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Smart Ideas for Your Business
Custom Program
PY7 Evaluation Report

FINAL

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

Presented to
Commonwealth Edison Company

February 19, 2016

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Table of Contents

List of Figures and Tables

Figures

Tables

NAVIGANT

E. Executive Summary

This report presents a summary of the findings and results from the impact evaluation of the program year seven (PY7) Custom program, which is one of several included in ComEd's Smart Ideas for Your Business suite of energy efficiency programs for business customers. This program provides a custom incentive, based on an ex-ante savings-based formula, for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Custom incentives are available based on the project's energy savings, provided the project meets all program eligibility requirements. The Custom program pays an incentive of $0.07/kWh saved for eligible projects. Incentives cannot exceed 100% of the total project cost and 100% of the incremental project cost. The primary objectives of this evaluation are to quantify gross and net impacts, determine process-related program strengths and weaknesses and identify ways in which the program can be improved. PY7 represents the seventh full year of implementation and evaluation of the Custom program.

The Custom incentives program also provides an early commitment incentive option to commercial and industrial (C&I) customers. The early commitment option provides incentive funding certainty once an application is approved. To qualify for this option, projects must reduce energy consumption by a minimum of 500,000 kWh. For qualifying early commitment projects, the program pays an incentive of $0.06/kWh saved. Incentives are paid after successful completion of the project has been verified and will not be subject to change based on actual verified energy savings.

E.1. Program Savings

Table E-1. summarizes the electricity savings reported by the Custom Program during PY7.

Table E-1. PY7 Total Program Electric Savings

Savings Category		Energy Savings (MWh)	Peak Demand Savings (MW)
Ex-Ante Gross Savings		29,575	2.205
Verified Gross Savings		29,356	7.411
Verified Net Savings	SAG NTGR[1]	18,788	4.743
	PY5 Evaluated NTGR[2]	18,788	4.150

Source: ComEd tracking data and Navigant team analysis.

Based on the gross impact sample size of 19 projects in PY7, the evaluation results yielded a gross energy realization rate of 0.99 and a gross peak demand realization rate of 3.36. The relative precision for the

[1] 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] The SAG-approved value did not include a separate value for kW NTGR. There was a significant difference between the kWh and kW NTGR values in PY5, with NTGRs of 0.64 for kWh and 0.56 for kW. For this reason, net demand savings are being reported using both the SAG deemed NTGR of 0.64 and the PY5 evaluated demand savings NTGR of 0.56.

gross impact results at a one-tailed 90 percent confidence level is ±15% for the energy realization rate and ±48% for the demand realization rate. To calculate net savings, the evaluation team used a deemed net-to-gross ratio (NTGR) of 0.64 for energy savings in accordance with the Illinois Stakeholder Advisory Group (SAG)-approved values. The SAG deemed NTGR was based on the PY5 evaluated NTGR for energy (kWh) savings. However, the SAG-approved value did not include a separate value for kW NTGR. Since there was a significant difference between the kWh NTGR and kW NTGR values in PY5, with NTGRs of 0.64 for kWh and 0.56 for kW, net demand savings are being reported using both the SAG deemed NTGR of 0.64 and the PY5 evaluated demand savings NTGR of 0.56.

Program implementers are continuing to collect site-specific pre- and post-metered data for the majority of projects which contributed significantly to the accuracy of the ex-ante savings estimates. Because of this, it was not necessary for the evaluation team to collect independent measurement and verification (M&V) data for desk review projects. For such projects, the program-collected M&V data was a crucial element in the development of evaluation-based savings estimates.

E.2. Results Summary

The following table summarizes the key metrics from PY7.

Table E-2. PY7 Results Summary

Participation	Units	PY7
Net Savings	MWh	18,788
Net Demand Reduction‡	MW	4.743
Verified Gross Savings	MWh	29,356
Gross Demand Reduction	MW	7.411
Program Realization Rate (MWh)	%	99%
Program Realization Rate (MW)	%	336%
Deemed SAG NTG Ratio (MWh/ kW) †	%	64%
PY5 Evaluated NTG Ratio (kWh)	%	64%
PY5 Evaluated NTG Ratio (kW)	%	56%
Projects Completed	#	123

Source: ComEd tracking data and Navigant team analysis.
‡ Using the 0.64 NTG ratio.
† A 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 website (www.ilsag.info)

E.3. Findings and Recommendations

The PY7 gross energy realization rate of 0.99 is slightly higher than the PY6 level of 0.97, yet the project-level realization rates ranged from zero to 3.22 which demonstrates a very large variation in evaluated savings. The reasons for this high variability in project-level realization rates are discussed throughout this report. The relatively high PY7 gross demand realization rate of 3.36 is driven to a large part by the frequency for which ex-ante savings are set equal to zero or missing. In past reports gross demand

realization rates were much lower because project-level estimates only contributed in those instances where ex-ante demand savings had been claimed. There were many projects in PY7 that had ex-post demand savings but the program did not claim them. For PY7 the evaluated gross demand realization rate was calculated for all the projects in the sample, including those where demand savings had not been claimed. This resulted in a higher than normal evaluated gross demand realization rate of 3.36. However, this high demand gross realization rate was also influenced by the large variation in project-level realization rates for non-zero demand savings claims, which ranged from 0.55 to 4.0.

Although the PY7 energy realization rate results indicate strong program performance, the evaluation team found a number of common issues present within the evaluated sample of projects, which are summarized below.[3]

Normalizing Pre- and Post- Analyses

Finding 1. The evaluation found that production normalization was an issue for three projects (#21097, 21549, and #23800). In these cases, the production variable[4], changed enough between the pre-retrofit case and the post-retrofit case to warrant an adjustment that substantially affected the resulting savings.

Recommendation 1. In order to ensure that pre- and post-retrofit usage data can be compared accurately, a production variable can be used to normalize pre-retrofit data to reflect post-retrofit production levels. This will ensure that the calculated savings result only from the increase in efficiency, and not from any increase or decrease in production. The report includes a summary of general normalization procedures.[5]

Ensuring Quality Control through Graphical Representations of Data

Finding 2. There were multiple instances where the ex-ante calculations had various deficiencies. In many cases, representing the data in a graphical format would have provided insight into the shortcomings of the analysis.

Recommendation 2. The evaluation team recommends that quality control procedures for project-specific data include reviewing graphical representations of the data. This method could have mitigated or eliminated some of the more extreme realization rates. The report includes a summary of several methods and techniques for representing the data graphically.[6]

PJM Peak Summer Demand Savings

Finding 3. Lack of claimed demand savings for some projects continues to be an issue for the ComEd Custom program. Figure E-1 below, shows the number of projects in the evaluation sample where the evaluation estimated and found demand savings versus number that claimed ex-ante demand savings. In PY6 and PY7 the evaluation has concluded that demand savings claims are warranted twice as often as ex-ante demand savings are claimed.

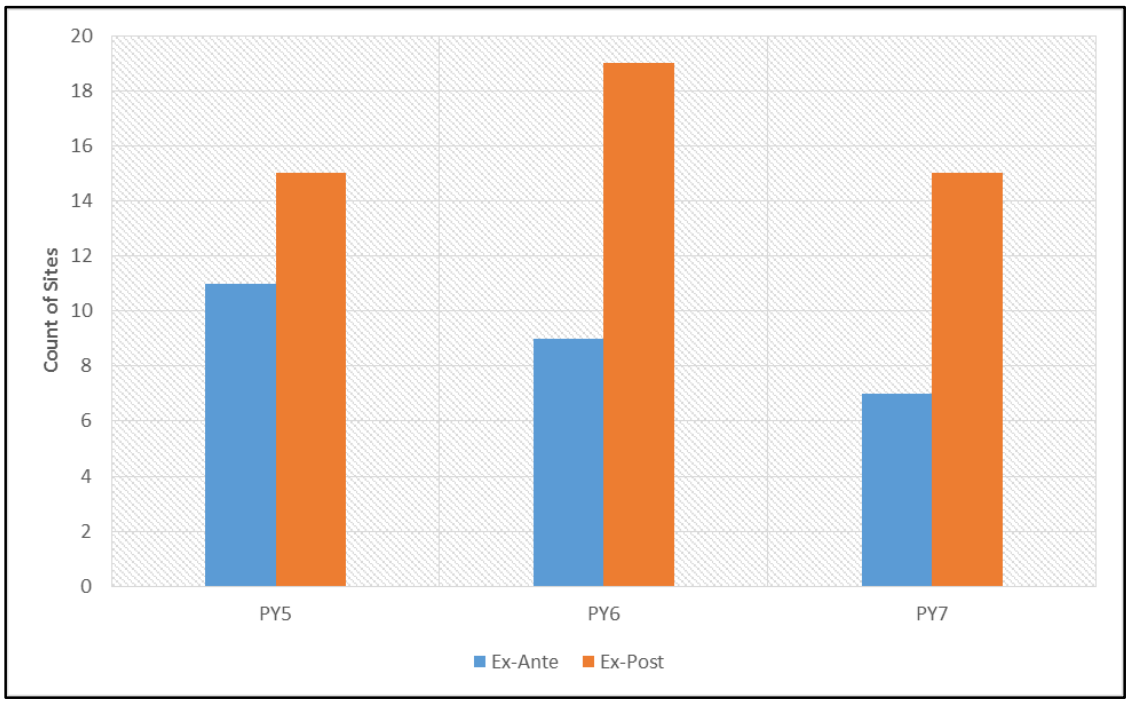
[3] Numbered findings and recommendations in this section are the same as those found in the Findings and Recommendations section of the evaluation report for ease of reference between each section.

[4] CFM for two projects, and Oil Production for one project.

[5] See Sections 6.1.1.2 and 6.1.1.3.

[6] Ibid.

Figure E-1. Comparison of Ex-Ante Claimed Demand Savings to Ex-Post Realized Demand Savings



Source: Evaluation Team analysis.

In this evaluation, the resulting realization rate is based on all evaluated sample points, including those projects where demand savings has not been claimed, which, as noted above, differs from prior-year evaluation result reporting. For example, if the overall program realization rate is limited to only those projects which had originally claimed demand savings the overall demand realization rate is 1.34, for a total demand savings of 2.965 MW compared to the ex-post evaluated savings of 7.411 MW and gross realization rate of 3.34 for the full population of projects.

Recommendation 3. Savings should be claimed for all projects that save energy over the PJM peak summer period of 1:00-5:00 PM Central Prevailing Time on non-holiday weekdays, during the months of June through August. The report includes a short description of possible methods of calculating peak demand using the PJM weighted temperature humidity index requirements.[7]

Billing Analysis to Create a Monthly Regression

Finding 5. The ex-ante approach for several sites used a billing analysis to calculate savings by attempting to correlate monthly CDD and HDD values to the billed kWh for that month using a multi-variable regression. These analyses would create a multi-variable regression fit of the pre-retrofit data, and model the regression fit to the post-period conditions. The percent savings would be calculated over the entire post-retrofit period, usually around six months. That percent savings would be applied to a typical year which was usually either a five-year average, or the previous year. The issue was that often this post-period was not able

[7] See Section 6.1.1.1.

to cover a range of seasons, so the correlation identified was only based on a short period of the year, which skewed some of the results. The second issue was that if the correlation was below an R^2 value of 0.3, the ex-ante analysis would scale up the kWh consumption from the pre- and post-period to an entire year, and take the direct difference of the two, which does not account for any fluctuation in energy usage due to external factors.

Recommendation 5. A billing analysis is still valid under some circumstances. However, there are several things that the program should verify to ensure that the billing analysis provides accurate estimates of project savings:

- Ensure that the overall savings identified through the billing analysis are reasonable. Billing analysis can often incorporate external factors that can drive differences in the monthly bills. The site contact should be interviewed to ensure that no major changes are happening between the pre- and post-retrofit periods that aren't accounted for by the equipment retrofit.
- The multi-variable regression should be fitted to the post-retrofit period in addition to the pre-retrofit period. These models should then be applied to a typical year's[8] data, to ensure that both the pre- and post-retrofit periods are modeled and that a separate percent savings is applied to the different periods of the year.
- The analysis should at a minimum use six months' worth of billing data. This will help to ensure that the effects of both the winter and summer seasons are depicted in the data so that fluctuations in energy usage due to high or low temperatures can be captured. It will also ensure that there are sufficient billing data points in the model to support the analysis.
- The analysis should use site-level EMS data whenever it is available. This will allow for more granular data, taken at the weekly, daily, or hourly level to support results that are more statistically robust.

[8] A typical year should use TMY3 data.

1. Introduction

1.1 Program Description

ComEd's Smart Ideas for Your Business suite of energy efficiency programs for business customers includes a Custom incentive program. This program provides a custom incentive, based on a formula, for less common or more complex energy-saving measures installed in qualified retrofit and equipment replacement projects. Custom incentives are available based on the project's kWh savings, provided the project meets all program eligibility requirements. For eligible projects, the program pays an incentive of $0.07/kWh saved. This is the seventh year of implementation of the Custom program.

The Custom incentives program also provides an early commitment incentive option to commercial and industrial (C&I) customers. The early commitment option provides incentive funding certainty once an application is approved. To qualify for this option, projects must reduce energy consumption by a minimum of 500,000 kWh. For qualifying early commitment projects, the program pays an incentive of $0.06/kWh saved. Incentives are paid after successful completion of the project has been verified and will not be subject to change based on actual verified kWh savings. Incentives for the Custom program cannot exceed 100% of the total project cost and 100% of the incremental project cost.

1.2 Evaluation Objectives

The evaluation team identified the following key objectives for PY7.

1.2.1 Impact Objectives

1. Estimate the gross impacts from the program.
2. Identify opportunities for improvement to the within-program impact calculations and estimates.
3. Estimate the net impacts from the program.
4. Assess whether or not the program has met its energy goals.
5. Provide real-time evaluation for a sample of large projects to provide evaluation input before each application is finalized and paid by the program.
6. Determine how the program can be improved.

The evaluation team did not conduct a process evaluation in PY7 and the sole focus was on estimation of gross and net program impacts.

2. Evaluation Approach

For the PY7 impact evaluation, gross program impact results were developed based on detailed M&V analysis for 19 projects. The NTGR used to calculate the PY7 impact was deemed by SAG[9] and was derived from PY5 evaluation results. The verified gross savings estimates were multiplied by the deemed NTGR to calculate the verified net energy and peak demand savings.

2.1 *Overview of Data Collection Activities*

The core data collection activities included on-site audits, detailed M&V analysis in support of gross impact analysis and telephone surveys in support of NTG analysis. The full set of data collection activities is shown in Table 2-1.

