts have been assessed, net program impacts are calculated by multiplying verified gross savings by the net-to-gross ratio (NTGR). The NTGR represents the percentage of the gross program impacts that can be attributed to the program. The NTG values were deemed for PY7 through a SAG consensus process supported by past evaluation research. The PY7 evaluation effort included research to estimate NTG values for future use (See Section 6.1.2 in the Appendix for complete details).

Table 2-3. Verified Net Savings Parameters

Input Parameters	Value	Deemed or Evaluated?
Energy Savings NTGR	0.68	Deemed (derived from PY5 evaluation results and includes 0.01 for spillover)
Peak Demand Savings NTGR	0.68	Deemed (derived from PY5 evaluation results and includes 0.01 for spillover)

Source: ComEd_NTG_History_and_PY7_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

Verified net energy and coincident peak demand savings were calculated by multiplying the verified gross savings estimates by the deemed NTGR. In PY7, the NTGR values used to calculate the verified net savings are based on a NTGR derived from research conducted for a census of projects completed by the program during PY5. The NTGR evaluation results from PY5 are 0.68 for both kWh and kW.

2.3 Sampling

2.3.1 Gross Impact (M&V) Sample

The Evaluation team extracted data from the ComEd's tracking database on July 12, 2015 that contained data for all the completed projects in PY7. Of the 25 projects in the population, one company was responsible for completing two projects; one compressed air and one process cooling. The Evaluation team divided the program population into three size-based sampling strata as shown in Table 2-4 below. The number of projects is presented by strata, along with ex-ante gross kWh claimed and ex-ante gross kW claimed.

[2] PJM defines the coincident summer peak period as 1:00-5:00 PM Central Prevailing Time on non-holiday weekdays, during the months of June through August.

The evaluation team used a stratified random sampling approach to select the gross impact sample of 10 projects. Projects were sorted and placed in three strata using ex-ante savings kWh. Table 2-4 provides a profile of the gross impact sample in comparison with the program population. The sample consisted of 10 applications, responsible for 11,959 MWh and represented 68 percent of the program population's ex-ante impact claim. The ex-ante based kWh sample weights for the three sampling strata are shown below.

Table 2-4. PY7 Gross Impact Sample by Strata

Sampling Strata	Population Summary				Gross Impact Sample		
	Number of Tracking Records (N)	Ex-Ante MWh Impact Claimed	MWh Weights	Ex-Ante MW	Number of Tracking Records (n)	Ex-Ante MWh	Sampled % of Population kWh
1	2	6,184	0.35	1.093	2	6,184	100%
2	6	5,906	0.34	0.585	4	4,197	71%
3	17	5,517	0.31	0.603	4	1,578	29%
TOTAL	**25**	**17,608**	**-**	**2.281**	**10**	**11,959**	**68%**

Source: Evaluation Team analysis based on ComEd tracking database, July 12, 2015.

2.3.2 Net Impact Sample

Per the evaluation plan, the target for the participant and technical service providers' surveys were census attempts for the Industrial Systems Optimization program in PY7. Data from these surveys were in support of the Net-to-Gross component of the evaluation. Table 2-5 summarizes the participating customer telephone interviews completed in support of the PY7 NTG research efforts. The completed interviews represent 12,961 MWh or 74 percent of the ex-ante impact claim for the total program population.

Out of the 25 participants in PY7, telephone surveys were conducted with 18. The remaining 7 participants were not interviewed either because the evaluation team was unable to reach anyone willing to complete a survey after multiple attempts or the people involved in the decision making process no longer worked for the business.

Table 2-5. PY7 Net Impact Sample by Strata

Sampling Strata	Population Summary			Completed Interviews		
	Number of Tracking Records (N)	Ex-Ante MWh Impact Claimed	MWh Weights	Number of Tracking Records (n)	Ex-Ante MWh	Sampled % of Population MWh
1	2	6,184	0.35	2	6,184	100%
2	6	5,906	0.34	3	2,632	45%
3	17	5,517	0.31	13	4,145	75%
TOTAL	**25**	**17,608**	**-**	**18**	**12,961**	**74%**

Source: Evaluation Team analysis

A census attempt was made for interviewing the Technical Service Providers (TSPs) associated with PY7 Industrial Systems Optimization projects. Of the 11 unique PY7 TSPs the evaluation team was able to complete interviews with 8 of them.

2.4 Process Evaluation

The evaluation team did not conduct a process evaluation in PY7 and placed priority on the net and gross impact evaluation efforts to optimize the use of evaluation budgets. The evaluation team conducted process evaluations for PY4 and PY5 and findings have been stable from year-to-year. Further, the program did not change significantly in PY7.

3 Gross Impact Evaluation

The evaluation team reviewed ComEd's tracking data extract to determine reported PY7 ex-ante gross savings. The verified gross program impacts for the evaluation for the Industrial Systems Optimization Program were developed based on on-site M&V analysis for nine sites and engineering desk reviews for one project.

3.1 Tracking System Review

ComEd provided the evaluation team with direct access to their on-line tracking system and data for evaluation purposes. The on-line system was easy to work with and provided viewing access to the project tracking data and downloading rights to project documentation in electronic format for each project. This documentation was complete and greatly facilitated the evaluation efforts.

3.2 Gross Program Impact Parameter Estimates

The evaluation team developed the gross program impacts based on on-site visits and detailed M&V analysis for nine projects and thorough engineering desk reviews supported with telephone interviews for one project. The verified gross impact results for PY7 are shown in Table 3-1 below.

Table 3-1. Verified Gross Savings Parameters

Gross Savings Input Parameters	Value	Deemed ‡ or Evaluated?
Energy Savings Realization Rate	0.86	Evaluated
Peak Demand Savings Realization Rate	0.97	Evaluated

Source: Evaluation Team analysis.

3.3 Development of the Verified Gross Realization Rate

There are two basic statistical methods for combining individual gross realization rates from the sample projects into an estimate of verified gross kWh savings for the population when stratified random sampling is used. These two methods are called "separate" and "combined" ratio estimation.[3] In the case of a separate ratio estimator, a separate gross kWh savings realization rate is calculated for each stratum and then combined. In the case of a combined ratio estimator, a single gross kWh savings realization rate is calculated directly without first calculating separate gross realization rates by stratum.

The evaluation team used the separate ratio estimation technique to estimate verified gross impacts for the Industrial Systems Optimization Program. This is because the separate ratio estimation technique

[3] A full discussion and comparison of separate vs. combined ratio estimation can be found in Sampling Techniques, Cochran, 1977, pp. 164-169.

follows the steps outlined in the California Evaluation Framework[4] which identified best practices in program evaluation. These steps are matched to the stratified random sampling method that was used to create the sample for the program. The standard error was used to estimate the error bound around the estimate of verified gross impacts.

3.4 Verified Gross Program Impact Results

Based on the gross impact sample size of 10 projects in PY7, the evaluation results yielded a gross energy realization rate of 0.86 and a gross demand realization rate of 0.97. The resulting total program verified gross savings is 15,089 MWh and 2,202 kW as shown in Table 3-2

Table 3-2. Gross Parameters and Savings Estimates

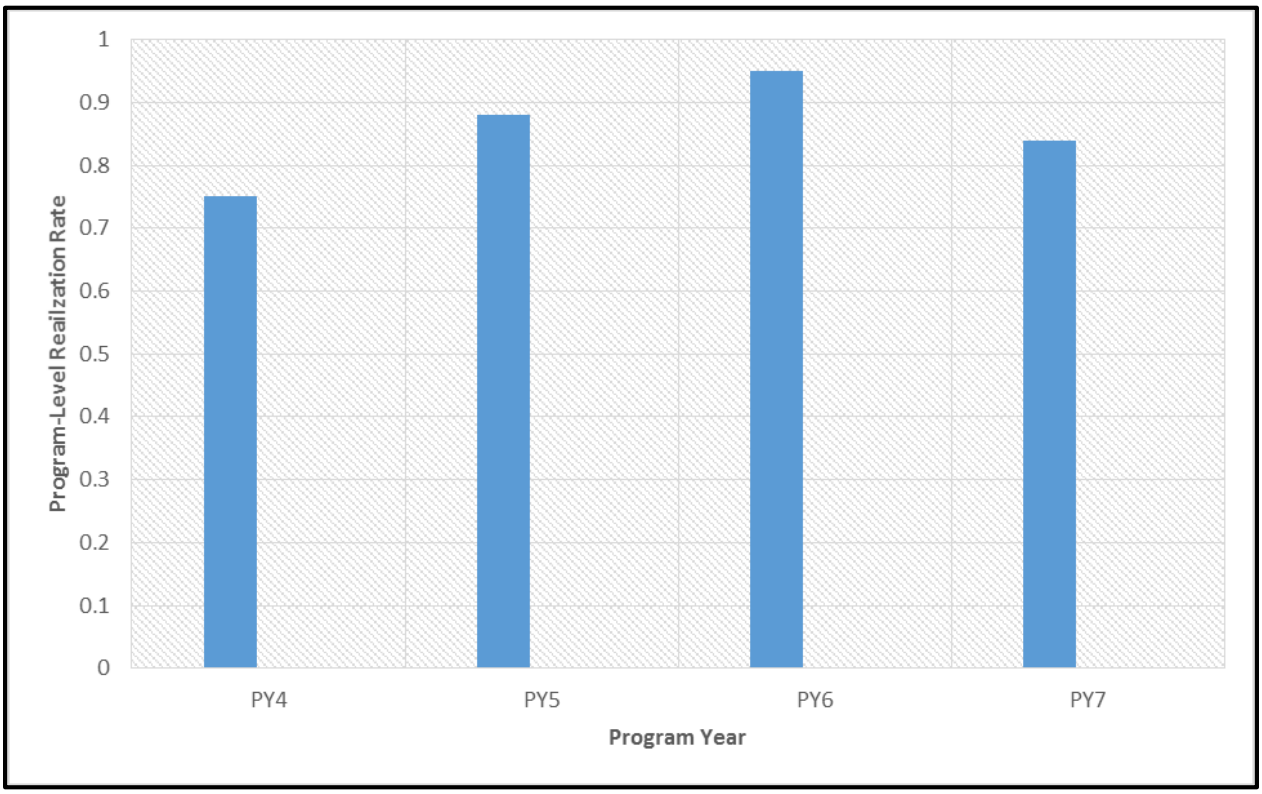
Sampling Strata	Ex-Ante MWh	Evaluation Verified MWh	MWh RR	Ex-Ante MW	Evaluation Verified MW	kW RR
1	6,184	4,485	0.73	1.093	0.832	0.76
2	5,906	6,116	1.04	0.585	0.700	1.20
3	5,517	4,488	0.81	0.603	0.671	1.11
PY7 TOTAL	**17,608**	**15,089**	**0.86**	**2.281**	**2.202**	**0.97**

Source: Evaluation Team analysis.

Figure 3-1 below compares the overall program-level energy realization rates over the last four years. At the program level, the energy realization rate of 0.86 is down after trending upwards in the previous evaluation periods. The reason for the low energy realization rate is due to adjustments by the evaluation team for some of the projects. For three projects, incorrect assumptions were made regarding to the operation of the systems. Savings were adjusted for two projects because the pre and post data had not been normalized to ensure equivalent loading conditions. Savings for one project were adjusted because the post case data collected did not represent the standard equipment operation.

[4] Tec Market Works, "The California Evaluation Framework," Prepared for the California Energy Commission, June 2004. Available at http://www.calmac.org

Figure 3-1. PY7 Industrial Systems Optimization Program Energy Realization Rates across Program Years



Source: Evaluation Team analysis.

Table 3-3 below shows the site-specific ex-ante and ex-post savings along with stratum level realization rates.