Table 2-1. Primary Data Collection Activities

What	Who	Target Completes	Completes Achieved	When	Comments
Onsite M&V Audit	Participants	15	15[10]	May – November 2015	Sampled PY7 projects
Desk Reviews	Participants	5	5	May – November 2015	Sampled PY7 projects
Telephone Survey	Participants	30	27	June – October 2015	Data collection supporting NTG research
Telephone Survey	Vendors	-	4[11]	September - November 2015	Triggered during NTG research

2.2 *Verified Savings Parameters*

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

[9] 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

[10] One of these sites turned out to be associated with the Operational and Influenced savings program, which was originally included in the Custom program sample population. The site was evaluated, but after discussions with ComEd, the evaluation team decided to remove it from the sample. The evaluation team will draft a memo on these two programs and the findings from the site review and follow-up phone interviews will be presented separately.

[11] Five vendor surveys were triggered during NTG research, however only four surveys were completed. The evaluation team was unable to reach the fifth vendor to complete the survey.

Table 2-2. Verified Savings Parameter Data Sources

Gross Savings Input Parameters	Data Source	Deemed † or Evaluated?
Gross Energy Savings	PY7 Analysis	Evaluated
Gross Peak Demand Savings	PY7 Analysis	Evaluated
Gross Energy Savings Realization Rate	PY7 Analysis	Evaluated
NTG Ratio (kWh/ kW) †	SAG Agreement	Deemed
NTG Ratio (kW)	PY5 Analysis	Evaluated
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 (www.ilsag.info).

2.2.1 Verified Gross Program Savings Analysis Approach

The evaluation team's objective for the verified gross program savings analysis was to verify the accuracy of the PY7 ex-ante gross savings estimates claimed in the Custom program tracking system. This was completed through on-site measurement and verification (M&V) analysis for 14 sites plus five engineering desk reviews. The engineering methodologies used to calculate evaluation-based savings for the 19 completed PY7 sites sampled are described below.

On-site data collection included verification of measure installation, functioning system and planned system operation, and specific details of any variation between the ex-ante and ex-post verifications. 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, were used to calibrate the site-specific analyses. Customer-supplied data from energy management systems (EMS) or supervisory control and data acquisition (SCADA) systems were also obtained when available.

For the five engineering desk review projects, the evaluation team conducted 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 reviews, the evaluation team completed telephone interviews with the site contacts for each site and the information collected during these interviews was used to verify the savings estimates.

The EM&V team performed engineering calculations to derive evaluated gross energy and demand 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[12] 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 EM&V 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 described in in Section 2.3.

NOTE: The winter PJM peak demand values were not reported in the ex-ante analysis and were not calculated by the evaluation team. For some of the projects, metering will need to be performed during the winter peak period to estimate the winter PJM peak demand savings. If the evaluation team ends up estimating the savings for the winter PJM peak demand savings, then the team will prepare a follow up memo to present the results.

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 ration (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 in PY5. Since the deemed SAG NTG values were based on evaluated energy savings NTGR in PY5, we also report the net demand savings using the PY5 evaluated demand savings NTGR. The PY6 evaluation effort included research to estimate NTG values for future use (see Section 6.1.2 in the Appendix for complete details).

2.3 Sampling

2.3.1 Profile of Population

The EM&V team divided the program population into three size-based sampling strata as shown in Table 2-3 below. In PY7, HVAC-related projects contributed to 28 percent of the ex-ante energy savings, lighting accounted for 14 percent of program energy savings, and other projects, including motors, pumps, and EMS comprised the largest share of 48 percent of the ex-ante savings claims.

[12] 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.

Table 2-3. PY7 Custom Program Participation by Sampling Strata

Sampling Strata	Ex-Ante MWh Impact Claimed	Ex-Ante MW Impact Claimed	Tracking Records	Incentive ($) Paid to Applicant
1	9,377	0.363	4	632,773
2	12,799	0.865	26	818,573
3	7,399	0.977	93	432,438
TOTAL	29,575	**2.205**	**123**	**1,883,783**

Source: Evaluation Team analysis

The EM&V team used a stratified random sampling approach to select the gross impact sample of 20 projects. The gross impact sampling was conducted in two waves. For Wave 1, ComEd's tracking database extract dated May 3, 2015 (referred to as 5/3/2015) was used to select 13 M&V sample points. Using the 5/3/2015 tracking extract, the EM&V team sorted the Custom records and placed them in three strata using ex-ante savings kWh to create roughly equal contributions to total program savings in each strata.

When the July 12, 2015 extract (referred to as 7/12/2015) became available for Wave 2 sampling, the strata boundaries defined on 5/3/2015 were preserved. This ensured that the Wave 1 sample remained representative of the projects installed before 5/3/2015, and could be easily combined with the additional Wave 2 sample to estimate PY7 results. The EM&V team selected seven additional M&V sample points from the incremental projects installed between 5/3/2015 and 7/12/2015, so that the sample reflects the final population distribution of savings within each stratum. Overall, a total of 20 M&V sample points were initially selected, consistent with the PY7 evaluation plan. The initial random sample of 20 projects was drawn to achieve a one tailed 90/10 confidence/precision level.

After the sample was drawn, the EM&V team discovered that the projects from the Operational and Influenced savings program were included in the Custom program population. The initial gross sample included one Operational Savings project (out of the 20) and the net sample included four Operational savings and one Influenced Savings project (out of the 30 projects). Upon further investigation, the EM&V team concluded that projects from these two new program elements should be evaluated separately. After consulting with ComEd, the EM&V team recommended[13] that the Operational Savings and Influenced Savings projects be removed from the population and from consideration in this evaluation. They will be reported separately through a stand-alone memo at a later time.

Based on this separate evaluation of Operational and Influenced Savings projects, one of the Gross impact sample points was removed from the sample frame, resulting in a final sample of 19 projects. The EM&V team also replaced the four Operational and Influenced Savings projects with Custom Projects in the Net sample frame.

[13] September 22, 2015 memo to ComEd.

Profile of the Gross Impact M&V Sample

Table 2-4 provides a profile of the gross impact M&V sample for the Custom program in comparison with the program population. This table shows the resulting sample that was drawn which consists of 19 projects. These projects make up 13,840 MWh of the ex-ante impact claim and represent 47 percent of the ex-ante impact claim for the program population. Also shown are the ex-ante based MWh sample weights for each of the three strata. Note that a census of the four stratum 1 projects was picked and these projects accounted for about 68 percent of the total sample MWh.

Table 2-4. PY7 Custom Program Participation by Sampling Strata

	Custom Population Summary			Impact Sample		
Sampling Strata	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	4	9,377	0.32	4	9,377	100%
2	26	12,799	0.43	8	3,769	29%
3	93	7,399	0.25	7	694	9%
TOTAL	123	29,575	-	19	13,840	47%

Source: Evaluation Team analysis

2.3.2 Telephone Survey Sample

The EM&V team performed a telephone survey to estimate the NTGR for future use. For this survey, the evaluation team picked a sample of 30 Custom projects based on the same considerations as for the impact analysis sampling. The team drew a stratified random sample of program participants in order to achieve a sample size of 30 customer interviews. Note that the original main selected participant sample included all the gross impact sample points, including Operational and Influenced projects. Before customer surveys were conducted, four Operational and Influenced projects were dropped from the main sample and replaced with backup projects.

For telephone surveys, the unit of sampling is the project contact. To develop the sample of unique project contacts, duplicate contact names were removed from the sample where a single person was involved in more than one project application. In addition, contacts that also completed Prescriptive program projects could only be contacted once regarding a given project (if the project yielded both Standard and Custom savings). Because fewer Custom projects were completed compared to the Standard Program, Custom projects were given preference over Standard ones.

For Custom telephone surveys, 18 sample points were selected using the 5/3/2015 database extract, and 12 additional sample points were selected using the 7/12/2015 database extract. The telephone survey was conducted for the two waves ultimately yielding a total of 29 completed interviews. Upon review, two of these were dropped from the analysis frame due to insufficient responses to calculate the NTGR,[14] resulting in 27 completed interviews for subsequent NTG analysis.

[14] Completed interviews were dropped because did not have adequate responses to the necessary questions for NTGR calculation (response was either "I don't know/ refused" or necessary questions weren't asked).

Profile of the Telephone Survey Sample

Table 2-5 summarizes the participating customer telephone interviews completed in support of the NTG research. The completed interviews represent 14,147 MWh or 48 percent of the ex-ante impact claim for the total program population. The achieved sample size meets the one-tailed 90/10 confidence/precision target at the program level - the selected sample points were representative of the program population.

Table 2-5. PY7 Telephone Survey Sample by Strata

Sampling Strata	Population Summary		MWh Weights	Completed Interviews		
	Number of Tracking Records (N)	Ex-Ante MWh Impact Claimed		Number of Tracking Records (n)	Ex-Ante MWh	Sampled % of Population MWh
1	4	9,377	0.32	3	8,195	87%
2	26	12,799	0.43	11	4,828	38%
3	93	7,399	0.25	13	1,124	15%
TOTAL	**123**	29,575	**-**	**27**	14,147	**48%**

Source: Evaluation Team analysis.

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 Custom program were developed based on on-site M&V analysis for 14 sites and engineering desk reviews for five projects.

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 plus downloading rights to project documentation in electronic format for each project. This documentation was complete and greatly facilitated the evaluation efforts.

A key finding is that for three projects (#19809, #20552, and #27573) in the gross impact sample, the program calculated peak demand savings in the ex-ante calculation sheets, but the peak demand savings were not reported in the tracking system.

3.2 Gross Program Impact Parameter Estimates

Gross program impacts were developed based on on-site visits and detailed M&V analysis for 14 projects and thorough engineering desk reviews supported with telephone interviews for five projects. The EM&V team conducted research to validate the parameters that were not specified in the TRM. The verified gross impact results for PY7 are shown in Table 3-1 below.

Table 3-1. Verified Gross Savings Parameters

Input Parameters	Value	Deemed or Evaluated?
Energy Savings Realization Rate	99%	Evaluated
Peak Demand Savings Realization Rate	336%	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.[15] 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 Custom program. This is because the separate ratio estimation technique follows the steps outlined in

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

the California Evaluation Framework[16] 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 19 projects in PY7, the evaluation results yielded energy gross realization rate of 0.99 and demand gross realization rate of 3.36. The resulting total program verified gross savings is 29,356 MWh and 7.411 MW as shown in Table 3-2.

Table 3-2. Gross Parameters and Savings Estimates

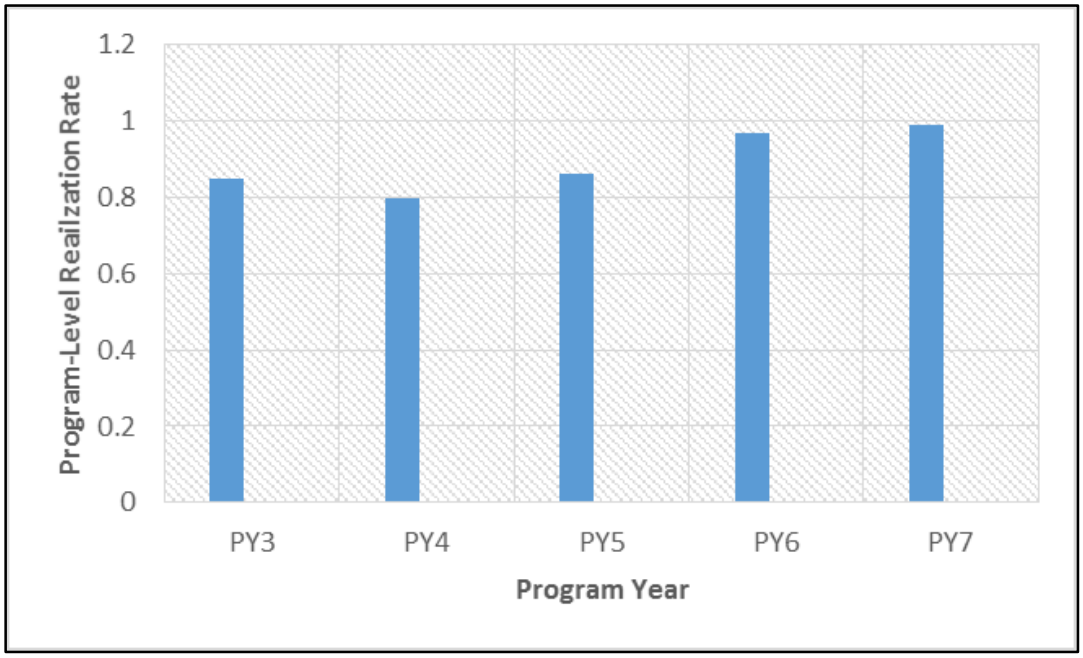
Sampling Strata	Ex-Ante MWh	Evaluation Verified MWh	MWh RR	Ex-Ante MW	Evaluation Verified MW	MW RR
1	9,377	8,533	0.91	0.363	1.105	3.05
2	12,799	17,203	1.34	0.865	3.170	3.66
3	7,399	7,344	0.99	0.977	3.135	3.21
PY7 TOTAL	**29,575**	**29,356**	**0.99**	**2.205**	**7.411**	**3.36**

Source: Evaluation Team analysis.

At the program level, the energy realization rate of 0.99 continues to reflect a trend upwards in the overall accuracy of program-level savings estimation over the PY6, PY5, and PY4 program realization rates. Figure 3-1 below compares the overall program-level energy realization rates over the last 5 years, showing an overall trend upwards towards a 100 percent program-level realization rate.

[16] 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 Custom Program Energy Realization Rates across Program Years



However, examination at the individual site-level reveals considerable variation in the savings gap across projects. Table 3-3 below shows the site-specific ex-ante and ex-post savings along with stratum level realization rates.