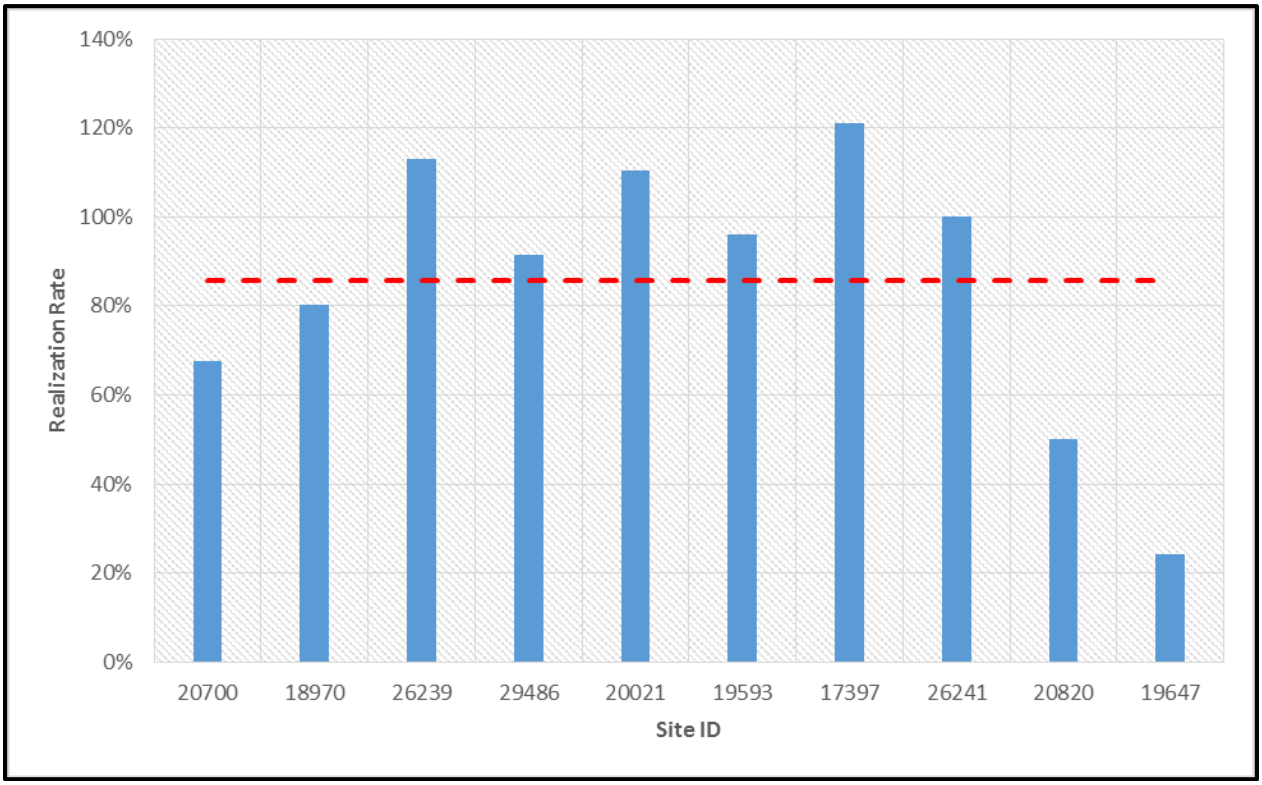
Table 3-3. Gross Impact Realization Rate Results for the Selected Industrial Systems Optimization Sample

Sampled Application ID	Sample-Based Ex-ante MWh Impact Claimed	Sample-Based Ex-ante kW Impact Claimed	Sampling Strata	Ex-Ante-Based MWh Gross Impact Weights by Strata	Sample-Based Evaluation Verified Gross MWh Impact	Sample-Based Evaluation Verified Gross kW Impact	Application - Specific Evaluation Verified Gross MWh Realization Rate	Application - Specific Evaluation Verified Gross kW Realization Rate	Sample-Based Evaluation Verified Gross kWh Realization Rate	Sample-Based Evaluation Verified Gross kW Realization Rate
20700	3,743	680	1	0.61	2,527	360.50	0.67	0.53	0.73	0.76
18970	2,441	149	1	0.39	1,959	269.79	0.80	1.82		
26239	1,103	152	2	0.26	1,245	204.53	1.13	1.35	1.04	1.20
29486	958	195	2	0.23	877	148.20	0.92	0.76		
20021	1,193	31	2	0.28	1,318	121.40	1.10	3.90		
19593	943	86	2	0.22	906	80.80	0.96	0.95		
17397	628	29	3	0.40	760	88.64	1.21	3.05	0.81	1.11
26241	190	22	3	0.12	190	25.00	1.00	1.12		
20820	581	68	3	0.37	290	44.50	0.50	0.66		
19647	180	28	3	0.11	44	5.10	0.24	0.18		
TOTAL	**11,959**	**1,438**	**-**	**NA**	**10,115**	**1,348**	**NA**	**NA**	**0.86**	**0.97**

Source: Evaluation Team analysis

The gross energy realization rates for all evaluated projects are shown below in Figure 3-2. The PY7 site-level energy realization rates ranged from 0.24 to 1.21, which indicates significant variation in realization rates across projects. For four of the 10 projects, the gross energy realization rate was lower than the program mean realization rate (0.86) and for the remaining six projects the gross energy realization rate was greater than the program mean.

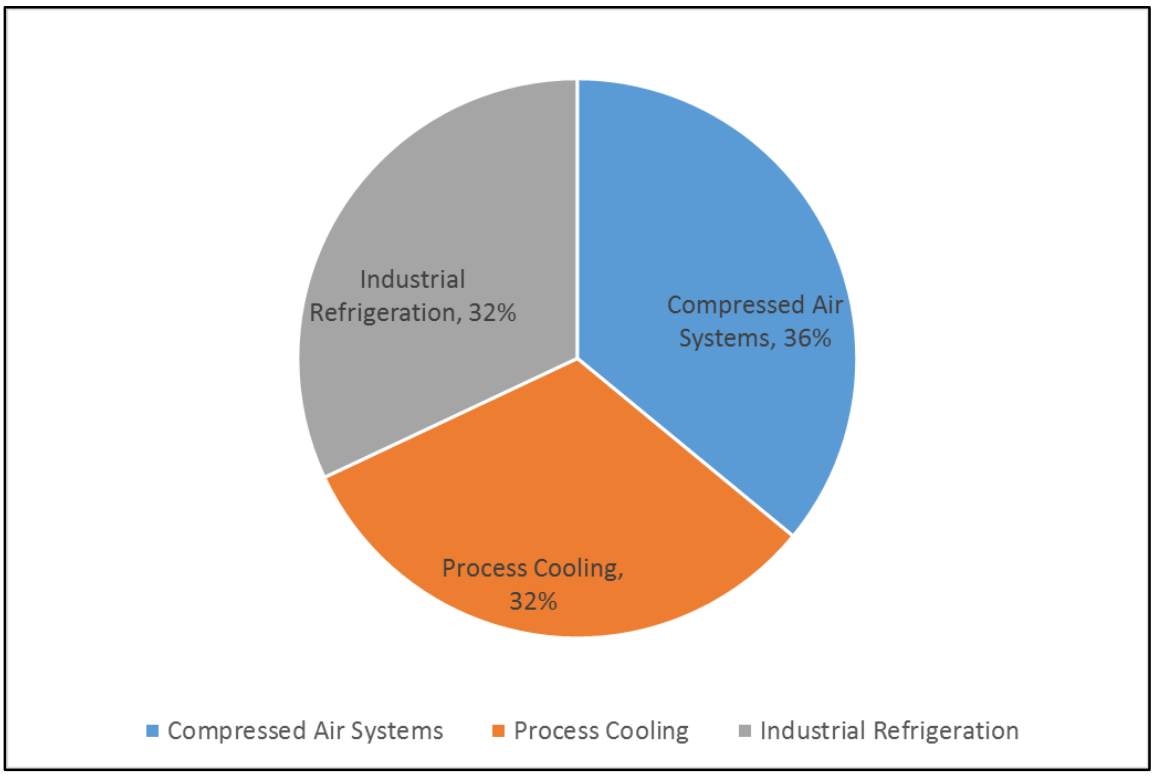
Figure 3-2. PY7 Industrial Systems Optimization Program Project Energy Realization Rates (Shown by Project ID)



Source: Evaluation Team analysis.

The evaluation team also looked at the distribution of the ex-ante program savings by end-use. The projects in the PY7 population were classified into three categories (Compressed Air Systems, Process Cooling and Industrial Refrigeration) based on the type of study that was performed. Figure 3-3 shows the distribution of the ex-ante savings by end-use. For PY7, there is nearly equal distribution of savings across the three end-uses with Compressed Air Systems representing approximately 36 percent of the ex-ante savings.

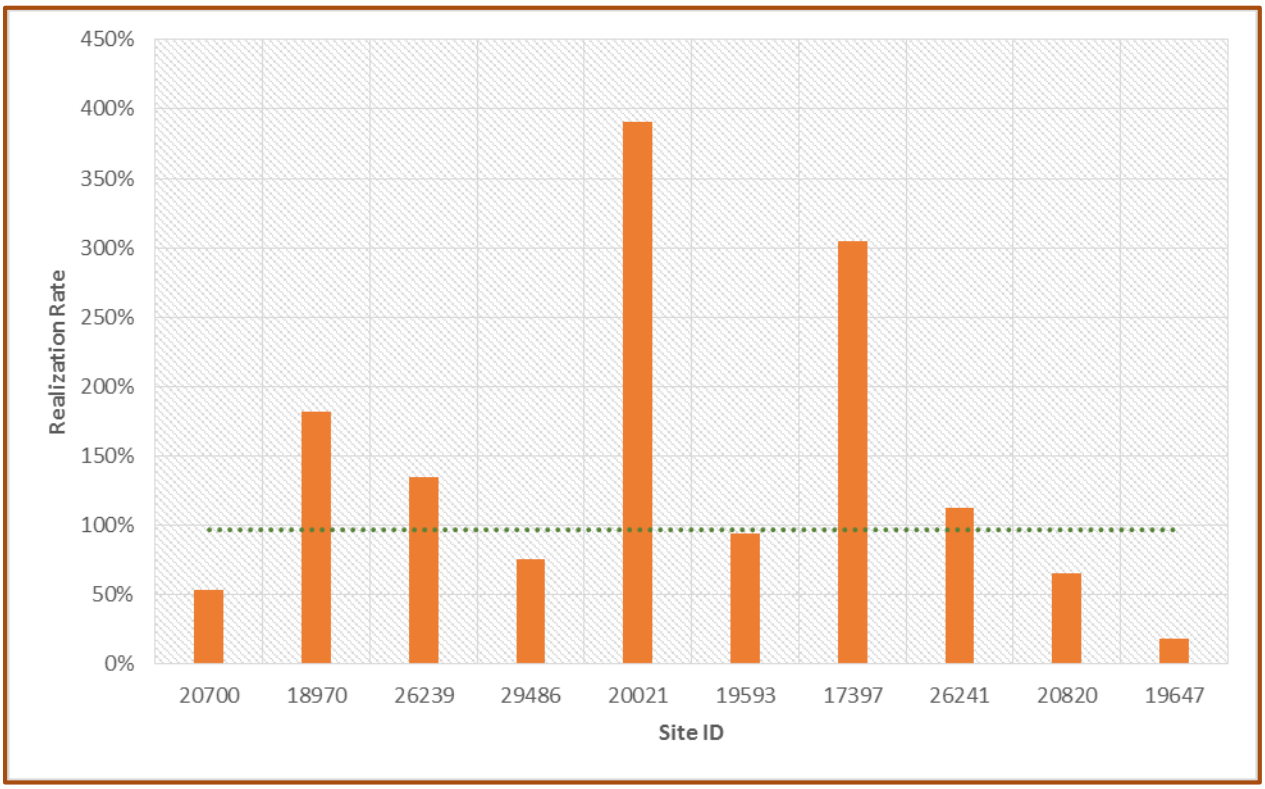
Figure 3-3. Industrial System Program Distribution of Ex-ante kWh Savings by End-use



Source: Evaluation Team analysis.