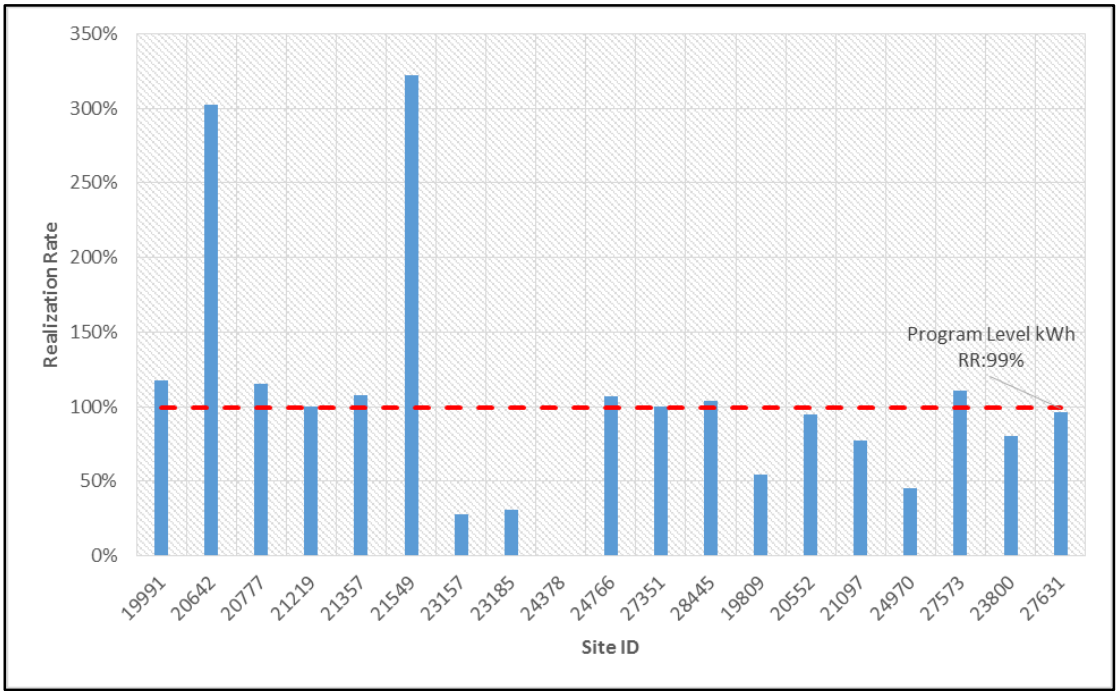
Table 3-3. Gross Impact Realization Rate Results for the Selected Custom Sample

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 MWh Realization Rate	Sample-Based Evaluation Verified Gross kW Realization Rate
27351	1,182	128	1	0.13	1,182	156.69	1.00	1.22	0.91	3.05
21219	2,062	235	1	0.22	2,060	222.00	1.00	0.94		
23800	3,628	0	1	0.39	2,916	332.92	0.80	-		
20552	2,505	0	1	0.27	2,375	393.88	0.95	-		
20777	398	0	2	0.12	457	55.27	1.15	-	1.34	3.66
21357	262	0	2	0.08	282	0.00	1.08	-		
21549	312	0	2	0.09	1,004	114.64	3.22	-		
19991	812	0	2	0.24	957	147.84	1.18	-		
20642	277	50	2	0.08	836	200.24	3.02	4.00		
19809	516	0	2	0.15	281	33.56	0.54	-		
21097	330	75	2	0.10	255	41.02	0.77	0.55		
27631	435	50	2	0.13	418	47.70	0.96	0.96		
23185	97	0	3	0.14	30	25.24	0.31	-	0.49	3.21
24378	200	0	3	0.29	0	0.00	0.00	-		
28445	177	25	3	0.26	184	27.70	1.04	1.11		
24766	37	4	3	0.05	40	6.60	1.07	1.65		
23157	125	0	3	0.18	34	33.52	0.28	-		
24970	18	0	3	0.03	8	0.00	0.45	-		
27573	38	0	3	0.06	43	0.00	1.11	0.00		
TOTAL	13,412	**567**	**-**	**NA**	13,363	**1,839**	**NA**	**NA**	**0.99**	**3.36**

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 zero to 3.22, which indicates significant variation in realization rates across projects. For eight of the 19 projects, the gross energy realization rate was greater than the program mean realization rate (0.99) and for nine projects the gross energy realization rate was less than the program mean. Two projects received a 1.0 realization rate. However, two projects had an extremely high realization rate (#20642 and #21549) of over 300 percent, while four other projects had realization rates of less than 50 percent (#23157, #23185, 24378, and 24970).

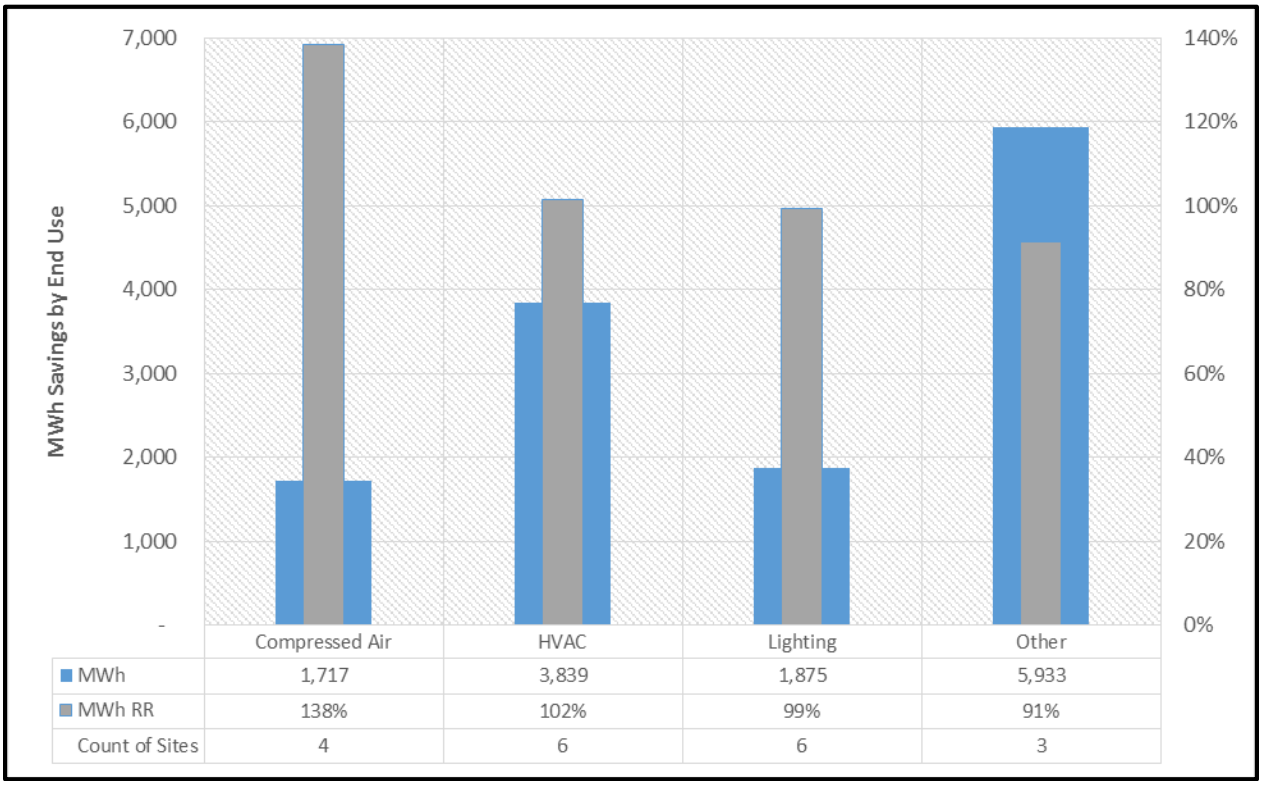
Figure 3-2. PY7 Custom Program Project Energy Realization Rates (*shown by Project ID*)



Source: Evaluation Team analysis.

The evaluation team also looked at the distribution of program savings by end-use. There were three projects grouped into an "Other" category, which included an energy management system (EMS) project, a pumping project, and a motors project, that accounted for 48 percent of the sample energy savings. HVAC savings were the next highest end-use category, accounting for 28 percent of the energy savings. These projects were a mixture of chiller plant retrofits, ventilation fans, and HVAC controls. Lighting and compressed air projects accounted for the lowest shares, at 14 percent and 9 percent respectively. These breakouts by end-use can be seen below in Figure 3-3. The chart also shows the realization rate by end-use. Note that the lighting and HVAC end-uses achieved nearly a 100 percent realization rate (unweighted) while the compressed air end-use had more variation, with a realization rate (unweighted) of 138 percent.

Figure 3-3. PY7 Custom Program Energy Savings and Realization Rate by End-Use

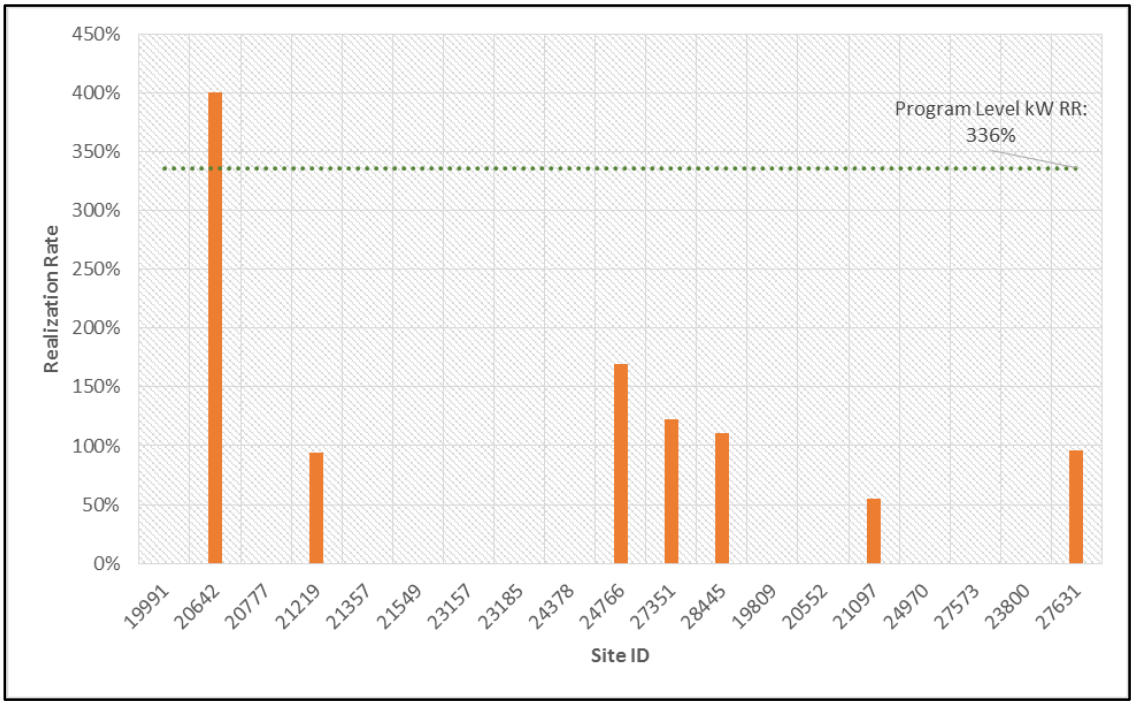


	Compressed Air	HVAC	Lighting	Other
MWh	1,717	3,839	1,875	5,933
MWh RR	138%	102%	99%	91%
Count of Sites	4	6	6	3

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 0.55 to 4.0 which indicates a very large variation in realization rates across projects. Site-level realization rates were only reported for seven sites, and of those, three projects had realization rates below 1.0 (between 0.55 and 0.96) while the remaining four had realization rates above 1.0 (between 1.11 and 4.0).

Figure 3-4. PY7 Custom Program PJM Peak Demand Realization Rates (*by Project ID*)



Source: Evaluation Team analysis.

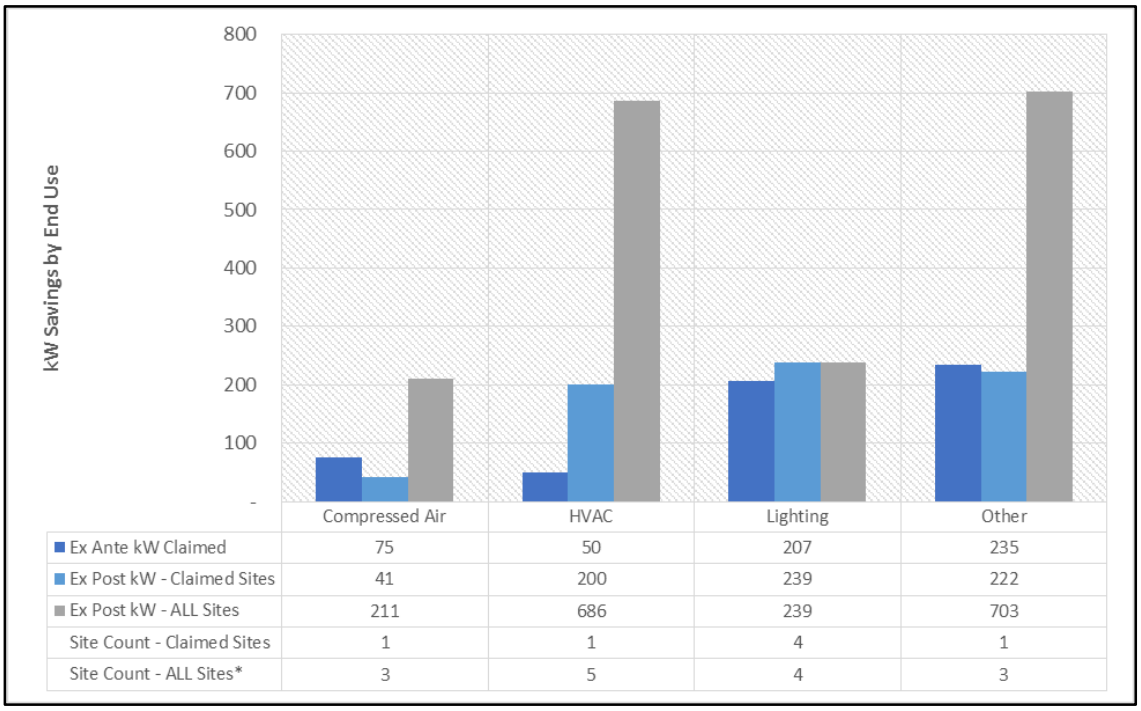
Gross realization rates for ex-post PJM peak summer demand savings were much higher than in previous years due to a difference in the way the EM&V team analyzed and reported on the savings. In previous program years, the EM&V team evaluated and reported demand savings for only those sites where ComEd had claimed demand savings. For PY7, the evaluation team evaluated and reported demand savings for all sites where demand savings could be documented. The evaluation team determined that 15 out of the 19 sites had demand savings during the PJM peak summer period[17]. However, less than 50 percent of those (seven sites) had claimed ex-ante demand savings. For comparison, the ex-post demand savings for the sites that had originally claimed demand savings was 702 kW. The total ex-post demand savings for all 15 sites where savings could be documented was 1,839 kW, which is over two and a half times higher.

Figure 3-5 provides a graphic representation of this and compares the ex-ante demand savings, the ex-post demand savings for the sites where ComEd claimed demand savings, and the ex-post demand savings for all of the sites in the sample. For lighting end-use, all four sites claimed demand savings and the realization rate was around 1.15. However, for the other end-uses, there was only a single site for each end-use that contributed to the overall claimed realization rate. Ex-post compressed air savings for the claimed sites were almost half of the ex-ante demand savings, while ex-post HVAC savings for the claimed sites were four times higher than the ex-ante demand savings. Values for the lighting and other end uses did not show as much variation for the claimed sites. However, the addition of demand savings

[17] Project #21357, #24378, #24970, and #27573 saw no demand savings during the PJM peak period. The ComEd team also did not claim any savings for these projects.

for those sites that did not claim demand savings largely explains the high gross realization rate for demand.

Figure 3-5. PY7 Custom Program PJM Peak Summer Demand Savings by End-Use



	Compressed Air	HVAC	Lighting	Other
Ex Ante kW Claimed	75	50	207	235
Ex Post kW - Claimed Sites	41	200	239	222
Ex Post kW - ALL Sites	211	686	239	703
Site Count - Claimed Sites	1	1	4	1
Site Count - ALL Sites*	3	5	4	3

Source: Evaluation Team analysis.

* The count of sites includes only the sites where the evaluation team concluded that there were demand savings that occurred during the PJM peak summer period.

The relative precision for the gross impact results at a one-tailed 90 percent confidence level is plus or minus 15 percent for the energy realization rate and plus or minus 48 percent for the kW realization rate, as seen below in Table 3-4 and Table 3-5. The achieved relative precision rates at a one-tailed 90 percent confidence level for both energy and demand are much higher than the evaluation targeted energy realization rate of plus or minus 10 percent. This is due to the large fluctuation in realization rates seen in the PY7 sample. For energy savings by stratum, stratum 3 had the largest relative precision of 57 percent, based on realization rates ranging from 0 percent to 111 percent. The high relative precision for the demand savings is due to the addition of evaluated demand savings for those seven sites where ComEd did not claim any demand savings.

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

Strata	Relative Precision ± %	Low	Mean	High
Stratum 1	0%	0.91	0.91	0.91
Stratum 2	23%	1.03	1.34	1.65
Stratum 3	57%	0.21	0.49	0.77
PY7 MWh RR	**15%**	**0.84**	**0.99**	**1.14**

Source: Evaluation Team analysis.

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

Strata	Relative Precision ± %	Low	Mean	High
Stratum 1	0%	3.05	3.05	3.05
Stratum 2	60%	1.48	3.66	5.85
Stratum 3	97%	0.11	3.21	6.31
PY7 kW RR	**48%**	**1.74**	**3.36**	**4.98**

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, as well as 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:

- **19991:** The discrepancy in energy savings was mainly due to an adjustment in the post-retrofit metering period. The ex-ante post-retrofit period utilized bills between February 2014 and July 2014, although when the evaluation team graphed the billing data they noticed a difference between the modeled and the actual usage. The EM&V team determined that the site was not fully trained on the EMS prior to August 2014, so full savings potential was not attained until after that period. This may not have been discoverable without the visual aid of a graph of the data. Additionally, the EM&V team calculated demand savings for this site using a zonal weighted temperature humidity index of 81.6 as prescribed by PJM[18].
- **20642:** The large increase in evaluation realized savings for this site was due to a discrepancy in the baseline definition, where the ex-ante calculation used theoretical profiles combined with a conservative full load fan demand. The evaluation team reviewed the ex-ante calculations, and graphed the results to view them visually. Based on this, it was clear that the ex-ante calculations

[18] http://www.pjm.com/~/media/planning/res-adeq/weather-standards-for-demand-response-certification.ashx

assumed that the ex-ante baseline showed a lower energy usage than the actual post-retrofit consumption for some of the fans, which was incorrect.

- **20777:** The ex-ante baseline was defined based on in situ equipment operating condition (which ran poorly and infrequently). In discussions with the customer, the evaluation team determined that the customer placed a high priority on repairing the current dryers. Therefore, the evaluation team assumed a baseline based on a typical operation of all three dryers assuming that they had been repaired.
- **21219:** The ex-ante savings were based on weekly production levels and resulting utilization factors, even though there was no correlation between the utilization factor and the tons of output per week. The ex-post analysis looked at the relationship between the tons per day and the utilization factor, which resulted in a more appropriate correlation. The demand savings were also changed to cover only the PJM peak summer demand period, rather than an average across the entire year.
- **21357:** The EM&V team combined ex-post metered data with the ex-ante metered data to produce more accurate post-project results. The ex-post metered data showed that two of the three RTUs operated far less than was assumed in the ex-ante calculations, while one of the RTUs almost never turned off.
- **21549:** The EM&V team discovered modifications to the original project during their on-site evaluation. A VSD compressor that was part of the project had been removed, and the compressor sequencing did not realize any savings. In addition, considerable savings was realized through a reduction in air pressure of the total system which greatly increased the savings at the facility. The ex-ante calculations also did not claim any demand savings for the project.
- **23157 & 23185:** Ex-ante and ex-post savings were based on different calculation methods. The evaluation team graphed the monthly energy savings used in the ex-ante calculations, and determined that the savings appeared to stay consistent throughout the winter months, even though, for this measure, savings should appear during the summer months rather than during the winter. Due to the savings seen in the winter, the evaluation team determined that the energy savings shown in the billing analysis appear to have an external influence, rather than resulting from just this project.
- **24378:** The evaluation team reviewed the project scope with the site contact and learned there had been no net change in the compressed air systems' operation. In reviewing the customer's billing data, it was clear that the reduction in customer energy usage occurred prior to the project implementation. For these reasons, the evaluation concluded that the project did not save energy.
- **24766:** The ex-post analysis resulted in an increase in the coincidence factor from 0.83 to 1.0. This was due to the lights in the facility operating 8,760 hours per year and 100 percent of the time during the peak demand period.
- **28445:** The ex-ante analysis calculated savings for the project by assuming that all of the LED light fixtures were installed inside the building. The evaluation team found that 20 of the fixtures had been installed outside of the facility. Because of the lower baseline for the exterior fixtures, the ex-post savings for these fixtures increased.
- **19809:** The ex-ante calculations had used an exponential curve fit to calculate the chiller demand versus outside air temperature. The evaluation team plotted this next to actual usage data and found that using this approach, savings were the largest during highest temperature bins, which was not consistent with the data provided by the site contact. The ex-post analysis modelled the

pre-installation system running for temperatures above 45°F as opposed to the ex-ante value of 49°F. This change resulted in 50 MWh of additional savings for the temperature bins below 70°F, but 176 MWh less savings for those bins above 70 °F. Additionally, the ex-post team calculated PJM peak summer demand using a Weighted Temperature Humidity Index (WTHI) of 81.6 °F. The ex-ante calculations used a maximum observed value of 95 °F. It is interesting to note that the ex-ante paperwork reported a 620 kW savings, but this was not included in the ComEd tracking data, which showed zero demand savings for this site.

- **20552:** In contrast to the ex-ante approach, the evaluation team modeled the heating and cooling loads separately, and updated the schedules based on as-found conditions. An error was also found in the demand savings calculations in the paperwork, which reduced the savings by 75 percent. However, the savings in the paperwork were never claimed, implying a demand savings of zero.
- **21097:** The evaluation team normalized the savings to account for the large difference between pre- and post- CFM levels, which reduced the final savings for this project.
- **24970:** The evaluation team installed logging equipment and spoke with the site contact to confirm the lighting operation due to the new controls installed. Based on these findings, the EM&V team recalculated the savings for the site. This was another site where demand savings were calculated in the paperwork, but never reported or claimed. The ex-post demand savings were zero because no savings occurred during PJM peak summer demand period.
- **27573:** The EM&V team made minor changes to the ex-ante savings based on discrepancies found in the input wattages in the ex-ante documentation versus the manufacturer's spec sheets. The ex-ante savings analysis calculated demand savings in the paperwork, however, this was never claimed in the tracking system. The ex-post demand savings were zero because no savings occurred during PJM peak summer demand period.
- **23800:** The evaluation team verified the operation, production levels, and the equipment installation during the on-site visit and related discussions with the site contact. However, these findings differed from what was reported through the ex-ante analysis. Additionally, there was no demand savings quantified in the ex-ante analysis, but the evaluation team determined that demand savings over the PJM peak summer demand period were possible.
- **27631:** The evaluation team recalculated savings based on discussions with the site contact, who noted that the lighting in storage only operated less than one hour per day, rather than the 24/7 operation noted in the ex-ante calculations.

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.[19] The PY7 NTGR deemed values are based on PY5 NTGR findings for energy savings. The peak demand net savings are also reported using the PY5 evaluated results, as the SAG deemed NTGR was based off PY5 evaluated energy savings NTGR only. Table 4-1 reports the deemed NTG values to be applied in PY7. Additional NTG research was also completed during PY7 for use in future years and is reported on separately in Appendix Section 6.1.2.

Table 4-1. Verified Net Savings Parameters

Input Parameters	Value	Deemed or Evaluated?
Energy Savings NTGR	0.64	Deemed
	0.64	Evaluated (derived from PY5 evaluation results)
Peak Demand Savings NTGR	0.64	Deemed
	0.56	Evaluated (derived from PY5 evaluation results)

Source: Evaluation Team analysis.

Net program impacts were calculated by multiplying PY7 verified gross program savings by the deemed and PY5 evaluated net-to-gross ratio (NTGR). Table 4-2 provides the program-level evaluation-verified net impact results for the PY7 Custom program. The verified net energy savings of 18,788 MWh represents a net (energy) realization rate of 0.635, while the verified net demand savings, using the 0.64 SAG Deemed NTGR, of 4.743 MW represents a net (demand) realization rate of 2.15. The verified net demand savings of 4.150 MW is based on the 0.56 PY5 evaluated NTGR represents a net (demand) realization rate of 1.88.

[19] 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

Table 4-2. PY7 Verified Net Impact Savings Estimates by Measure Type

	Sample Size	Energy Savings (MWh)	90/10 Significance	Coincident Peak Demand Savings (MW)	90/10 Significance
Ex-Ante PY7 Gross Savings	19	29,575	Yes	2.205	Yes
Realization Rate	19	0.99	No	3.36	No
Verified Gross Savings	19	29,356	No	7.411	No
Free Ridership	27	0.39	Yes	0.44	Yes
Spillover	27	0	Yes	0	Yes
NTG (SAG Deemed)	27	0.64	Yes	0.64	Yes
NTG (PY5 Evaluated)				0.56	Yes
Verified Net Savings (SAG Deemed)	27	18,788	Yes	4.743	Yes
Verified Net Savings (PY5 Evaluated)				4.150	Yes

Source: Evaluation Team analysis.

5. Findings and Recommendations

The PY7 Custom program has a high gross energy impact realization rate of 0.99 and demand realization rate of 3.36. However, examination at the site-level reveals a large variation in the ex-ante claimed and ex-post evaluated savings for many sites examined. The Custom program has been well run over the program years and continues to be a well-run program integrating custom calculation methods based on site specific M&V, and analysis of complex and/or emerging technologies. Additionally, many of the evaluation recommendations from previous years continue to be adopted each year, further improving the program over time. Nevertheless, some areas of improvement remain and they are highlighted below.

Normalizing Pre- and Post- Analyses.

Finding 1. The evaluation found that production normalization was an issue for three projects (#21097, 21549, and #23800). In these cases, the production variable[20], changed enough between the pre-retrofit case and the post-retrofit case to warrant an adjustment that substantially affected the resulting savings.

Recommendation 1. In order to ensure that pre- and post-retrofit usage data can be compared accurately, a production variable can be used to normalize pre-retrofit data to reflect post-retrofit production levels. This will ensure that the calculated savings result only from the increase in efficiency, and not from any increase or decrease in production. The report includes a summary of general normalization procedures.[21]

Ensuring Quality Control through Graphical Representations of Data.

Finding 2. There were multiple instances where the ex-ante calculations had various deficiencies. In many cases, representing the data in a graphical format would have provided insight into the shortcomings of the analysis.

Recommendation 2. The evaluation team recommends that quality control procedures for project-specific data include reviewing graphical representations of the data. This method could have mitigated or eliminated some of the more extreme realization rates. The report includes a summary of several methods and techniques for representing the data graphically.[22]

PJM Peak Summer Demand Savings.

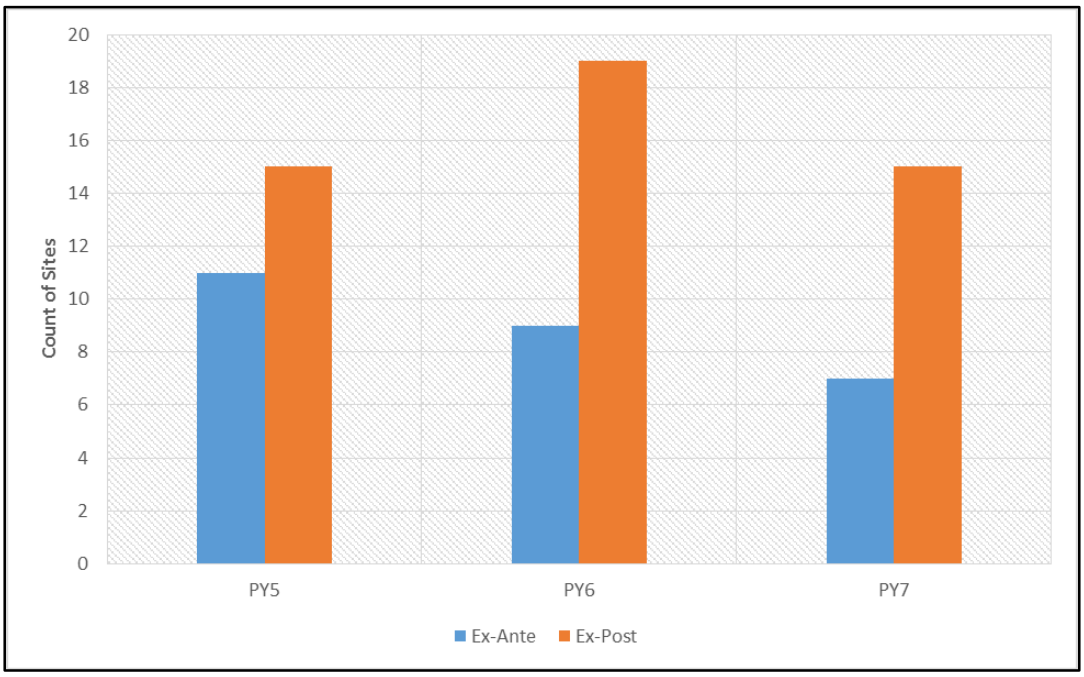
Finding 3. Lack of claimed demand savings for some projects continues to be an issue for the ComEd Custom program. Figure 5-1 below, shows the number of projects in the evaluation sample where the evaluation estimated and found demand savings versus number that claimed ex-ante demand savings. In PY6 and PY7 the evaluation has concluded that demand savings claims are warranted twice as often as ex-ante demand savings are claimed.

[20] CFM for two projects, and Oil Production for one project.

[21] See Section 6.1.1.2, along with a follow up to methods of normalization using graphical means in Section 0.

[22] See Section 0.

Figure 5-1. Comparison of Ex-Ante Claimed Demand Savings to Ex-Post Realized Demand Savings



Source: Evaluation Team analysis.

In this evaluation, the EM&V team calculated the realization rate based on all evaluated sample points, including those projects where demand savings has not been claimed, which, as noted above, differs from prior-year evaluation result reporting. For example, if the overall program realization rate is limited to only those projects which had originally claimed demand savings the overall demand realization rate is 1.34, for a total demand savings of 2.965 MW compared to the ex-post evaluated savings of 7.411 MW and gross realization rate of 3.34 for the full population of projects.