The PJM peak summer demand savings realization rates for all evaluated projects, are shown below in Figure 3-4. The PY7 site-level demand realization rate results ranged from 0.18 to 3.9 indicating a very large variation in realization rates across projects. Ex-ante demand savings were reported for all the projects in the gross sample. Five projects had realization rates greater than the mean program realization rate of 0.97, however, the largest project in the sample had a lower realization rate of 0.53, which brought down the overall program gross demand realization rate to below 100%.

Figure 3-4. PY7 Industrial Systems Optimization Program PJM Peak Demand Realization Rates (Shown *by Project ID*)



Source: Evaluation Team analysis.

The relative precision for the gross impact results at a one-tailed 90 percent confidence level is plus or minus 10 percent for the kWh realization rate and plus or minus 17 percent for the kW realization rate, as shown below in Table 3-4 and Table 3-5. The achieved relative precision rates at a one-tailed 90 percent confidence level for energy is better than the evaluation targeted kWh realization rate of plus or minus 10 percent, while the relative precision for demand savings is slightly worse than targeted at 17 percent. This is due to the large fluctuation in realization rates seen in the PY7 sample. For both energy and demand savings by stratum, stratum 3 had the largest relative precision of 33 percent and 54 percent, respectively. These were based on large varying realization rates, from 24 percent to 121 percent for energy and 18 percent to 305 percent for demand.

Table 3-4. Gross kWh Realization Rates and Relative Precision at 90 %Confidence Level

Stratum	Relative Precision ± %	Low	Mean	High
Stratum 1	0%	0.73	0.73	0.73
Stratum 2	4%	1.00	1.04	1.07
Stratum 3	33%	0.55	0.81	1.08
PY7 kWh RR	**10%**	**0.77**	**0.86**	**0.94**

Source: Evaluation Team analysis.

Table 3-5. Gross kW Realization Rates and Relative Precision at 90% Confidence Level

Stratum	Relative Precision ± %	Low	Mean	High
Stratum 1	0%	0.76	0.76	0.76
Stratum 2	19%	0.97	1.20	1.43
Stratum 3	54%	0.51	1.11	1.71
PY7 kW RR	**17%**	**0.80**	**0.97**	**1.13**

Source: Evaluation Team analysis

The evaluation team has provided ComEd with site-specific M&V reports for each verified project. These site-specific impact evaluation reports summarize the ex-ante savings in the Final Application submitted, and the ex-post M&V plan, data collected at the site and all of the calculations and parameters used to estimate savings.

Some general observations from the gross impact sample are listed by project ID below:

- **20700:** The evaluation team used a whole-building billing analysis to capture the overall savings for this project, while the ex-ante analysis calculated savings based on spreadsheet calculations and metered data for each measure. The evaluation team speculates that the primary reason for the discrepancy is that the ex-ante methodology did not account for the interactive effects between the lighting and the refrigeration load from a large lighting project that was installed in 2014. Secondly, the metered data of a single measure may not adequately take into account the interactions between multiple measures. While the use of metered data is the primary method of calculating savings, the evaluation team recommends using billed data analysis for this project. The main reason is there were multiple measures installed at the facility that interact with each other and that the savings exceed 10% of the billed usage.
- **18970:** There were several factors behind the difference between the ex-ante and ex-post calculations for this project. The primary reason is that the ex-ante analysis did not adequately normalize the metered pre and post usages to account for differences in tonnage during the metered periods. Secondly, the ex-post analysis also adjusted the savings based on the changes in system operation that was identified during the on-site visit.

- **26239:** Ex Ante calculations were performed using spreadsheet-based calculation methods (express workbook). The ex-post analysis used actual logged data to determine the post-case operation.
- **29486:** There were several primary differences between the ex-ante and ex-post calculations. The ex-ante approach assumed that the energy usage was proportional to production, using the kW/ton from a limited amount of production data. Since the actual relationship between energy usage and production was non-linear, the resulting correlation was poor, with an R^2 of 0.52 for one plant and 0.31 for the second plant.[5] The other reason for the discrepancy was due to a calculation error found in the ex-ante calculations in determining fan power.
- **20021:** Minor savings discrepancies for some of the measures were due to different calculation methods, cell reference errors in the ex-ante calculation spreadsheet and modifications to Affinity and Load Factors.
- **19593:** Two adjustments were made to the ex-ante analysis. The first was to include the operation of the dry cooler circulation pumps which were left out of the ex-ante calculations. The second adjustment was to the sequencing of the operation of the dry cooler fans based on operating setpoints identified during the onsite visits.
- **17397:** Ex-post analysis used the measured power factors and voltage values provided by the implementers. The ex-post savings increased from the ex-ante savings because of the adjustments made to power factor and voltage values. Additionally, ex-ante demand savings were not calculated for three out of the seven measures. The ex-post values included demand savings estimates for the three measures.
- **26241:** The only modification to savings was to recalculate the demand savings over the PJM Peak Demand period.
- **20820:** The analysis and operation of the pre-retrofit case was not available for the evaluation team to review. However, the evaluation team identified several factors that contribute to the savings gap. The first is that the ex-ante calculations did not normalize the kW to the air flow profile. Based on the metered data and the investigation report, at the time of the pre data collection the facility was running weekend production. However, at the time of the post data collection, the system was turned off over the weekend, which demonstrates the requirement to normalize the data. The ex-ante analysis also appeared to include corrupt data, which was deleted in the ex-post savings estimates. Finally, the ex-ante savings used a simplified kW/CFM approach to estimate savings for the leaks, which resulted in an overestimation of savings.
- **19647:** The ex-ante approach calculated savings using a prescriptive method, rather than one based on site level M&V. The ex-post approach utilized metering data and compressor operating efficiency curves to calculate savings.

[5] According to IPMVP, an acceptable minimum Coefficient of Determination (R^2) value of 0.75 is considered to be a reasonable indicator of a good causal relationship among variables.
Efficiency Valuation Organization (EVO). *International Performance Measurement and Verification Protocol. Concepts and Options for Determining Energy and Water Savings. Volume 1.* January 2012.

4 Net Impact Evaluation

The NTG values the evaluation used to calculate verified net savings were established through a SAG consensus process and were deemed for PY7. The PY7 NTGR deemed values are based on PY5 NTGR findings for both energy and demand. Table 4-1 reports the deemed NTG values to be applied in PY7. Refer to Section 6.1 in the Appendix for complete details on the NTG research conducted in this evaluation for future use.

Table 4-1. Verified Net Savings Parameters

Input Parameters	Value	Deemed or Evaluated?
Energy Savings NTGR	0.68	Deemed (derived from PY5 evaluation results and includes 0.01 for spillover)
Peak Demand Savings NTGR	0.68	Deemed (derived from PY5 evaluation results and includes 0.01 for spillover)

Source: ComEd_NTG_History_and_PY7_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

4.1.1 Evaluation Verified Net Program Impact Results

The evaluation team calculated the net program impacts by multiplying PY7 evaluation research findings gross program savings by the deemed PY7 NTGR for energy (kWh) and demand (kW). Table 4-2 provides the program-level evaluation-verified net impact results for the PY7 Industrial Systems Optimization Program.

Table 4-2. PY7 Verified Net Impact Savings Estimates

Savings Source	Sample Size	Energy Savings (MWh)	90/10 Significance	Peak Demand Savings (MW)	90/10 Significance
Ex-ante PY7 Gross Savings	25	17,608	-	2.281	-
Realization Rate	10	0.86	Yes	0.97	No
Verified Gross Savings	10	15,089	Yes	2.202	No
Free Ridership *		0.33		0.33	
Spillover *		0.01		0.01	
NTG *		0.68		0.68	
Verified Net Savings *		10,261		1.498	

Source: Evaluation analysis

*Deemed value. Source: ComEd_NTG_History_and_PY7_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

The evaluation research findings NTG ratio for future use are 0.80 for kWh and 0.81 for kW (see the appendix for details). The kWh NTGRs for the Industrial Systems Optimization program have fluctuated between 0.67 and 0.74 since the program began and are in line with similar programs offered elsewhere in the U.S. However, the PY7 kWh NTGR of 0.80 suggests that some amount of free ridership is still present.

5 Findings and Recommendations

The PY7 Industrial Systems Optimization Program performed well, with a verified gross realization rate for energy of 0.86 and for demand of 0.97. However, note that the PY7 gross energy realization rate is down, following an upward trend in energy realization rates in PY6 and PY7 (i.e., energy realization rates of 0.95 in PY6 and 0.88 in PY5).

Overall, the program team did a good job of ensuring all the implemented measures were installed and operating as planned. The program team continues to collect site-specific pre- and post-metered data for all projects in support of accurate savings estimation. Additionally, the impact results make it evident that ComEd has followed the evaluation team's recommendations from previous years regarding data collection activities, normalizing models and best practices for developing savings calculations. However, based on gross impact evaluation results and associated finding, there is room for additional improvement in this area.

Verified Gross Impacts and Realization Rate

Finding 1. For Project 20021, the ex-ante baseline for several measures did not appear to capture standard operating conditions.

Recommendation 1. Make sure that the assumptions used for establishing baseline and efficient cases represent typical operation under current conditions. Carefully review data to verify that modeled equipment operation is consistent with observed conditions.

Finding 2. For Project 26239, the ex-ante analysis used the Compressed Air Express Workbook to determine savings even though post-retrofit logged data was available.

Recommendation 2. The spreadsheet tool is a reasonable, simple method for estimating savings due to compressed air demand reduction. It appears to be particularly useful for estimating savings during the investigation phase of compressed air system audits and simplifies savings estimates. However, if logged data is available, model calibration should be performed to ensure proper characterization of compressed air system operations. The availability of logged data represents a significant investment in time and expense during the incentive process. By leveraging and analyzing this data, the program will be able to improve the accuracy of savings estimates in the future.

Finding 3. The evaluation team adjusted the savings for the projects 18970, 20820, and 29486 as the pre- and post-conditions were not being normalized in each case.

Recommendation 3. Normalizing for the output of the equipment being analyzed and its power between the pre-case and post-case conditions is favored over production normalizing. If production information is sufficiently granular and a strong correlation can be established between production and power or energy use by the equipment being examined, normalizing for production is also acceptable.

Finding 4. For Project 20700, quick review of facility billing data and comparing with the ex-ante savings calculations would have been useful to validate the savings estimate. The billing data

will also ensure that the ex-ante savings for the facility are not being overestimated compared to their annual usage.

Recommendation 4. Use simple whole-building billing analysis as a secondary-check for the spreadsheet calculation methods especially when the savings are 10 percent or higher of the entire facility usage. Graphically representing the pre- and post- data can be extremely useful to determine the impact of the savings, and how they relate to a spreadsheet calculation method[6].

Net-to-Gross Ratio for Future Use

Finding 5. The evaluation research findings NTG ratio for future use are 0.80 for kWh and 0.81 for kW. The kWh NTGRs for the Industrial Systems Optimization program have fluctuated between 0.67 and 0.74 since the program began and are in line with similar programs offered elsewhere in the U.S. However, the PY7 kWh NTGR of 0.80 suggests that some amount of free ridership is still present.

Recommendation 5. The NTGR of 0.80 is commendable for these types of customers and projects. However, free ridership continues to be present for a small percentage of projects. This can be addressed by examining program influence at an early stage of these projects. This process could be incorporated into the pre-approval process by ComEd and the program implementer. Projects with low program influence can then be re-defined so as to reduce free ridership.

[6] See Section 6.1.1.2 for more information on graphical representation of data.

6 Appendix

6.1 Evaluation Research Impact Approaches and Findings

6.1.1 Evaluation Research Gross Impact Findings for Future Use

6.1.1.1 Production and Weather Normalization

Normalizing data is the process of bringing different data sets to the same scale and many projects will require some level of normalization. Data normalization is required or must be addressed where multiple data sets are used in an analysis such as pre and post data. The challenge is determining when and what is appropriate to normalize.