Additionally, as described in the tracking data review section (Section 3.1), the evaluation team identified four projects in which demand savings were actually calculated in the ex-ante calculations, but not reported to ComEd. The projects were #19809, #20552, #24970, and #27573. PY7 also saw two projects where savings were calculated in the ex-ante paperwork, but not reported.

Recommendation 3. Savings should be claimed for all projects that save energy over the PJM peak summer period of 1:00-5:00 PM Central Prevailing Time on non-holiday weekdays, during the months of June through August. The report includes a short description of possible methods of calculating peak demand using the PJM weighted temperature humidity index requirements.[23]

[23] See Section 6.1.1.1

Billing Analysis to Create a Monthly Regression

Finding 4. The ex-ante approach for several sites used a billing analysis to calculate savings by attempting to correlate monthly CDD and HDD values to the billed kWh for that month using a multi-variable regression. These analyses would create a multi-variable regression fit of the pre-retrofit data and model that to the post-period conditions. The percent savings would be calculated over the entire post-retrofit period, usually around six months. That percent savings would be applied to a typical year which was usually either a five-year average, or the previous year. The issue was that often this post-period was not able to cover a range of seasons, so the correlation identified was only based on a short period of the year, which skewed some of the results. The second issue was that if the correlation was below an R^2 value of 0.3, the ex-ante analysis would scale up the kWh consumption from the pre- and post-period to an entire year, and take the direct difference of the two, which does not account for any fluctuation in energy usage due to external factors.

Recommendation 4. A billing analysis is still valid under some circumstances. However, there are several things that the program should verify to ensure that the billing analysis provides accurate estimates of project savings:

- Ensure that the overall savings identified through the billing analysis are reasonable. Billing analysis can often incorporate external factors that can drive differences in the monthly bills. The site contact should be interviewed to ensure that no major changes are happening between the pre- and post-retrofit periods that aren't accounted for by the equipment retrofit;
- The multi-variable regression should be fitted to the post-retrofit period in addition to the pre-retrofit period. These models should then be applied to a typical year's data[24], to ensure that both the pre- and post-retrofit periods are modeled and that a separate percent savings is applied to the different periods of the year;
- The analysis should at a minimum use six months' worth of billing data. This will help to ensure that the effects of both the winter and summer seasons are depicted in the data so that fluctuations in energy usage due to high or low temperatures can be captured. It will also ensure that there are sufficient billing data points in the model to support the analysis;
- The analysis should use site-level EMS data whenever it is available. This will allow for more granular data, taken at the weekly, daily, or hourly level to support results that are more statistically robust; and
- The analysis should involve plotting the actual kWh data to visually inspect it for atypical operation. Plotting pre-models, actual data, and post-models versus actual weather data on the same graphs to inspect model fit is a good way to verify that the data is well-represented.

Net-to-Gross

Finding 5. The research results net-to-gross ratios (NTGR) found in this evaluation are 0.58 for energy and 0.70 for demand.

Recommendation 5. ComEd should consider adopting procedures to limit or exclude known free riders by conducting screening for high free ridership on a project-by-project basis. In cases

[24] A typical year should use TMY3 data.

where it is found, the program implementer should continue and expand their current pre-approval process to provide more explicit consideration and re-formulation of projects already planned for completion by the customer. The NTGRs (energy) for the Custom program have fluctuated between 0.58 and 0.67 in the last three years, and are in line with similar programs offered elsewhere in the U.S. However, the PY7 NTGR of 0.58 suggests that significant free ridership is still present and there is still some room for improvement. A more aggressive approach to program screening and approval is warranted.

6. Appendix

6.1 Evaluation Research Impact Approaches and Findings

6.1.1 Evaluation Research Gross Impact Guidance

The evaluation team identified several recurring issues that came up during the review of the ex-ante calculations. The following topics will hopefully provide some additional guidance for future program years, in order to reduce the variance seen this year in project-level realization rates.

6.1.1.1 PJM Peak Summer Demand Savings

PJM peak summer demand periods are listed as 1:00 to 5:00 PM Central Prevailing Time on non-holiday weekdays, during the months of June through August. The evaluation team has identified several scenarios that would require different methods of calculating demand savings. This list is not meant to cover all scenarios that might arise, but it is designed to give guidance on how to establish demand savings, in hopes that future program years will be able to report a higher percentage of sites with demand savings.

Equipment runs on consistent schedule at a consistent load during PJM peak summer demand period.
This is the most common and straight forward situation where the demand savings can be calculated. For this scenario, the savings would be calculated using the consistent pre-retrofit load minus the consistent post-retrofit load.

Equipment runs on consistent schedule at a varying load during PJM peak summer demand period.
The best way to evaluate this is to take trend or metered data during the PJM period to determine the average load, pre-retrofit and post-retrofit consumption during the PJM peak hours. Once an average load is calculated, a simple difference between these average loads would give use the peak demand during the PJM period.

Equipment operation and load varies across the year. Operation could occur at any time.
In this case, it is not always possible to determine whether or not the unit is actually operating during peak loads. If it is known that the equipment can operate during peak periods (i.e. it is not outdoor lighting or a similar technology), then additional operating characteristics (such as daily operating profiles) should be used to further determine the operation during the peak period. If there is truly no common operation that can be identified, then as a last resort a basic average can be taken of the calculated annual energy usage divided by 8,760 hours of operation.

Equipment operation is weather-dependent.
This is likely to be the most complicated method of savings calculations, however, PJM documentation has provided a standardized method to calculate these savings[25]. The document states that the PJM

[25] PJM. PJM Manual 18B: Energy Efficiency Measurement & Verification. Revision: 01. March 1st, 2010. https://www.pjm.com/~/media/documents/manuals/m18b.ashx

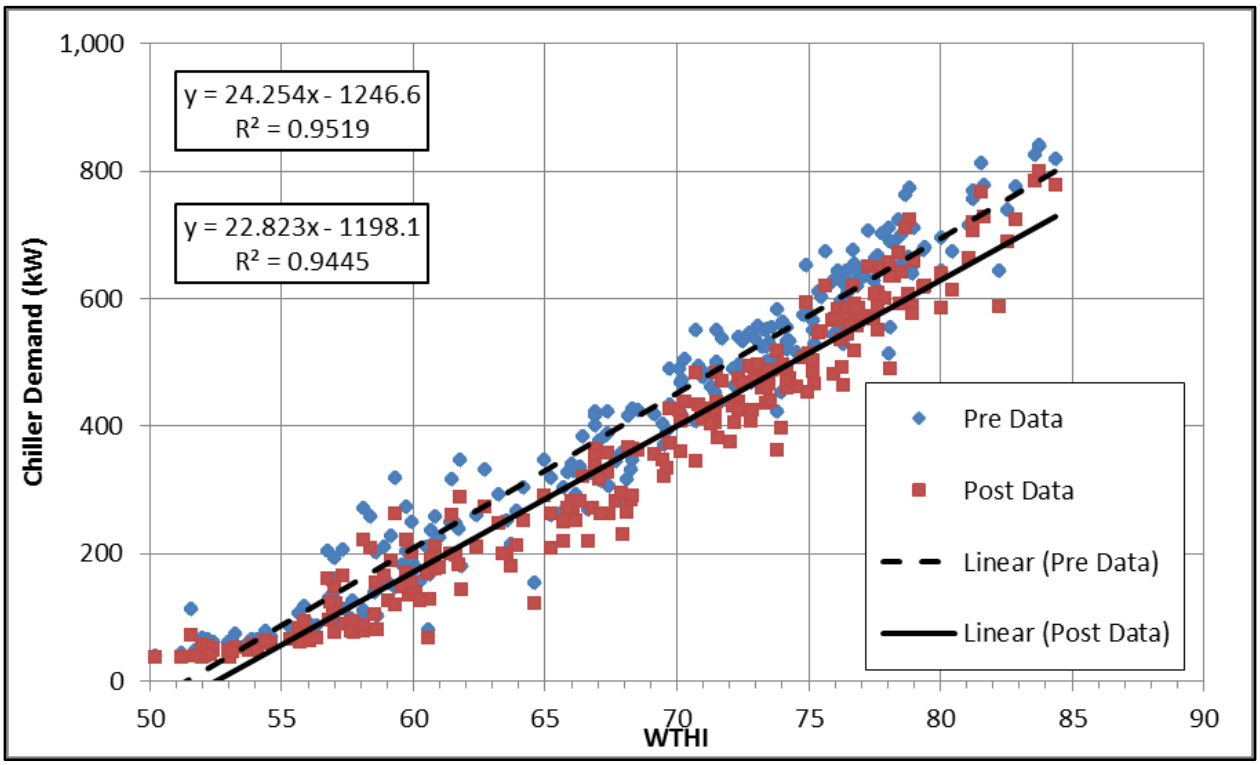
savings for ComEd should be based on a zonal weighted temperature humidity index (WTHI) of 81.6°F[26]. To use this, it is typical that the WTHI will be calculated for each day using daily temperature data for the applicable weather zone, using the following formulas:

$$THI = MaxTemperature_{degF} - 0.55 \times \left(1 - \frac{RelativeHumidity}{100}\right) \times (MaxTemperature_{degF} - 58.0)$$

$$WTHI = \frac{[(4 \times THI_{CurrentDay}) + (THI_{PreviousDay})]}{5}$$

If the equipment is truly weather-sensitive, good correlation between the load and the WTHI can be obtained with a best-fit curve as shown in Figure 6-1 below. The best fit curve should then be used with the deemed zonal WTHI of 81.6 to establish an average PJM peak summer demand value for pre- and post.

Figure 6-1: Identifying Trend Lines between WTHI and Average Demand



6.1.1.2 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

[26] Manual 18B uses a WTHI of 80.4 for ComEd, however an updated document with a date of 12/11/2014 was provided to the evaluation team, showing a WTHI of 81.6 for ComEd. http://www.pjm.com/~/media/planning/res-adeq/weather-standards-for-demand-response-certification.ashx

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).

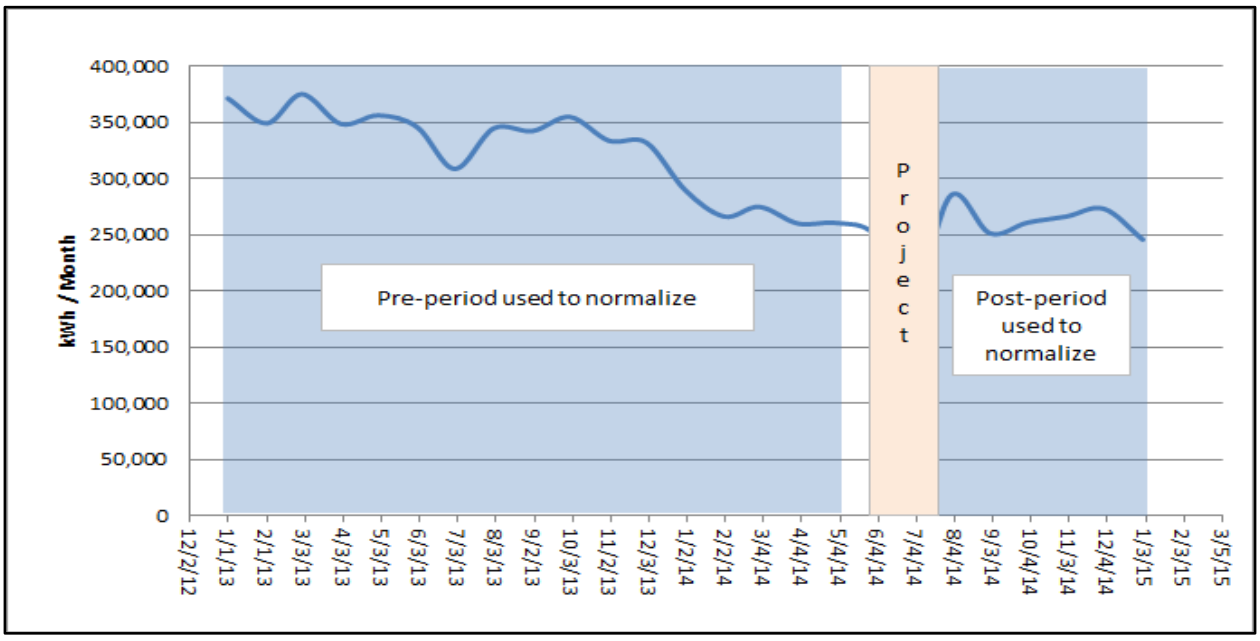
It is also important to note that it is not always appropriate to normalize the data set. Systems that are manually controlled or constant processes are not going to be influenced by drivers such as production or weather and it would therefore be inappropriate to normalize by these factors. In many cases,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

6.1.1.3 Plotting of Data

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.

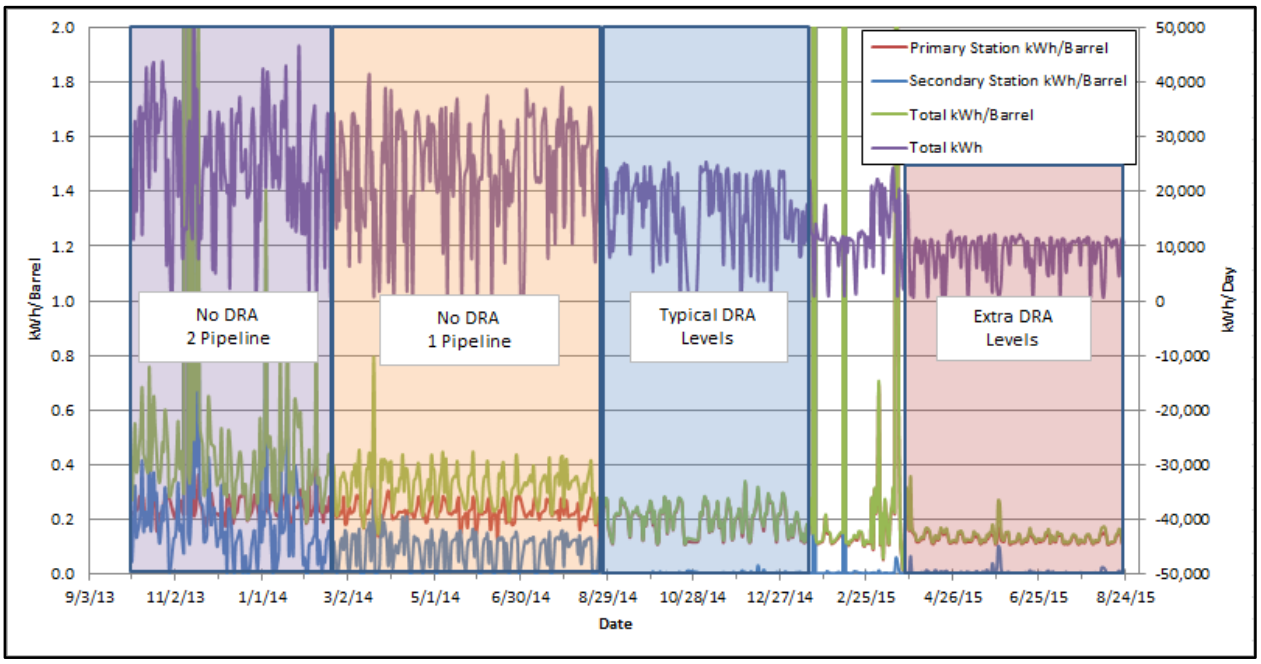
Figure 6-2 represents a project that normalized a facilities energy usage to justify project savings. The analysis did not look at the billed data to verify whether the reduction in energy usage was due to the claimed project or not. The figure illustrates how plotting the usage over time is useful in 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.