One needs to have good understanding of the system and the primary drivers of the process's energy usage to understand the factors or variable to normalize data. The common factors for normalizing are temperature, heating and/or cooling degree days, time of day, and production (multiple indices can be used for this). The energy usage can be plotted against one of the factors listed above. An indicator of the factors influence on the systems energy usage can be understood by examining the R^2 of the plot. It is possible that multiple normalization factors affect the data, and therefore may require a multi-variable regression (ex. Heating Degree Days and Cooling Degree Days may both be required to represent weather-sensitive equipment).

It is also important to note that it is not always appropriate to normalize the data set. Systems that are manually controlled or constant processes are not going to be influenced by drivers such as production or weather and it would therefore be inappropriate to normalize by these factors. In many cases, the best way to determine the influence of different drivers is by plotting the data.

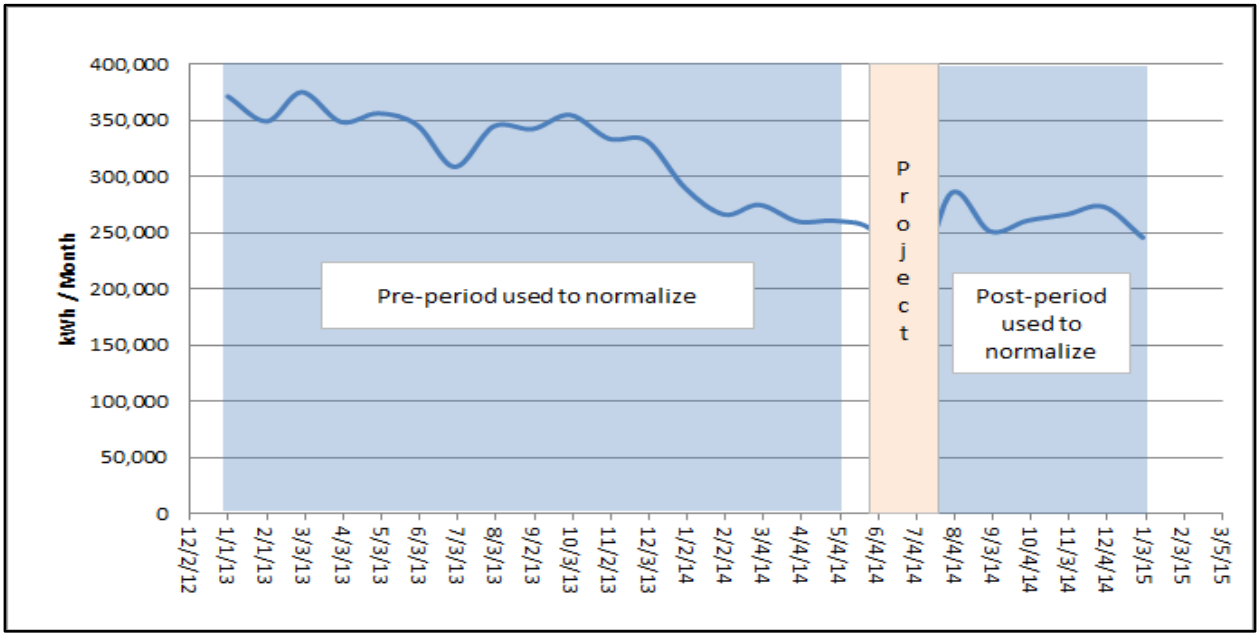
6.1.1.2 Plotting of Data[7]

When dealing with metered or trended data whether from meters, weather stations, or utility meters it is always best practice to plot the data over time to enable a visual review of the data. This will quickly identify periods of abnormal operation or process changes.

Figure 6-1 represents a project that normalized a facilities energy usage to justify project savings. The analysis did not look at the billed data to verify whether the reduction in energy usage was due to the claimed project or not. The figure illustrates how plotting the usage over time is useful in identifying whether or not a reduction in savings can be attributable to the project or if the change is due to other influences. The plot shows how a large reduction in energy usage was claimed for a project even though it is apparent that this reduction happened six months prior to the project starting.

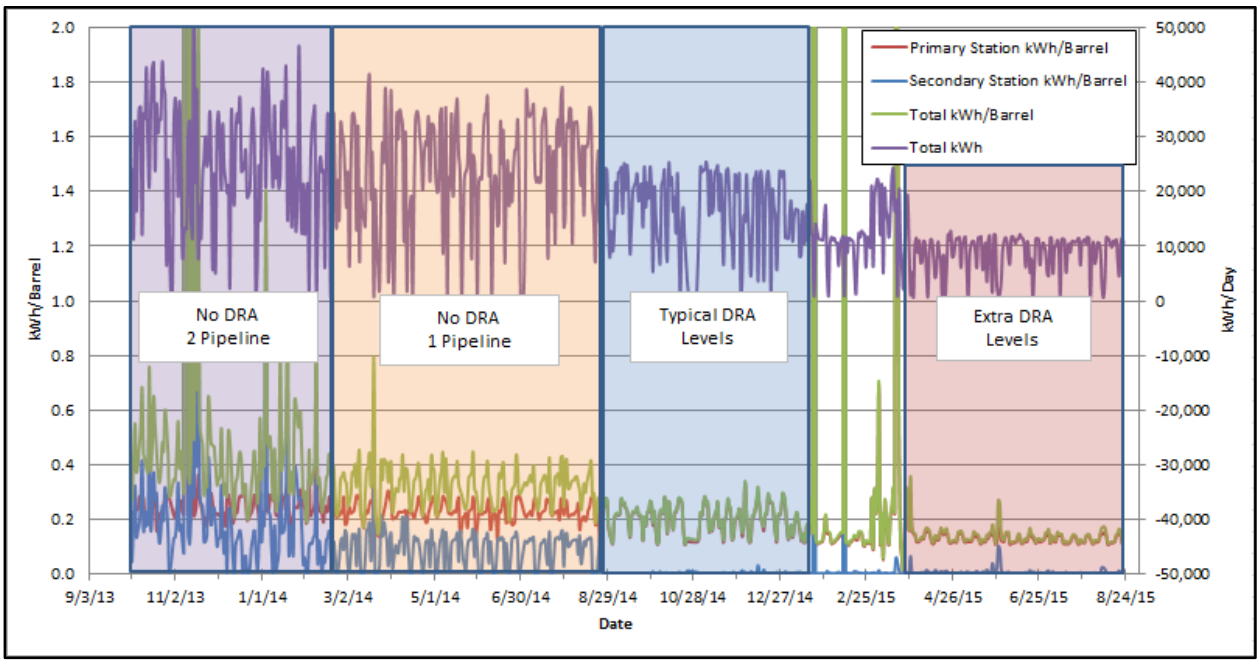
[7] The project examples listed here are not from the PY7 Industrial Systems program, but are described here to provide insight on how plotting the data can be useful to determine high level conclusions that will guide the savings calculation methods.

Figure 6-1: Air Compressor Removal



It may be also necessary to look at the data in multiple ways and not just energy usage over time. The following figure shows the energy usage over time as well as the energy usage per barrel of oil pumped over time. When looking at the kWh/Barrel pumped, the data becomes clearer and provides better understanding of the things happening at the facility. It reveals that there are four distinct operating conditions whereas the project documentation showed only two set of operating conditions. In fact, when looking at the total kWh usage it is not possible to see the difference in the energy usage when the utility meter was capturing a second pipeline's pumping station; however, this operation becomes apparent in the kWh/Barrel graph. Plotting data in this way is critical to find and remove atypical operation from the analysis. For this project, the calculation included a portion of the time with two pipelines running, artificially increasing the energy usage of the pre-case. Plotting the data like this is important for all data sets and not just the data sets that will be normalized.

Figure 6-2: Oil Pipeline Operation



When data sets are going to be normalized, it is useful to plot the data sets versus the factors the data will be normalized too. This helps to determine the amount of influence each factor has on the overall operation of the system. The following three figures, Figure 6-3 through Figure 6-5 are for the same project as above and the original analysis used all three of these factors (HDD, CDD, Barrels) to normalize the data. Notice for both HDDs and CDDs that the R2 is very low indicating no influence on the energy usage, however, the kWh per barrel pumped shows a nice correlation, with an R2 value of over 0.75 for both the pre- and post-production period.

Figure 6-3: kWh vs HDDs

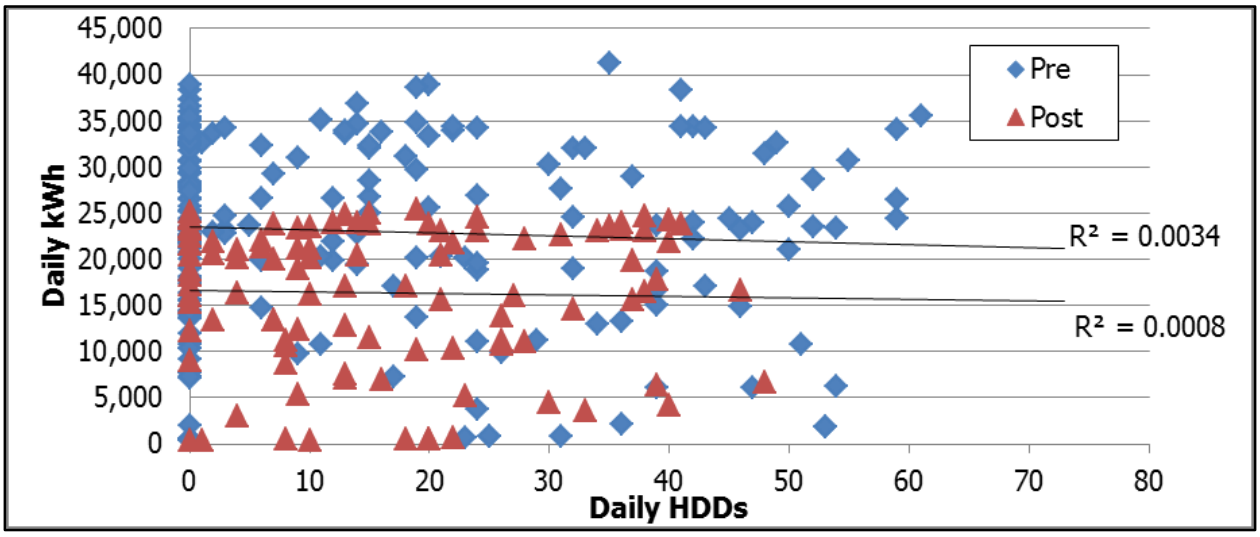


Figure 6-4: kWh vs CDDs

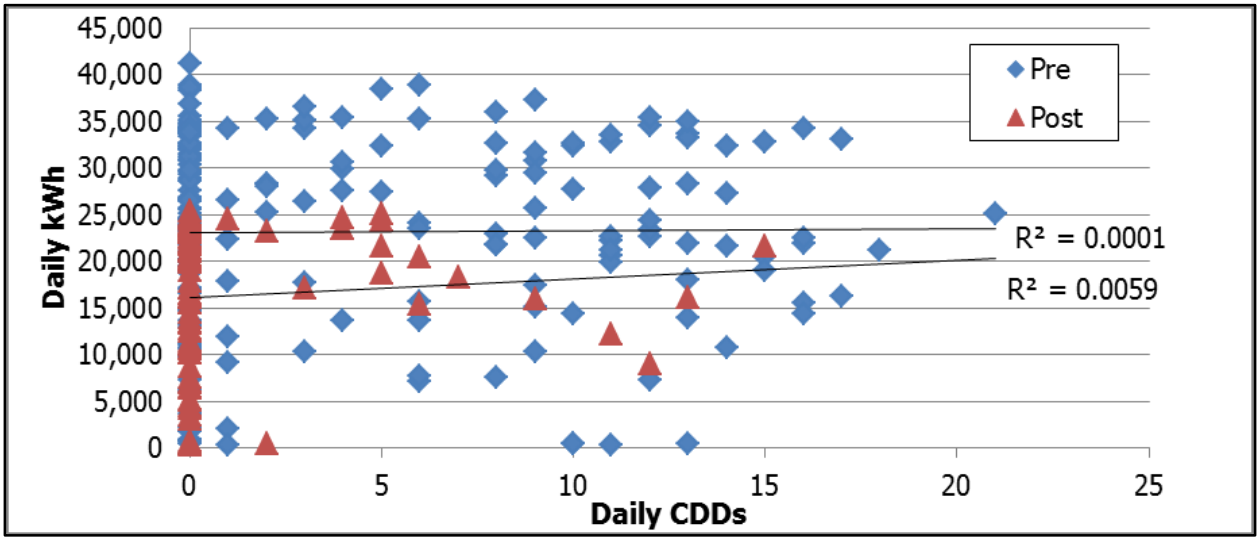
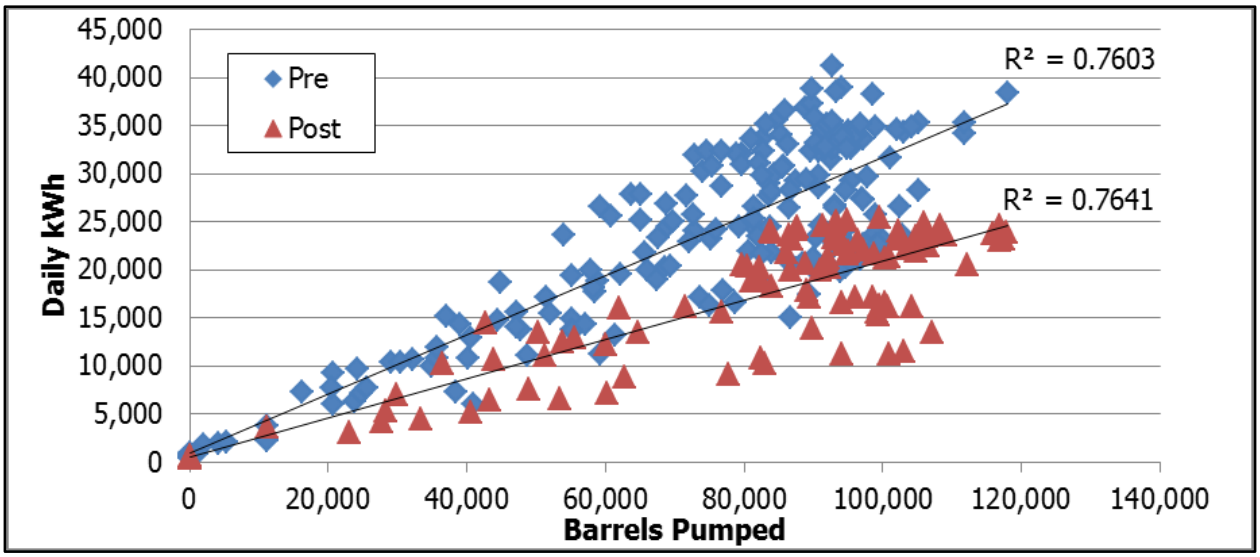


Figure 6-5: kWh vs Barrels Pumped



Many times it is necessary to normalize for production. Production can be characterized by many indices and it can be difficult to determine the most appropriate one. Many times production is tracked as number of parts, pounds of materials, gallons of material produced. Care must be taken with metrics such as this. Many times pounds of material may include different products that went through different manufacturing processes resulting in one pound of material A not being equivalent to one pound of material B. This becomes more critical when looking at supporting systems such as process cooling, refrigeration, compressed air. Not all production uses these resources at the same rate. These support systems don't operate directly based upon production, but to maintain the required GPM rate or CFM

rate required for the production process. These rates may be constant processes not tied to production rates. For these processes the most accurate normalization will be not be to pounds of material but the GPM or CFM the system must supply. This is demonstrated below in both Figure 6-6 and Figure 6-7. This project is a compressed air plant upgrade and was normalized to production as tons of steel produced.

Figure 6-6: Compressed Air Plant Upgrade (Pre Data)

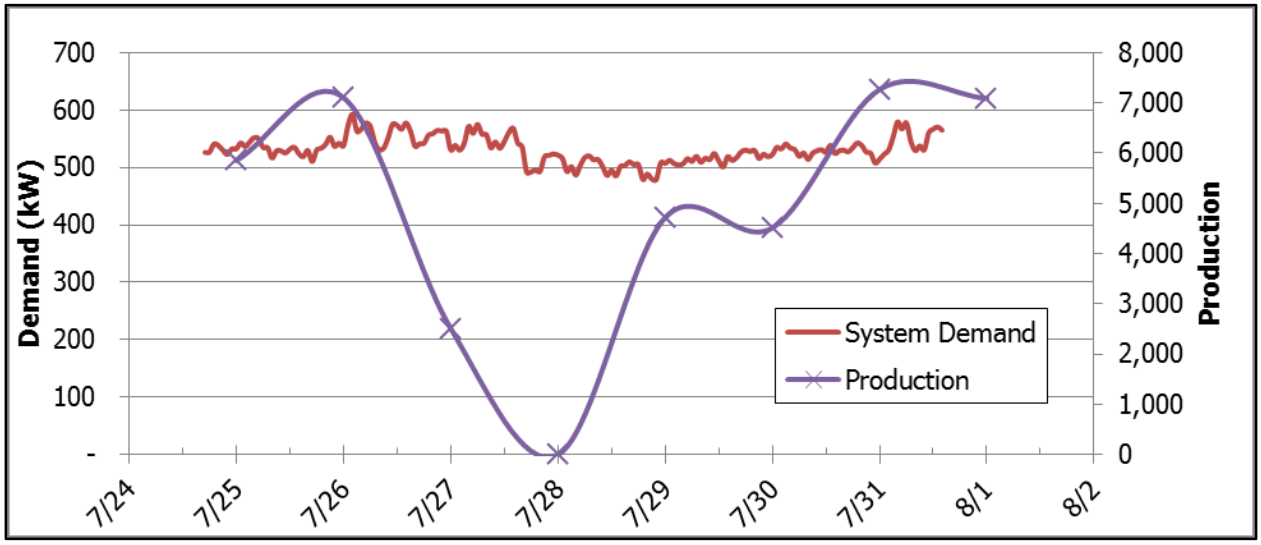
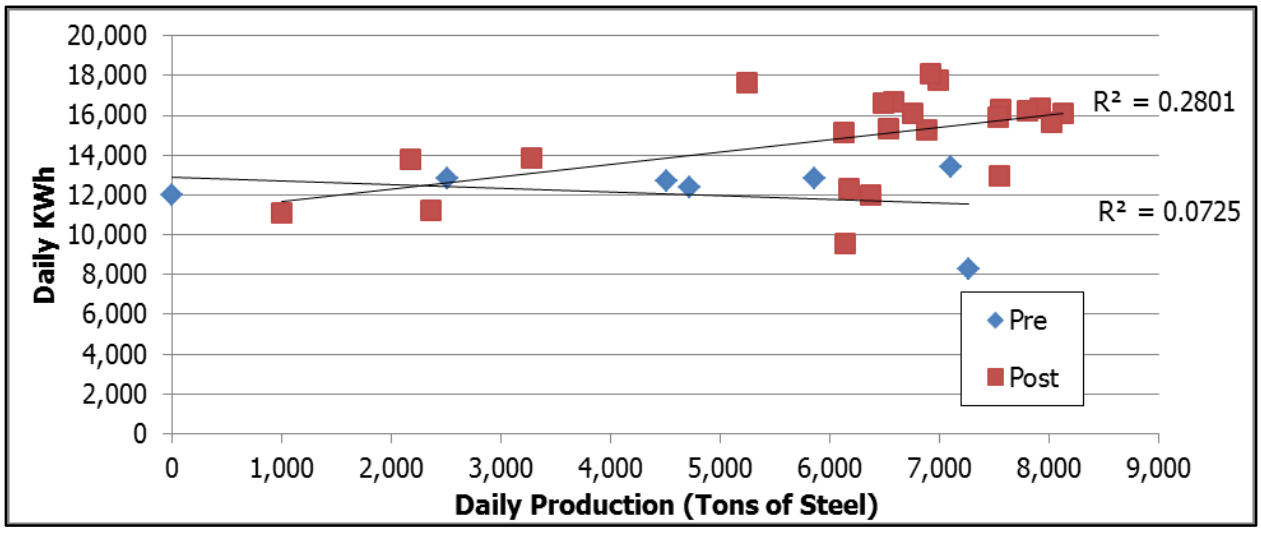


Figure 6-7: kWh vs production



These graphs clearly show that the compressed air plants provided CFM is not correlated to tons of steel and a different approach needs to be taken.

The analysis of metered and trended data is not a simple and straightforward task. It requires innate understanding of the affected processes and other outside influences. The data needs to be screened to

identify and if necessary remove abnormal operation. The plotting of this data against different factors can aid in the understanding of these processes and allow for accurate models of their energy usage.

6.1.2 Evaluation Research Net Impact Findings for Future Use

NTG research methods in PY7 consisted of telephone surveys of participating customers and technical service providers and analysis of results. Research for both groups used a self-report survey-based method in which participants and technical service providers answered a series of questions designed to assess the influence of program and non-program factors on their decisions to implement and offer energy efficient industrial systems measures, respectively. The participating customer survey researched participants' awareness of the installed measures prior to their participation in the program, and their previous use of those measures outside the program.

6.1.2.1 Free Ridership

The program's Net-to-Gross Ratio is equal to one minus the free ridership rate plus the spillover rate. The evaluation team calculated the free ridership rate using a self-report method, which relies on the results of surveys with PY7 participants. The calculation of both the free ridership rate and each project's net-to-gross ratio (NTGR) is a multi-step process. The determination of free ridership requires estimating what would have happened in the absence of the program. The evaluation team used responses from the telephone survey to calculate a Program Components score, a Program Influence score and a No-Program score for each project covered through the survey. These three scores can take values of 0 to 10 where a lower score indicates a higher level of free-ridership. The calculation then averages those three scores to come up with a project- or measure-level net-to-gross ratio. Further details on the scoring approach used to calculate free-ridership from data collected through participant telephone surveys are provided in Table 6-1 below.

Table 6-1. Basic Net-to-Gross Scoring Algorithm for the PY7 Industrial Systems Optimization Program

Scoring Element	Calculation
Program Components score. The maximum score (on a scale of 0 to 10 where 0 equals not at all influential and 10 equals very influential) among the self-reported influence level the program had for: A. Availability of the program incentive B. Technical assistance from utility or program staff C. Recommendation from utility or program staff D. Information from utility or program marketing materials E. Endorsement or recommendation by a utility account rep F. Recommendation from vendor or Technical Service Provider[8]	Maximum of A, B, C, D, E and F
Program Influence score. "If you were given a TOTAL of 10 points that reflect the importance in your decision to implement the <ENDUSE>, and you had to divide those 10 points between: 1) the program and 2) other factors, how many points would you give to the importance of the PROGRAM?"	Points awarded to the program Divide by 2 if the customer learned about the program AFTER deciding to implement the measure that was installed
No-Program score. "Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the utility program had not been available, what is the likelihood that you would have installed exactly the same equipment?" Adjustments to the "likelihood score" are made for timing: "Without the program, when do you think you would have installed this equipment?" Free-ridership diminishes as the timing of the installation without the program moves further into the future.	Interpolate between No Program Likelihood Score and 10 where "At the same time" or within 6 months equals No Program score, and 48 months later equals 10 (no free-ridership)
Project-level Free-ridership (ranges from 0.00 to 1.00)	1 – Sum of scores (Program Components, Program Influence, No-Program)/30
PY7 Project level Net-to-Gross Ratio (ranges from 0.00 to 1.00)	1 – Project level Free-ridership
Apply score to other end-uses within the same project?	If yes, assign score to other end-uses of the same project
Apply score to other projects of the same end-use?	If yes, assign score to same end-use of the additional projects

Telephone surveys were completed for a total of 18 projects to support the calculation of the net-to-gross ratio in PY7. Of these, eight overlap with the gross M&V sample points. Technical Service Provider (TSP) interviews and project summaries provided by program staff were also used to provide context and to guide the customer interviews, which followed.