Figure 6-2: 24378 - 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 6-3: 23800 - 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 6-4 through Figure 6-6 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 6-4: 23800 - kWh vs HDDs

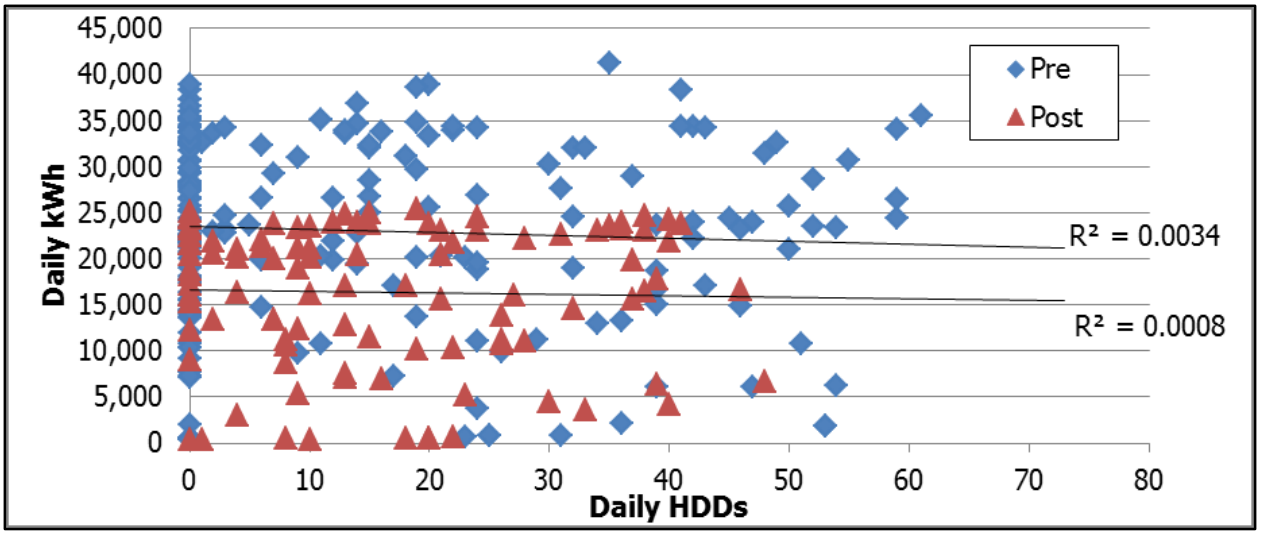


Figure 6-5: 23800 - kWh vs CDDs

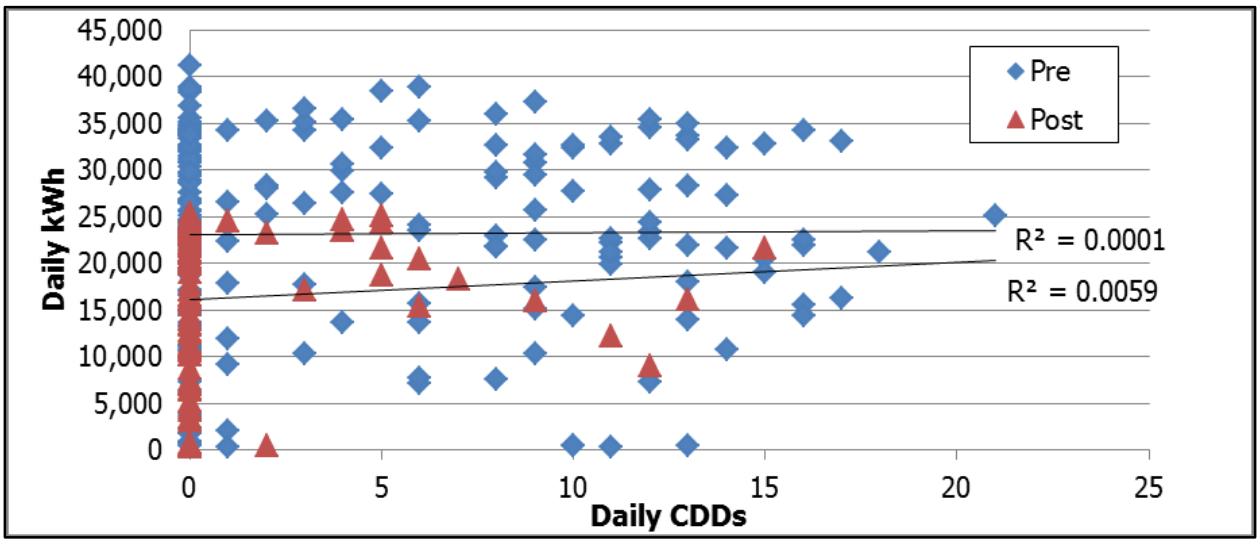
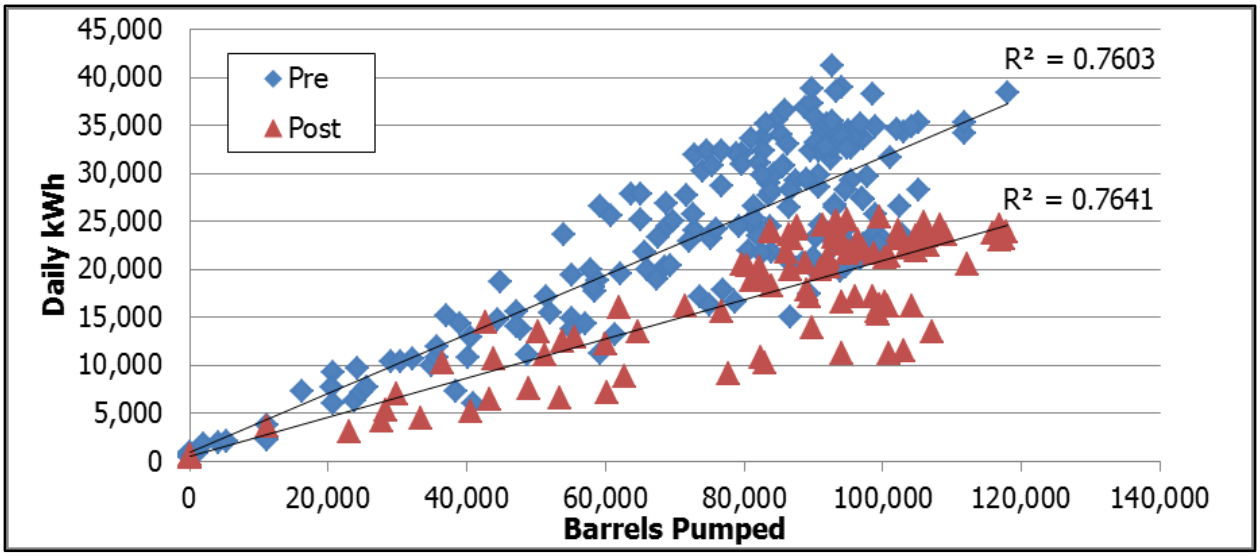


Figure 6-6: 23800 - kWh vs Barrels Pumped



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 6-7 and Figure 6-8. This project is a compressed air plant upgrade and was normalized to production as tons of steel produced.

Figure 6-7: 21549 - Compressed Air Plant Upgrade (Pre Data)

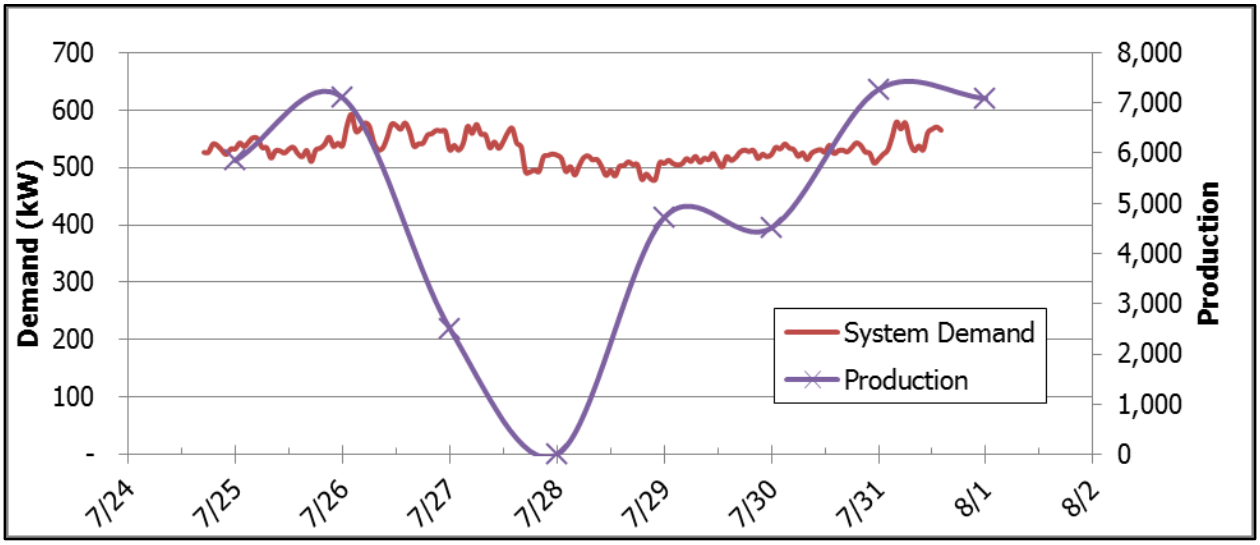
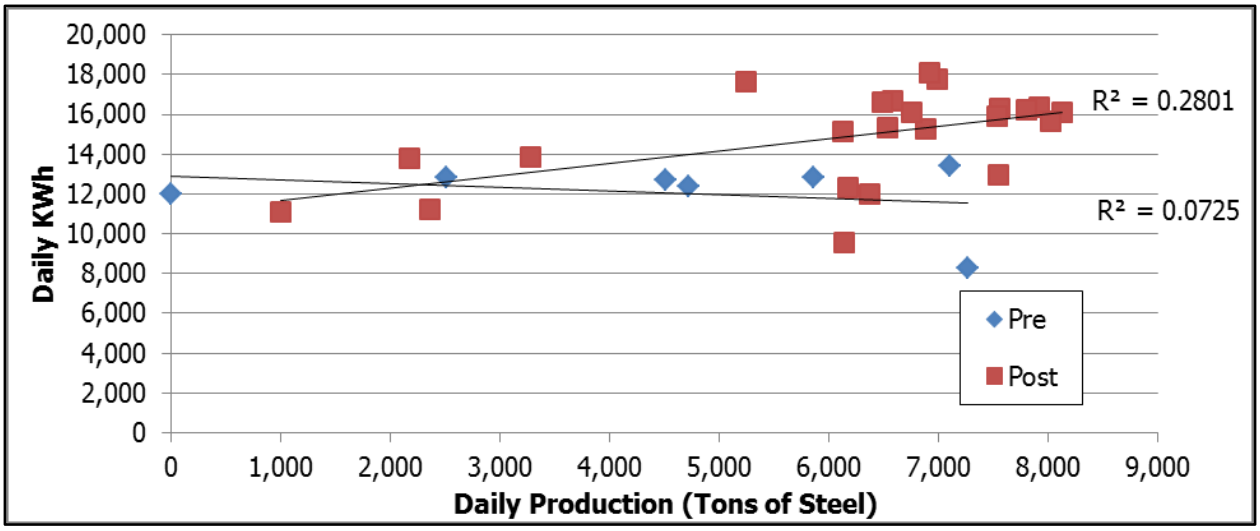


Figure 6-8: 21549 - kWh vs production



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.

6.1.1.4 Billing Analysis Discussion

The ex-ante approach to a billing analysis models the pre-data and applies the model to weather conditions or other variables observed during the post-retrofit period. In many cases these weather condition variables used are monthly CDD and HDD values. In most cases, only six months of data or less is being used. The pre- and post- monthly data is then analyzed to find a percent savings over the time period, which is then applied to the average year of energy usage. Different months used can yield different results.

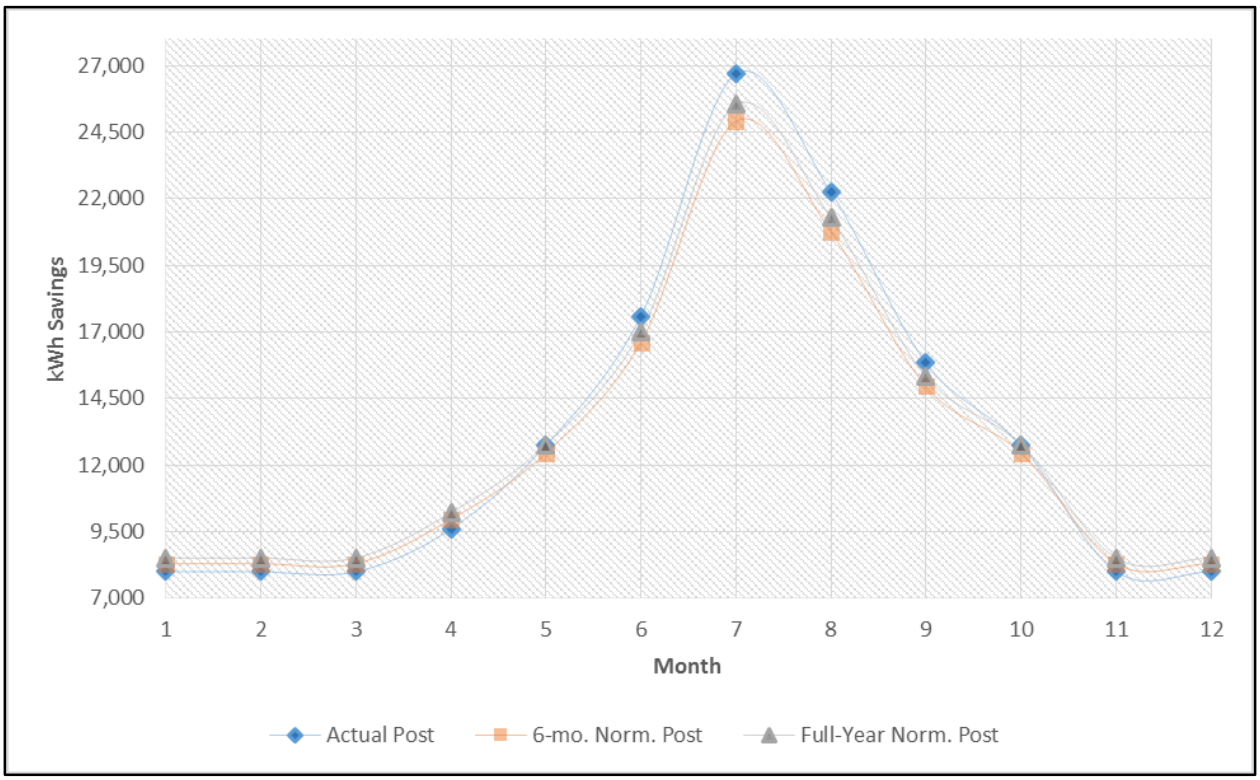
The following example, shown in Table 6-1 and Figure 6-9, is an example of a project that has relatively fixed savings over the year (a reasonable mild example using scheduling fans). The data ranged between 20 percent savings and 11 percent savings, depending on the months analyzed. Comparing the first six months of data results in a 17 percent savings. When that savings is applied to the rest of the year, the results are 31,354 kWh over the entire year, which is actually more than the actual savings of 27,510 kWh, a difference of 14 percent If a post-model had been created and applied to a typical year, it would have captured the reduced savings in the summer, and not over predicted by so much.

Table 6-1. Example Ex-Ante Billing Analysis Method

Month	kWh						
	Actual Pre	Actual Post	Actual Savings	Actual Percent	6-mo. Norm. Post	Full-Year Norm. Post	
Jan	10,000	8,000	2,000	20%	8,305	8,513	6 month Compared Period
Feb	10,000	8,000	2,000	20%	8,305	8,513	
Mar	10,000	8,000	2,000	20%	8,305	8,513	
Apr	12,000	9,600	2,400	20%	9,966	10,216	
May	15,000	12,750	2,250	15%	12,458	12,769	
Jun	20,000	17,600	2,400	12%	16,610	17,026	
Jul	30,000	26,700	3,300	11%	24,916	25,539	
Aug	25,000	22,250	2,750	11%	20,763	21,282	
Sep	18,000	15,840	2,160	12%	14,949	15,323	
Oct	15,000	12,750	2,250	15%	12,458	12,769	
Nov	10,000	8,000	2,000	20%	8,305	8,513	
Dec	10,000	8,000	2,000	20%	8,305	8,513	
6 Mo. Compared Total	77,000	63,950	13,050	17%	-	-	
Full Year Total	185,000	157,490	27,510	15%	153,646	157,490	
Normalized Post-Consumption	185,000	-	-	-	153,646	157,490	
Normalized Savings	0	0	0	0	31,354	27,510	
Annual Difference	-	-	-	-	3,844	0	

Source: Evaluation Team analysis

Figure 6-9: Billing Analysis Example Difference



6.1.2 Evaluation Research Net Impact Findings

6.1.2.1 Free-Ridership

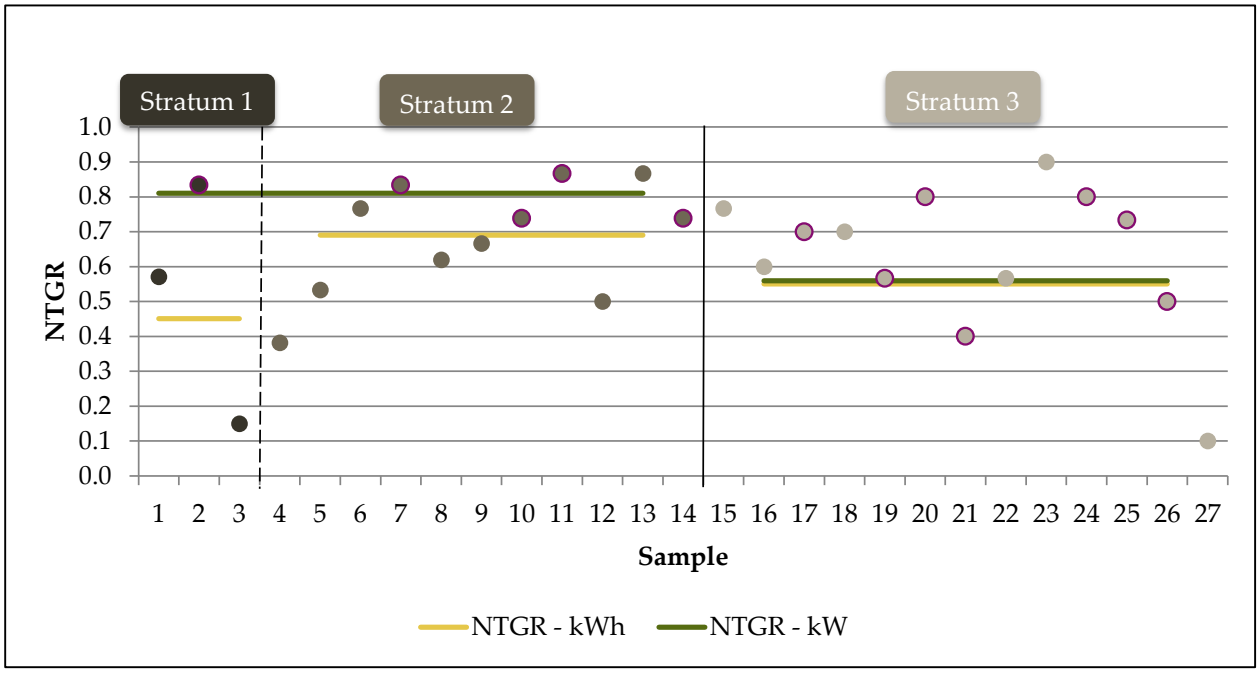
The program's net-to-gross ratio is equal to one minus the free ridership rate plus the spillover rate. The EM&V team calculated a PY7 net-to-gross ratio for future consideration using a self-report method which relies on the results of surveys with PY7 participants. The calculation of both the free ridership rate and each project's net-to-gross ratio (NTGR) is a multi-step process. Responses from the telephone survey are used directly to calculate a timing and selection score, a program influence score and a no-program score for each project (as outlined in Table 6-2 below). 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 and incorporates spillover findings to come up with a project-level net-to-gross ratio.

Table 6-2. Basic Net-to-Gross Scoring Algorithm for the PY7 Custom Program

Scoring Element	Calculation
Timing and Selection 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 an equipment contractor or vendor	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 (Timing and Selection, 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 conducted for two waves of sample, yielding a total of 29 completed interviews. Ultimately two of these were dropped from the analysis frame due to insufficient responses to calculate a NTGR, resulting in 27 completed interviews to support the calculation of the net-to-gross ratio in PY7. Of these, 14 overlap with the 19 gross M&V sample points. The PY7 project-specific NTGRs are plotted in Figure 6-10. Each circle in the figure represents a sampled project (purple outlined circles indicate projects with both energy and demand savings). The circles are grouped by strata, where stratum 1 is large sized projects, stratum 2 is medium sized projects, and stratum 3 is small sized projects. The yellow and green horizontal lines denote the strata-level energy and demand weighted NTGRs, respectively. Note that strata 1 and 2 were combined for the demand weighted NTGR, as there was only a single stratum 1 project with demand savings.

Figure 6-10. Sample NTGR by Stratum



Source: Evaluation Team analysis

The separate ratio estimation technique was used to estimate NTGR for the program. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework. The standard error was used to estimate the error bound around the estimate of verified evaluation NTGR. The program level NTGR, along with precision estimates, is shown in Table 6-3 (MWh impacts) and in Table 6-4 (kW impacts).

Spillover effects were examined in this evaluation and their magnitude was found to be quite small, as discussed below in the spillover section. A quantification of spillover was incorporated into the NTGR, however the impact of spillover on the final results was negligible.

Table 6-3. MWh NTG Ratio and Relative Precision at 90% Confidence Level

Sampling Strata	Relative Precision ± %	Low	Mean	High
1	29%	0.32	0.45	0.58
2	7%	0.64	0.69	0.74
3	26%	0.41	0.55	0.70
Custom PY7	**10%**	**0.52**	**0.58**	**0.64**

Source: Evaluation Team analysis

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

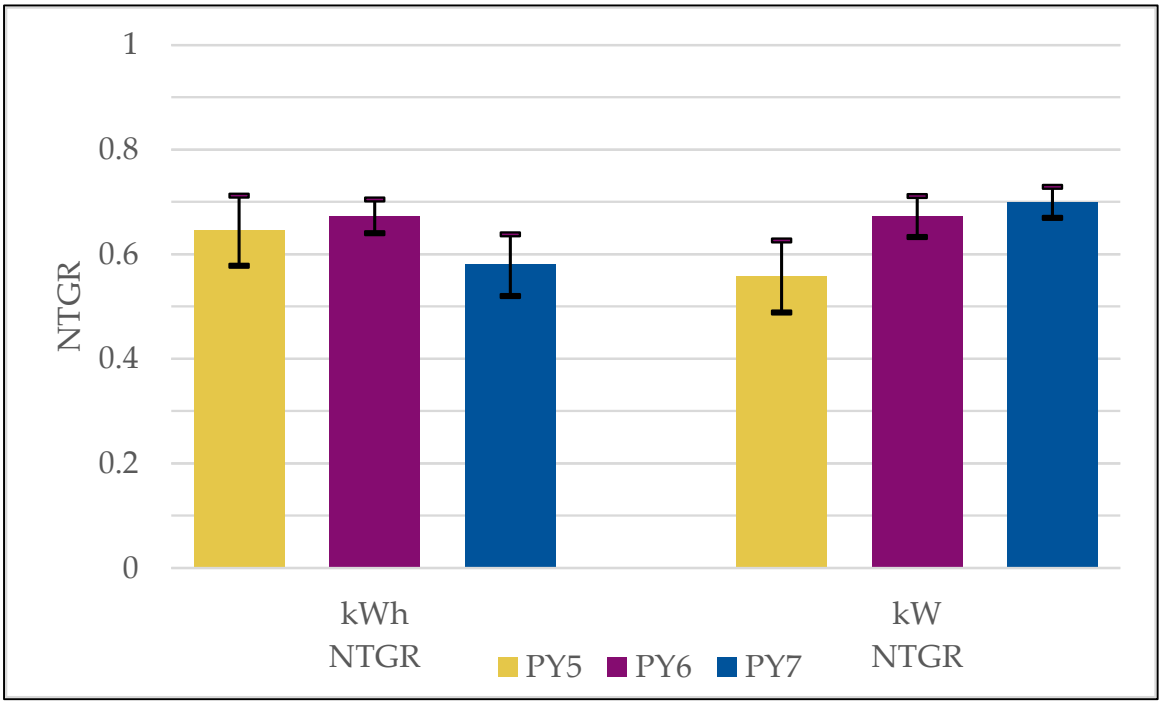
Sampling Strata	Relative Precision ± %	Low	Mean	High
1	2%	0.79	0.81	0.83
2				
3	11%	0.50	0.56	0.62
Custom PY7	**4%**	**0.67**	**0.70**	**0.73**

Source: Evaluation Team analysis

The energy NTGR scores for the three Custom sampling strata are 0.45 for stratum 1 (large sized projects), 0.69 for stratum 2 (medium sized projects), and 0.55 for stratum 3 (small sized projects) which indicates the free-ridership level for the largest sized projects (stratum 1) is lower than the free-ridership of the smaller project sizes.

The evaluation research findings energy and demand-weighted NTGR by program year, for PY5, PY6, and PY7, are presented in Figure 6-11. The PY7 evaluated kWh NTGR for Custom projects of 0.58 is lower than the PY6 NTGR of 0.67 and the PY5 NTGR of 0.64. However, the 90 percent confidence interval (CI) of the PY7 kWh NTGR overlaps with the CIs of both the PY5 and PY6 kWh NTGRs. The kWh NTGRs overlapping CIs suggest that the kWh NTGRs across program years are not statistically different.

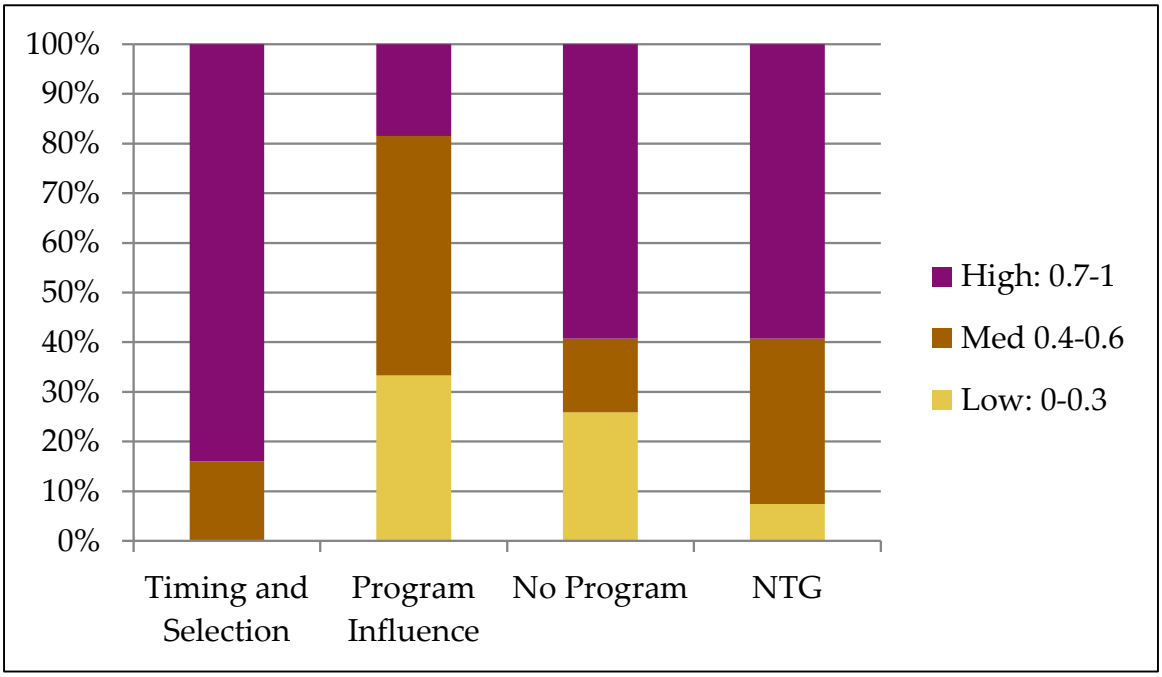
Figure 6-11. Evaluated NTGR by Program Year with 90% Confidence Intervals



Source: Evaluation Team analysis

A breakdown of NTGR by the three component scores is shown in Figure 6-12. The timing and selection score reflects the importance of various program and program-related elements in the customer's decision and timing of the decision in selecting specific program measures. The program influence score reflects the relative degree of influence the program had on the customer's decision to install the specified measures as versus non-program factors. The no-program score captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available.