[8] Only applicable for sites that indicated a vendor influence score greater than maximum of the other program element scores or those sites that had a study performed by a Technical Service Provider.

A project and/or measure-specific Net-to-Gross ratio (NTGR) was calculated for each site. The PY7 project-specific and stratum level NTGRs are shown in Table 6-2.

Table 6-2. PY7 NTGR Results for the Industrial Systems Optimization Sample

Project ID*	Sampling Strata	Project Specific Energy NTGR	Sample-Based Research Findings kWh NTGR	Sample-Based Research Findings kW NTGR
PY7 – 01**	1	0.77	0.82	0.85
PY7 – 02**	1	0.86		
PY7 – 03**	2	0.88	0.85	0.86
PY7 – 04**	2	0.77		
PY7 – 05	2	0.93		
PY7 – 06**	3	0.79	0.71	0.70
PY7 – 07**	3	0.45		
PY7 – 08**	3	0.83		
PY7 – 09**	3	0.15		
PY7 – 10	3	0.97		
PY7 – 11	3	0.65		
PY7 – 12	3	0.60		
PY7 – 13	3	0.70		
PY7 – 14	3	0.78		
PY7 – 15	3	0.63		
PY7 – 16	3	0.71		
PY7 – 17	3	0.90		
PY7 – 18	3	0.83		
Total	**N/A**	**N/A**	**0.80**	**0.81**

Source: Evaluation Team analysis
* Actual Project IDs are not provided to protect customer confidentiality.
**Overlaps with gross impact sample.

A ratio estimation technique was used to estimate the program-level NTGR, based on the steps outlined in the California Evaluation Framework and summarized above. The standard error was used to estimate the error bound around the estimate of the verified evaluation NTGR. The program level kWh and kW NTGR, along with confidence intervals and precision estimates, are shown in Table 6-3 (kWh impacts) and in Table 6-4 (kW impacts).

Spillover was also researched in this evaluation and the magnitude was found to be quite small as discussed below in the spillover section. *Therefore, a quantification of spillover was not included in the calculation of the NTGR for PY7.*

Table 6-3. kWh NTGR and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low NTGR	Mean NTGR	High NTGR
1	0%	0.82	0.82	0.82
2	5%	0.81	0.85	0.90
3	4%	0.68	0.71	0.74
TOTAL	**2%**	**0.78**	**0.80**	**0.81**

Source: Evaluation Team analysis

Table 6-4. kW NTGR and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low NTGR	Mean NTGR	High NTGR
1	0%	0.85	0.85	0.85
2	4%	0.83	0.86	0.90
3	4%	0.68	0.70	0.73
TOTAL	**1%**	**0.80**	**0.81**	**0.82**

Source: Evaluation Team analysis

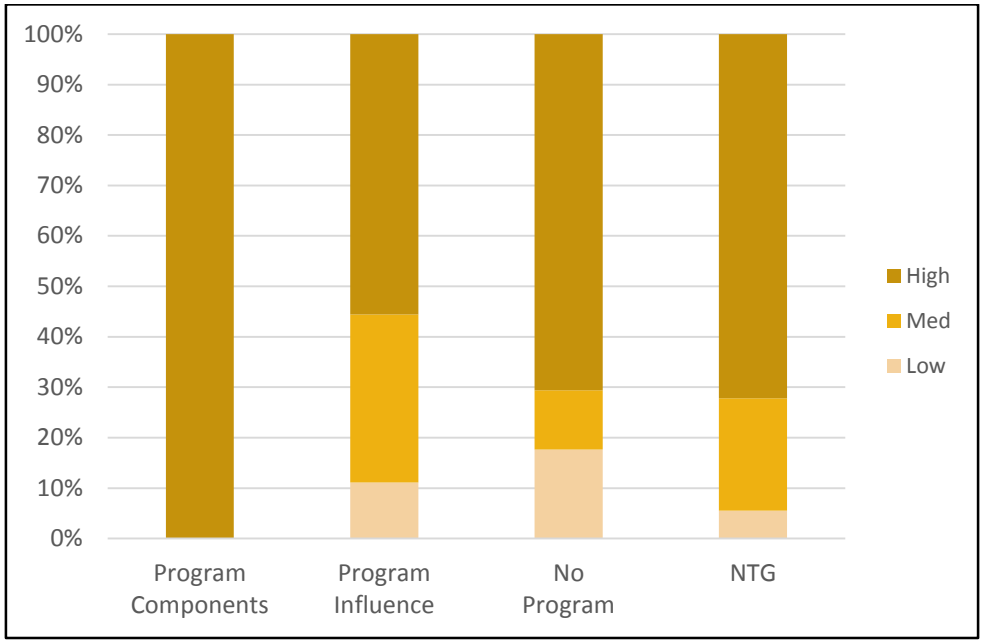
Observations regarding PY7 NTGR findings. Overall, the program influence has improved in PY7 based on the Evaluation Research Findings kWh NTGR of 0.80, compared to the PY6 kWh NTGR of 0.74 and the PY5 kWh NTGR of 0.68. The energy NTGR scores for the three sampling strata are 0.82 for stratum 1 (large sized projects), 0.85 for stratum 2 (medium sized projects), and 0.71 for stratum 3 (small sized projects).

Significant free-ridership (at or above 40 percent) was found in three out of 18 evaluated projects, of which one project had a resulting NTGR below 0.30. All three projects with substantial free-ridership had low No-Program[9] scores revealing that absent the program, the customer would have been very likely to install the same measures at the same time on their own.

As shown in Figure 6-8, relatively high and relatively low NTG scores in the sample were not directly affected to the same extent by the Program Influence and Program Components[10] score. That is, the correlation between the Program Influence and Program Components scores and resulting NTGR was not as significant as was the correlation with the No-Program score and the resulting NTGR.

[10] A Program Components score reflects the importance of various program-related and non-program elements in the customer's decision and timing of the decision in selecting specific program measures.

Figure 6-8. NTG Component Scores



Source: Evaluation Team analysis

Figure 6-8 provides a breakdown of each of the three scores used to calculate the NTGR based on the distribution of values reported for each project. Overall free-ridership in the Industrial Systems Optimization Program is relatively low. In cases with partial free-ridership, a number of different reasons existed. Three customers reported that one of the measures they installed was likely to be a similar measure and would have been installed earlier or at the same time in the absence of the program, resulting in a low No-Program score. Further, when PY7 participants were asked to divide 10 points between the importance of the program versus the most important of the non-program factors in their decision to implement the measure, four out of 17 participants rated the non-program factors higher than the program factors, resulting in a low Program Influence score.

Figure 6-9 presents the average scores for each Program Components score element in the telephone survey. Most of the program elements were rated high, while non-program elements were rated lower. The payback and the technical assistance provided by the ComEd sponsored study program incentives were rated highest on average (8.9 and 7.9, respectively), followed by the cash incentives (7.7) and recommendation from an account manager (7.7). In contrast, the only program element that was rated somewhat low was the information provided by the Service Provider, at an average of 6.6.

Figure 6-9. Average Ratings of Program Component Elements

Source: Evaluation Team analysis

* Program related elements

^ Payback can be a program or a non-program related element depending on whether the incentive helped the participant meet their payback requirements or not.

6.2 Spillover

Spillover effects were also investigated in the PY7 evaluation based on responses to a battery of spillover questions in the telephone survey. The evidence of spillover for the program is presented in Table 6-5 below. These results ultimately did not support any quantification of spillover savings.

Table 6-5. Evidence of Spillover in PY7

Spillover Question	Evidence of Spillover
Since your participation in the ComEd program, did you implement any additional energy efficiency measures at this facility that did NOT receive incentives through any utility or government program?	Of the 18 surveyed customers that responded to this question, 2 said "Yes" (18%). These 2 respondents implemented a total of 2 energy efficiency measures.
What type of energy efficiency measure was installed without an incentive?	(1) Additional lighting retrofit: T12s to T8s in the offices. (1) VSD's on motors.
On a scale of 0 to 10, where 0 means "not at all significant" and 10 means "extremely significant," how significant was your experience in the ComEd program in your decision to implement this energy efficiency measures?	For the 2 implemented measures: (0) Rating between 0 and 3 (0) Rating between 4 and 6 (2) Rating between 7 and 10

Source: Evaluation Team analysis

One customer reported being highly influenced by the program to do an additional lighting retrofit outside of an incentive program. The evaluation team reached out to this customer to gather more information regarding the retrofit, however the evaluation team was unsuccessful in their attempts. Upon further investigation the evaluation team discovered that this customer installed lighting measures through the prescriptive program in 2014 and considered that this may be a continuation of that project and therefore spillover will not be applied.

These findings suggest that there are no spillover effects for PY7. The evaluation team will collect spillover data in this same manner in the PY8 evaluation. The decision to conduct additional evaluation activities to quantify spillover in PY8 will be examined as part of the evaluation planning effort.

6.3 Survey Instruments

6.3.1 Participant Telephone Survey

COMED SMART IDEAS FOR YOUR BUSINESS PROGRAM
PARTICIPANT SURVEY – INDUSTRIAL SYSTEMS PROJECTS
PY7 Draft

Introduction

Hello, this is _____ from Itron calling on behalf of ComEd regarding your company's participation in the Industrial Systems program. May I please speak with [**CONTACTNAME**]?

Our records show that [**COMPANY**] completed a <**PROJECT_TYPE**> project in ComEd's Smart Ideas for Your Business Industrial Systems Program, and we are calling to conduct a follow-up study about your firm's participation in this program. Our records indicate that you're the person most knowledgeable and the most involved with the decision to participate in the program. Is this correct? [IF NOT, ASK TO BE TRANSFERRED TO THE DECISION MAKER OR SOMEONE FAMILIAR WITH THE BASIS FOR THE DECISION TO PARTICIPATE OR RECORD NAME & NUMBER.]

[IF NEITHER DECISION MAKER OR SOMEONE FAMILIAR WITH THE BASIS FOR THE DECISION TO PARTICIPATE, IS AVAILABLE TERMINATE AND CALL REFERRAL]
(IF NEEDED: Is it possible that someone else dealt with the <**PROJECT_TYPE**> project?)

This survey will take about 20 minutes. Is now a good time? [If no, schedule call-back]

Participation Verification

A1 First, according to our records, you participated in ComEd's Smart Ideas for Your Business Industrial Systems Program between <**MONTH/YEAR**>. [*IF NEEDED: the ComEd Smart Ideas for Your Business Industrial Systems Program promotes energy efficiency improvements to industrial facilities with a primary focus on Compressed Air, Industrial Refrigeration, and Process Cooling system improvements. The program offers technical assessments to help identify applicable measures and analyze the energy and cost savings of the recommended measures. The program also offers cash incentives to help cover a portion of the cost of making the recommended energy efficiency improvements to the energy using equipment.]*
Do you recall participating in the ComEd Smart Ideas for Your Business Industrial Systems Program between <**MONTH/YEAR**>?

1.	Yes	
2.	No	Thank & terminate
88.	Refused	Thank & terminate
99.	Don't know	Thank & terminate

A2 Next, I'd like to confirm the following information regarding your participation in the Industrial Systems Program. I understand that you participated at <**ADDRESS**>. The Industrial Systems

study was completed in <**MONTH/YEAR**> by <**SERVICEPROVIDER**> and you implemented <**NO OF MEASURES**> measure(s), including <**MEASURE1**>, <**MEASURE2**>, <**MEASURE3**>.) Does that sound right?

1. Yes
2. No Thank & terminate
88. Refused Thank & terminate
99. Don't know Thank & terminate

Project Background

B1. Before I ask you specific questions about your decision, please tell me in your own words why you decided to look into making changes to improve the energy efficiency of the <**PROJECT_TYPE**> equipment at this facility? Were there any other reasons?

77. RECORD VERBATIM
88. Refused
99. Don't know

N1b Where did the idea to look into making changes to improve the energy efficiency of the <**PROJECT_TYPE**> come from? [IF NEEDED: Did your company develop the idea, was it suggested by a vendor or consultant or the program Service Provider, was it the result of an audit, was it part of a larger expansion or remodeling effort?]

77. RECORD VERBATIM
88. Refused
99. Don't know

S1. How did you first hear about the Industrial Systems Program? **[DO NOT READ]**

1. Service provider
2. ComEd program representative
3. ComEd Account manager
4. ComEd Website
5. Friend/colleague/word of mouth
6. Contractor
77. Other [RECORD VERBATIM]
88. Refused
99. Don't know

S2. How long ago or when was this?

1. RECORD VERBATIM
88. Refused
99. Don't know

B2a. Before learning about the ComEd Industrial Systems Program, had you ever made any other changes to improve the energy efficiency of your <**PROJECT_TYPE**> equipment at this facility or any of your other facilities?

1. Yes, at this facility
2. Yes, at another facility [skip the next two questions, go to B5]
3. No [skip the next two questions, go to B5]
88. Refused [skip the next two questions, go to B5]
99. Don't know [skip the next two questions, go to B5]

[ASK IF B2a=1]
B2aa. Specifically, what did you have done at this facility?
77. RECORD VERBATIM
88. Refused
99. Don't know

[ASK IF B2a=1]
B2b. Did you receive an incentive or another form of financial support for this previous <**PROJECT_TYPE**> project?
1. Yes
2. No
88. Refused
99. Don't know

B5. My next questions are about your awareness of the energy saving opportunities identified through your Industrial Systems study PRIOR to conducting it. Would you say you were aware of all, some, or none of the opportunities before the study? [if needed read: <**MEASURE1** through **MEASUREx**>]
1. All [skip the next question]
2. Some
3. None [skip the next three questions]
88. Refused [skip the next three questions]
99. Don't know [skip the next three questions]

[ASK IF B5=2]
B6. Which of the following energy saving opportunities were you previously aware of? Were you aware of the opportunities with your… (1=Yes, 2=No, 88=Refused, 99=Don't know)
a. **MEASURE1**
b. **MEASURE2** [ASK IF MEASURE2 ne ""]
c. **MEASURE3** [ASK IF MEASURE3 ne ""]
d. **MEASURE4** [ASK IF MEASURE4 ne ""]
e. **MEASURE5** [ASK IF MEASURE5 ne ""]

[ASK IF B5=1,2]
B2bb. What were the main factors that kept you from making the specific changes identified through the Industrial Systems Program Study PRIOR to your participation in the program?
77. [RECORD VERBATIM]
88. Refused

99. Don't know

[ASK IF B5=1,2]

B2cc Did the information you received through the program influence you to make any additional improvements or upgrades to the improvements you already had in mind?

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

[ASK IF B2cc=1]

B2dd Please explain what you were planning on doing before the program and how the program influenced you to make additional improvements or upgrades?

77. [RECORD VERBATIM]
88. Refused
99. Don't know

[ASK IF **MEASURES_NOT_INSTALLED** not blank]

B8c. Our records show that your company did not install all of the measures recommended in the Industrial Systems study. What were the reasons why your company didn't implement the following measures: <**MEASURES_NOT_INSTALLED**>?

77. [RECORD VERBATIM]
88. Refused
99. Don't know

[ASK IF **NUM_PROJECTS**>1]

B7. Our records indicate that your company completed <**NUM_PROJECTS**> projects through the program. Was your decision to participate in the program the same for each project?

1. Yes
2. No
77. Some decisions were the same (RECORD VERBATIM)
88. Refused
99. Don't know

Decision Influences (*USED IN NTG CALCULATOR*)
BEGIN LOOP FOR MEASURE1-MEASURE3

N1. When did you first learn about ComEd's Industrial Systems Program, was it BEFORE or AFTER you first began to THINK about implementing <**MEASUREx**>?

1. Before [skip the next question, go to N3]
2. After
88. Refused
99. Don't know

[ASK IF N1=2, 88, 99]

N2. Did you learn about ComEd's Program and the availability of technical assistance and incentives for energy efficiency improvements BEFORE or AFTER you DECIDED to implement <**MEASUREx**>?

1. Before
2. After
88. Refused
99. Don't know

[IF N2 = 2 THEN ASK, ELSE SKIP TO N3.]

N2a. How did you first learn about <**MEASUREx**>? [IF NEEDED: Were you working with another contractor?]

77. Record VERBATIM
88. Refused
99. Don't know

N2b. Did you delay your project in order to receive the study/incentive through the Program?

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

[IF N2b = 1 THEN ASK, ELSE SKIP TO N3.]

N2bb. How long did you delay your project to receive the study/incentive?

77. Record VERBATIM
88. Refused
99. Don't know

N2c. Why did you decide to participate in the Smart Ideas for your Business Program AFTER you had decided to implement <**MEASUREx**>?

77. Record VERBATIM
88. Refused
99. Don't know

N3. Now I'm going to ask you to rate the importance of several factors that might have influenced your decision to implement <**MEASUREx**>. On a scale from 0 to 10, where 0 means 'not at all important' and 10 means 'extremely important', how important were the following in your decision to implement <**MEASUREx**>.

[FOR N3a-m, RECORD 0 to 10; 96=Not Applicable; 88=Refused; 99=Don't know][If needed: How important in your DECISION to conduct the study and commit the funding to implement <**MEASUREx**> was…]

[ROTATE N3a-N3m]

N3b. The availability of cash incentives for <**MEASUREx**>

N3c. The comprehensive study funded by the Smart Ideas Program

N3e. Previous experience with this type of project

N3f. The recommendation from your ComEd Account Manager
N3h. The information from the Industrial Systems Program Representative (Service Provider)
N3i. Recommendation from an expert not affiliated with the program
N3j. Standard practice in your business/industry
N3l. Corporate policy or guidelines
N3m.Payback on the investment with the incentives

N3n. Were there any other factors that we haven't discussed that were influential in your decision to implement <**MEASURE*x***>? If so, what were they? [If needed: Are these other factors program related?]
77. Yes [RECORD VERBATIM]
96. Nothing else influential [skip the next question, go to N41]
88. Refused [skip the next question, go to N41]
99. Don't know [skip the next question, go to N41]

[ASK IF N3n=77]
N3nn. Using the same 0 to 10 scale, how would you rate the influence of this factor?
#. RECORD 0 to 10
96. Not Applicable
88. Refused
99. Don't Know

[READ IF (N3a, N3b, N3c, N3e, N3f, N3h, N3i, N3j, N3l, N3m, OR N3n)=8,9,10]
You just told me that the following factors were important:
[READ IN ONLY ITEMS WHERE THEY GAVE A RATING OF 8 or higher]
PROGRAM RELATED:
N3b. The availability of cash incentives for <**MEASURE*x***>
N3c. The comprehensive study funded by the Smart Ideas Program
N3f. The recommendation from your ComEd Account Manager
N3h. The information from the Industrial Systems Program Representative (Service Provider)
OTHER FACTORS:
N3e. Previous experience with this type of project
N3i. Recommendation from an expert not affiliated with the program
N3j. Standard practice in your business/industry
N3l. Corporate policy or guidelines
N3m. Payback on the investment with the incentives
N3n. Other factor

N41. If you were given a TOTAL of 10 points that reflect the importance in your decision to implement <**MEASURE*x***>, and you had to divide those 10 points between: 1) the program and 2) other factors, how many points would you give to the importance of the PROGRAM? [IF NEEDED: Program factors include the cash incentives, the fully funded study, recommendations by ComEd staff or Service Provider.] Points given to program:
#. RECORD 0 to 10

88. Refused
99. Don't Know

[CALCULATE VARIABLE "OTHERPTS" AS: 10 MINUS N41 RESPONSE; IF N41=88, 99, SET OTHERPTS=BLANK]

N42. And how many points would you give to other factors? [IF NEEDED: Other factors include the previous experience, recommendations from people unrelated to the program, standard practice, corporate policy.] [The response should be <**OTHERPTS**> because both numbers should equal 10.]
#. RECORD 0 to 10
88. Refused
99. Don't Know

PAYBACK BATTERY

N10a. Did the cash incentive, including the avoided cost of the assessment, move <**MEASUREx**> within an acceptable payback cutoff point?
1. Yes
2. No
88. Refused
99. Don't know

CONSISTENCY CHECK ON PROGRAM IMPORTANCE SCORE

[ASK IF (N41>=7 AND ALL OF (N3b, N3c, N3f, AND N3h)=0,1,2,3), ELSE SKIP TO N4e]

N4 You just gave <**N41 RESPONSE**> points to the importance of the program, I would interpret that to mean that the program was quite important to your decision to install this equipment. Earlier, when I asked about the importance of individual elements of the program I recorded some answers that would imply that they were not that important to you. Just to make sure I have recorded this properly, I have a couple questions to ask you.

N4a When asked about THE AVAILABILITY OF THE CASH INCENTIVE, you gave a rating of ...<**N3B RESPONSE**> ... out of ten, indicating that the cash incentive was not that important to you. Can you tell me why the cash incentive was not that important?
77. Record VERBATIM
88. Refused
99. Don't know

N4b When I asked you about THE COMPREHENSIVE STUDY, you gave a rating of ...<**N3C RESPONSE**> ... out of ten, indicating that the study was not that important to you. Can you tell me why the study was not that important?
77. Record VERBATIM
88. Refused
99. Don't know

N4c When I asked you about THE RECOMMENDATION FROM YOUR COMED ACCOUNT MANAGER, you gave a rating of ...<**N3F RESPONSE**> ... out of ten, indicating that the recommendation was not that important to you. Can you tell me why the recommendation was not that important?

77. Record VERBATIM
88. Refused
99. Don't know

N4d When asked about THE INFORMATION from the INDUSTRIAL SYSTEMS PROGRAM REP, you gave a rating of ...<**N3H RESPONSE**> ... out of ten, indicating that this information from the program rep was not that important to you. Can you tell me why this information was not that important?

77. Record VERBATIM
88. Refused
99. Don't know

[ASK IF N41<=3 AND ANY ONE OF (N3b, N3c, N3f, OR N3h =8,9,10) ELSE SKIP TO N9a]

N4e You just gave <**N41 RESPONSE**> points to the importance of the program. I would interpret that to mean that the program was not very important to your decision to make energy efficiency improvements to the <**PROJECT_TYPE**>. Earlier, when I asked about the importance of individual elements of the program I recorded some answers that would imply that they were very important to you. Just to make sure I understand, would you explain why you scored the importance of the program a <**N41 RESPONSE**> in your decision to make energy efficiency improvements to the <**PROJECT_TYPE**>?

Actions Without the Program

ASK FOR MEASURE1, SKIP to N12 FOR MEASURE2 and MEASURE3

N9a. Now we would like you to think about the action you would have taken if the Program had not been available. If you had not received the ComEd comprehensive study, would you have undertaken a study on your own?

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

N12. Now thinking about <**MEASURE*x***> and its efficiency. Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the ComEd Industrial Systems program had NOT been available, what is the likelihood that you would have performed/installed the exact same measure?

#. RECORD 0 to 10
88. Refused
99. Don't know

N13. Without the program, when do you think you would have implemented <**MEASURE*x***>? Would you say…

1. At the same time [skip the next two questions, go to B1a]
2. Earlier [skip the next two questions, go to B1a]
3. Later
4. Never [skip the next two questions, go to B1a]
88. Refused [skip the next two questions, go to B1a]
99. Don't know [skip the next two questions, go to B1a]

[ASK IF N13=3]

N13a. How much later would you have implemented <**MEASURE*x***>? Would you say…

1. 1 to 3 months later [skip the next question, go to B1a]
2. 4 to 6 months later [skip the next question, go to B1a]
3. 7 to 12 months later [skip the next question, go to B1a]
4. 13 to 24 months later [skip the next question, go to B1a]
5. More than 2 years later
88. Refused [skip the next question, go to B1a]
99. Don't know [skip the next question, go to B1a]

[ASK IF N13a=5]

N13b. Why do you think it would have been 2 or more years later?

77. RECORD VERBATIM
88. Refused
99. Don't know

ASK FOR MEASURE1, SKIP to CH1 AFTER MEASURE3

B1a Thinking about all of the questions we just discussed, would you say the decision making process was the same for <**MEASURE2**> and <**MEASURE3**>, or was each measure part of a separate decision?

1 Same decision making process for all
2 Different decision making process
77 Other, specify
88 Refused
99 Don't know

END NTG LOOP

If B1A=1 THEN MOVE ON TO CH1, ELSE BEGIN NTG LOOP FOR THE NEXT MEASURE

Spillover and Channeling

CH1. Since your participation in the Industrial Systems program, have you installed any additional energy efficient equipment at this facility?

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

[ASK IF CH1=1(yes), ELSE SKIP TO S1]

CH2. What type of energy efficient equipment did you install?

77. RECORD VERBATIM
88. Refused [skip the next three questions, go to S1]
99. Don't know [skip the next three questions, go to S1]

CH2a. Did you receive an incentive from any utility or government program for this measure?

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

CH3. On a scale of 0 to 10, where 0 means "no influence" and 10 means "greatly influenced," how much influence did your participation in the Industrial Systems Program have on your decision to install additional energy efficiency measures?

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

[ASK IF CH3=8,9 or 10; ELSE SKIP TO S1]

CH4. How did the Industrial Systems Program influence your decision to install additional energy efficiency measures?

77. RECORD VERBATIM
88. Refused
99. Don't Know

Those are all of the questions I have. Thank you very much for your participation!

6.3.2 Technical Service Providers Telephone Survey

Vendor NTG Survey Instrument – for ComEd Custom Programs – Industrial Systems version – PY7

Introduction

AA1. Hello, this is _____ from Itron calling on behalf of ComEd. THIS IS NOT A SALES CALL. I am calling about your firm's recent involvement in conducting a technical assessment study sponsored by ComEd for ... <%CUSTOMER>... through the ComEd Smart Ideas for Your Business Program on approximately ... <%STUDY_DATE>._____Our records indicate that ...<%CONTACT>... would be the person most knowledgeable about this. Is he/she available?

1	Yes	AA5
2	No	AA2
88	Refused	Thank and Terminate
99	Don't know	Thank and Terminate

AA2. Who would be the person most knowledgeable about your firm's involvement in conducting a technical assessment study sponsored by ComEd for ...<%CUSTOMER>... through the ComEd Smart Ideas for Your Business Program on approximately...<%STUDY_DATE>?

1	Record name	AA3
88	Refused	Thank and Terminate
99	Don't know	Thank and Terminate

AA3. May I speak with him/her?

1	Yes	AA4
2	No (not available right now)	SCHEDULE APPOINTMENT

AA4. Hello, this is _____ from Itron calling on behalf of ComEd. THIS IS NOT A SALES CALL. I was told that you are the person most knowledgeable about your firm's involvement in conducting a technical assessment study sponsored by ComEd for ...<%CUSTOMER>... through the ComEd Smart Ideas for Your Business Program on approximately...<%STUDY_DATE>. Is this correct?

1	Yes	A1
2	No, there is someone else (RECORD NAME AND ASK TO BE TRANSFERRED)	AA5
3	No and I don't know who to refer you to	Thank and Terminate
88	Refused	Thank and Terminate
99	Don't know	Thank and Terminate

AA5. Am I speaking with …<%BETTER_CONTACT> ...the representative of your company that worked with ...<%CUSTOMER>... during the time that your firm conducted a technical assessment study sponsored by ComEd? This study was conducted on approximately... <%STUDY_DATE>.

1	Yes	A1
2	Yes, but we need to make an appointment.	Reschedule appt.

3	No but I will give you to the correct person.	AA4
88	Refused	Thank and Terminate
99	Don't know	Thank and Terminate

Before we start, I would like to inform you that for quality control purposes, this call may be monitored by my supervisor. For the sake of expediency, we will be recording this interview.

A1. Our records indicate that your firm conducted a technical assessment study sponsored by ComEd in which you recommended that <%CUSTOMER> install <%MEASURE1-%MEASURE3>. Is this correct?

1	Yes	A2
2	No	Thank and Terminate
88	Refused	Thank and Terminate
99	Don't know	Thank and Terminate

[DO NOT READ: The following question will determine if we ask about influences on their recommendations. Please be sure to be thorough with this question. If they truly only installed this equipment, then a "No" is fine]

LOOP/ASK FOR EACH MEASURE (1-3)

A2. As <%CUSTOMER>'s vendor, did you recommend the installation of this <%MEASUREx>?

1	Yes	A3
2	No	A3
88	Refused	A3
99	Don't know	A3

A3. Can you please explain what was your firm's involvement with ...<%CUSTOMER>'s ... implementation of <%MEASUREx>? [IF NEEDED: were they just an order taker, were they just equipment suppliers, or were they instrumental in what equipment was selected?.....if they were instrumental, then you need to go back and correct the answer to the previous question.]

77	RECORD VERBATIM	A3a
88	Refused	Thank and Terminate
99	Don't know	Thank and Terminate

A3a. Does your company currently stock and sell <%MEASUREx>s?

1	Yes	V2
2	No	V2
88	Refused	V2
99	Don't know	V2

[READ] For the sake of expediency, during the balance of the interview, we will be referring to the ComEd Smart Ideas for Your Business Program as the PROGRAM and we will be referring to the installation of ... <%MEASUREx> as the MEASURE. I will repeat this from time to time during the interview as your organization may have installed more than one measure through more than one program.

I am going to ask you to rate the importance of the ComEd Smart Ideas for Your Business in influencing your decision to recommend this <%MEASUREx> to ...<%CUSTOMER>.. Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means not at all important and 10 means very important, so that an importance rating of 8 shows twice as much influence as a rating of 4.

V2. Using this 0 to 10 scale where 0 is NOT AT ALL IMPORTANT and 10 is EXTREMELY IMPORTANT, how important was the ComEd Smart Ideas for Your Business Program, including incentives as well as program services and information, in influencing your decision to recommend that ...<%CUSTOMER>... install the energy efficiency <%MEASUREx> at this time?

#	Record 0 to 10 score (_____)	V3
88	Refused	V3
99	Don't know	V3

V3. And using a 0 to 10 likelihood scale where 0 is NOT AT ALL LIKELY and 10 is EXTREMELY LIKELY, if the ComEd Smart Ideas for Your Business Program, including incentives as well as program services and information, had not been available, what is the likelihood that you would have recommended this specific <%MEASUREx> to ...<%CUSTOMER>?

#	Record 0 to 10 score (_____)	V4
88	Refused	V4
99	Don't know	V4

V4. Approximately, in what percent of technical assessment studies did you recommend this <%MEASUREx> before you learned about the ComEd Smart Ideas for Your Business Program?

%	Record PERCENTAGE	V5
88	Refused	V5
99	Don't know	V5

V5. And approximately in what percent of technical assessment studies do you recommend this <%MEASUREx> now that you have worked with the ComEd Smart Ideas for Your Business Program?

%	Record PERCENTAGE	V6a
88	Refused	V6a
99	Don't know	V6a

V6a. In what other ways has the ComEd Smart Ideas for Your Business Program influenced your recommendation that a customer install <%MEASUREx>?

1	Record FIRST mention	V6aa
2	Record SECOND mention	V6aa
3	Record THIRD mention	V6aa
4	No other way	V7b
88	Refused	V7b
99	Don't know	V7b

IF V6a=1 THEN ASK, ELSE V6ab

V6aa. Using a 0 to 10 scale, how important was <%FIRST_MENTION_IN_V6A > in your recommendation that a customer install <%MEASUREx>?

#	Record 0 to 10 score (_____)	V6a
88	Refused	V6a
99	Don't know	V6a

IF V6a=2 THEN ASK, ELSE V6ac

V6ab. Using a 0 to 10 scale, how important was <%SECOND_MENTION_IN_V6A > in your recommendation that a customer install <%MEASUREx>?

#	Record 0 to 10 score (_____)	V6ac
88	Refused	V6ac
99	Don't know	V6ac

IF V6a=3 THEN ASK, ELSE V7b

V6ac. Using a 0 to 10 scale, how important was <%THIRD_MENTION_IN_V6A > in your recommendation that a customer install <%MEASUREx>?

#	Record 0 to 10 score (_____)	V7b
88	Refused	V7b
99	Don't know	V7b

V7b. And how important was the information provided by the ComEd website in your recommendation that a customer install this MEASURE?

#	Record 0 to 10 score (_____)	V7c
88	Refused	V7c
99	Don't know	V7c

V7c. And how important was your firm's past participation in an incentive or study-based program sponsored by ComEd in your recommendation that a customer install this MEASURE?

#	Record 0 to 10 score (_____)	V8
88	Refused	V8
99	Don't know	V8

IF VENDOR ALSO STOCKS AND SELLS PROGRAM QUALIFYING <%MEASURE> (if A3a=1) THEN ASK V8. ELSE SKIP TO V15.

V8. Approximately, what percentage of your sales over the last 12 months of <%MEASUREx>s installed in ComEd's service territory are energy efficient models, that qualify for incentives from the program?

%	Record PERCENTAGE	V9
88	Refused	V9
99	Don't know	V9

V9. In what percent of sales situations do you encourage your customers in ComEd's service territory to purchase program qualifying <%MEASUREx>s?

%	Record PERCENTAGE	V9a
88	Refused	V10
99	Don't know	V10

IF V9 < 100% THEN ASK. ELSE SKIP TO V10.

V9a. In what sales situations do you NOT encourage your customers to purchase program qualifying <%MEASUREx>s? And why is that?

77	RECORD VERBATIM	V10
88	Refused	V10
99	Don't know	V10

V10. Of those installations of <%MEASUREx>s in ComEd's service territory that qualify for incentives, approximately what percentage do not receive the incentive?

%	Record PERCENTAGE	V11
88	Refused	V12
99	Don't know	V12

IF V10 > 0%

V11. Why do you think they do not receive the incentive?

77	RECORD VERBATIM	V12
88	Refused	V12
99	Don't know	V12

V12. Do you also recommend <%MEASUREx>s in areas where customers do not have access to incentives for energy efficient models?

1	Yes	V13
2	No	V14
88	Refused	V14
99	Don't know	V14

V13. About what percent of your sales of program-qualifying <%MEASUREx>s are represented by these areas where incentives are not offered?

%	Record PERCENTAGE	V14
88	Refused	V14
99	Don't know	V14

V14. Have you changed your stocking practices of <%MEASUREx>s as a result of ComEd's Program? [IF NEEDED: BY STOCKING PRACTICES, I MEAN THE TYPES OF EQUIPMENT YOU SUPPLY AND SELL IN COMED'S SERVICE TERRITORY.]

1	Yes	V15
2	No	V15
88	Refused	V15

99 Don't know V15

IF V12=1

V15. Do you promote energy efficient equipment, such as <%MEASUREx>, equally in areas with and without incentives??

1 Yes V16
2 No V16
88 Refused V16
99 Don't know V16

V16. Do you know of any other vendors that worked with <%CUSTOMER> during their implementation and/or installation of <%MEASUREx>? For example engineers or designers?

1 Yes V16a
2 No V17
88 Refused V17
99 Don't know V17

V16a. Do you have their business name?

77 RECORD Business name and contact's name and phone number(s) V17
88 Refused V17
99 Don't know V17

END LOOP – MEASURE 1-3

PROCESS MODULE

V17. And finally, for verification purposes only, may I please have your first name?

77 RECORD VERBATIM END

END Those are all the questions I have for you today. Thank you very much for your time.

END OF SURVEY