Figure 6-12. NTGR Level by Component Scores



Source: Evaluation Team analysis

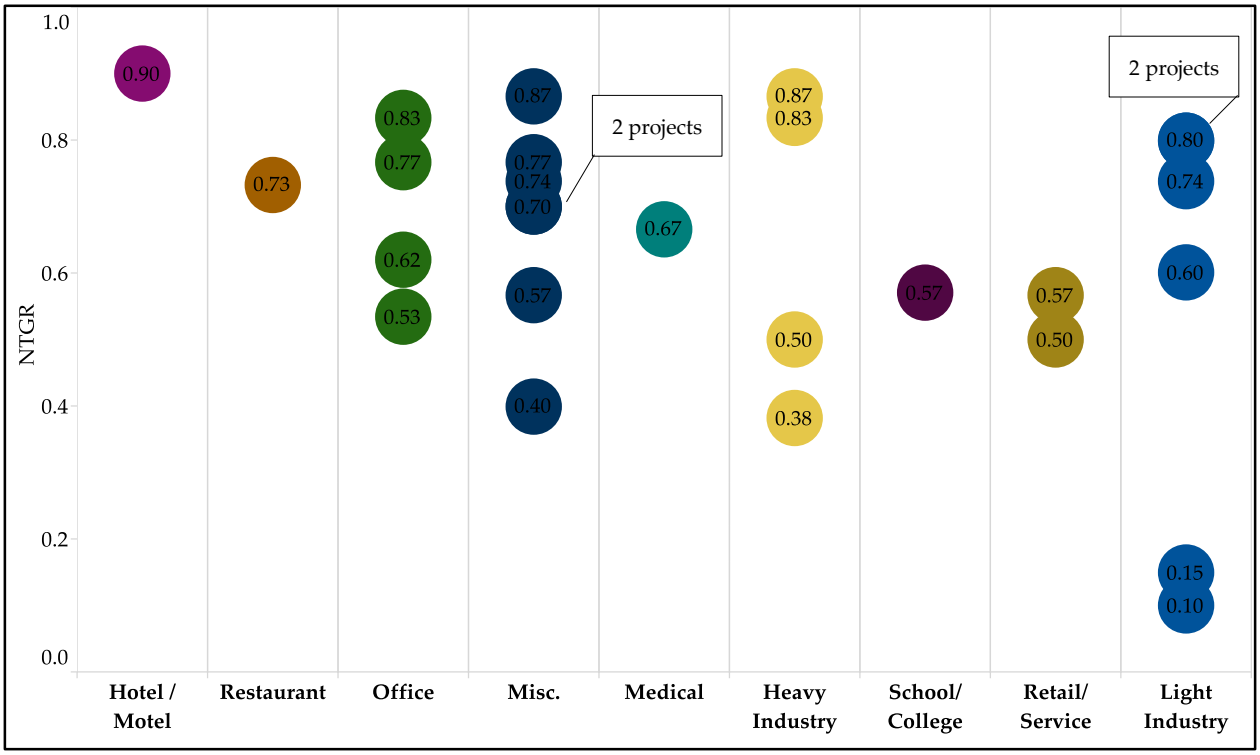
Significant free-ridership (above 40 percent) was found in 11 out of 27 evaluated projects; of which two projects had resulting NTGRs below 0.30. The project with the highest free-ridership was a small sized project (stratum 3). And the project with the second highest free-ridership was a large sized project (stratum 1).

The timing and selection score is calculated as the maximum score among the self-reported influence levels a program had for six potential influences. A component of one of the six potential influences is the recommendation from an equipment contractor or vendor that helped with the choice of equipment. If the participant rates a vendor recommendation highest (and the score is at least 5) among the five other potential influences, a vendor interview is triggered. The result of the vendor interview is a score of how influential the program is on the vendor's decision to recommend the equipment. A combination of the vendor interview score and vendor recommendation score is then evaluated among the five other timing and selection influences. The maximum score among these six influences determines the timing and selection score.

Based on the results of the PY7 participant telephone surveys, five participants' responses triggered a vendor interview. All but one of the five vendors were interviewed (the fifth vendor was unresponsive to survey recruitment attempts and the survey could not be completed). As a result of the vendor interviews, one of the project's timing and selection score increased from 7 to 8, indicating a higher program influence and thereby bringing the project NTGR up from 0.53 to 0.57. The vendor interview for another project increased the timing and selection score from 9 to 10, which increased the project NTGR from 0.80 to 0.83. The vendor interview for the third project increased the timing and selection score from 5 to 10, which increased the project NTGR from 0.63 to 0.80. The vendor interview for the fourth project increased the timing and selection score from 5 to 10, which increased the project NTGR from 0.40 to 0.57.

Across business segments, projects with high levels of free-ridership (above 0.7) were found only in Light Industry, see Figure 6-13 below. Business segments with the majority of their projects with low free-ridership (below 0.3) include Hotel/Motel and Restaurant.

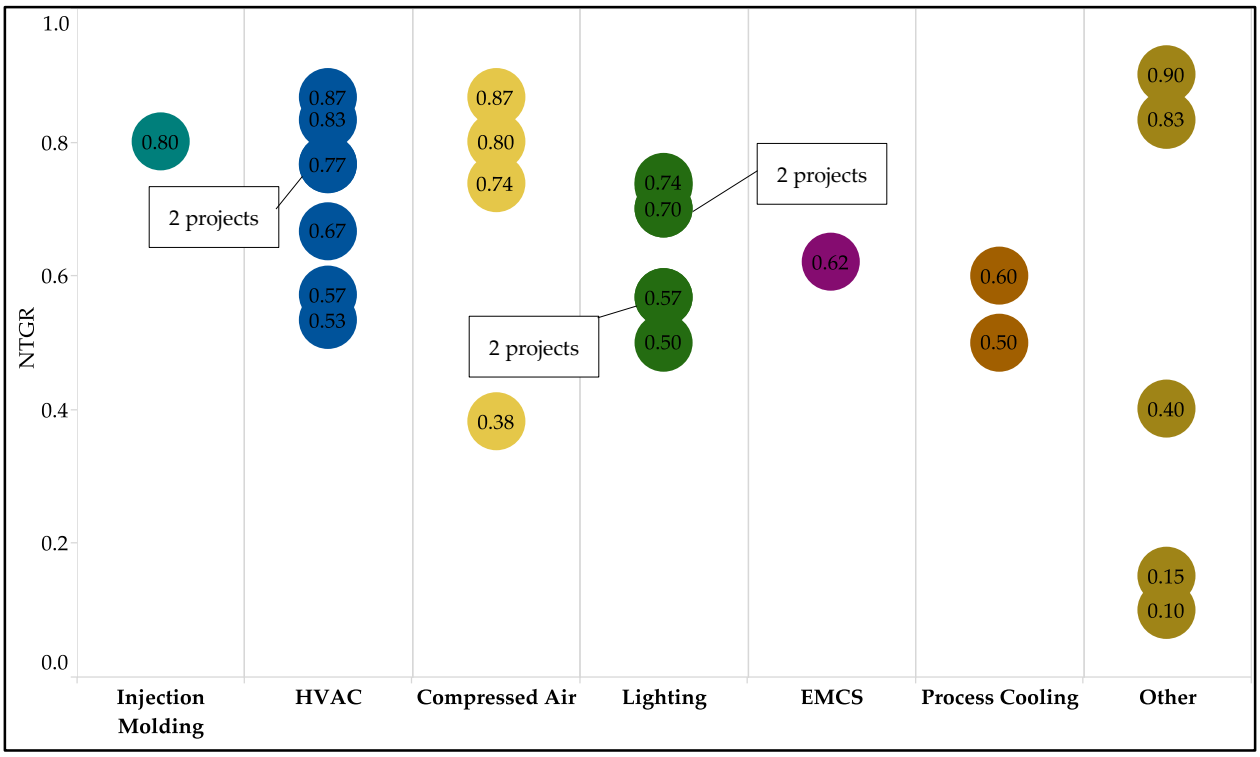
Figure 6-13. NTGR by Business Category



Source: Evaluation Team analysis

By end use, projects with high levels of free-ridership (above 0.7) were found only in the "Other" end use category, as shown in Figure 6-14 below. The measures addressed in the two "Other" end use projects with very high free-ridership levels were process related. End uses with the majority of their projects with low free-ridership (below 0.3) included Compressed Air, HVAC, and Injection Molding.

Figure 6-14. NTGR by End Use



Source: Evaluation Team analysis

6.1.2.2 Procedures to Reduce Free Ridership

Without a doubt, the large non-residential market is perhaps the most challenging to address in terms of the size and sophistication of end-use customers and suppliers, and the complexity of end-user projects. As a result, a certain amount of free ridership is to be expected in this market. Despite these challenges, there are a number of different strategies available to ComEd to adjust program design elements and implementation procedures in order to reduce free ridership. These recommendations are as follows:

Recommendation: Adopt procedures to limit or exclude known free riders.

The best way to accomplish this is to conduct screening for high free ridership on a project-by-project basis. In cases where it is found, the program implementer should continue and expand their current pre-approval process to provide more explicit consideration and re-formulation of projects already planned for completion by the customer. The NTGRs for the Custom program have fluctuated between 0.56 and 0.72 since the program began, and are in line with similar programs offered elsewhere in the U.S. However, the decline in the PY7 NTGR to 0.58 suggests that a more aggressive approach is warranted since the NTG ratios indicate significant free ridership is still present.

Another path is for the program to set the standard for incentive eligibility higher across-the-board so that all such projects will need to meet a higher standard to qualify. Note that **none** of these options

equates to rejecting a customer for energy efficiency funding. Instead, the concept is to "upsell" the customer to an energy efficiency project that they weren't already planning to do on their own.

6.1.2.3 Screening out Free Riders

One way to assess the rate of free ridership likely on a given project is to critically examine the key reasons behind the project **before** the incentive is approved. For example:

- Has the project already been included in the capital or operating budget? Has the equipment already been ordered or installed?
- Is the measure one that the company or other comparable companies in the same industry/segment routinely installs as a standard practice? Is the measure installed in other locations, without co-funding by incentives? Is the measure potentially Industry Standard Practice?
- Is the project being done, in part, to comply with regulatory mandates (such as environmental regulations)?
- Are the project economics already compelling without incentives? Is the rebate large enough to make a difference in whether or not the project is implemented?
- Is the company in a market segment that is ahead of the curve on energy efficiency technology installations? Is it part of a national chain that already has a corporate policy to install the proposed technology?
- Does the proposed measure have substantial non-energy benefits? Is it largely being considered for non-energy reasons (such as improved quality or increased production)?
- Is the project payback quite short even without the incentive?

By conducting a brief interview regarding these issues before the incentive is approved, ComEd can better assess the likely degree of free ridership and may be able to then decide if the project should be excluded or substantially re-scoped to a higher efficiency level.

Recommendation: Make changes to the incentive design
Tier incentives by technology class, such as end-use, to enhance promotion of technologies that are less well accepted versus those that are already established. Under this approach, the incentive level for less widely adopted and emerging technologies would be higher, while the incentive level for more widely-adopted measures would be lower.

Consider Incorporating a Payback Floor, Excluding Projects for Which the Payback Time is Less Than One Year (for example). Project-specific investigation of free ridership for custom programs also indicates that projects with extremely short payback periods are more likely to be free riders, all else being equal. Although it is certainly true that many customers do not adopt attractive efficiency projects with very low paybacks[27], a payback floor can still be helpful, particularly if it is not set too high and if the administrator is allowed some flexibility in its application. Several program administrators in other parts of the country

[27] For example, industrial end users sometimes do not invest in compressed air projects with paybacks as low as one year or even less.

have used payback floors effectively, although such criteria present project cost verification challenges. A one year floor guideline makes sense because projects with a one-year payback or less can usually be funded out of the current year's energy budget. The use of a payback floor (a minimum payback level based on energy savings alone) can help to reduce free ridership by eliminating projects that have extremely quick paybacks and thus little need for ratepayer-funded incentives. *Offer bonuses to incent desirable behavior*, such as installation of multiple measures or installation by a first-time participant.

6.1.2.4 Spillover

Spillover effects were addressed in the PY7 evaluation, based on responses to a battery of spillover questions in the telephone survey. Detailed spillover-related findings from the surveys are reported in Table 6-5 below.

Table 6-5. Detailed Spillover-Related Findings for PY7

Spillover Question	Evidence of Spillover
Since receiving an incentive for the project we just discussed, did you implement any ADDITIONAL energy efficiency measures at this facility or at your other facilities within ComEd's service territory that did NOT receive incentives through any utility or government program?	Of the 27 surveyed customers that responded, 6 (22%) did implement an additional measure without receiving incentive. These 6 respondents implemented a total of 6 energy efficiency measures.
What type of energy efficiency measure was installed without an incentive?	(4) Lighting Measures (3 LED lamps, 1 T8 lamps) (1) Air Compressor (1) Refrigerator
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 6 implemented measures for which this question was asked: (2) Rating between 0 and 3 (1) Rating between 4 and 6 (3) Rating between 7 and 10
If you had not participated in the ComEd program, how likely is it that your organization would still have implemented this measure? Use a 0 to 10, scale where 0 means you definitely would NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure?	For the 6 implemented measures for which this question was asked: (1) Rating between 0 and 3 (3) Rating between 4 and 6 (2) Rating between 7 and 10
Why did you purchase this energy efficiency measure without the financial assistance available through the ComEd's program?	For the 6 implemented measures for which this question was asked: (2) Didn't think it was worth it/would qualify (1) Timing, wanted to implement immediately and the item was leased (2) Timing, the program ended (1) installed more of the same measure from program

Source: Evaluation Team analysis

The spillover findings suggested that three respondents installed measures with potential savings that could be attributed to calculation of the spillover ratio. Through evaluation of the installed measure specifications, two of the three installed measures were found to have zero qualifying energy or demand savings. The third project was found to have saved 4,551 kWh and 1.19 kW from the installation of LED lamps.

The effect of the spillover savings on the NTGR is negligible, and does not increase the overall NTGR above the net impacts found solely from free-ridership. Although participating customers are installing other energy efficiency improvements outside of the program, they either attribute little influence to ComEd's program in their decision to install these additional measures or the savings from these additional measures is minor.

6.2 *Survey Instruments*

6.2.1 Customer Survey

COMED SMART IDEAS FOR YOUR BUSINESS PROGRAM
PARTICIPANT SURVEY – CUSTOM PROJECTS
PY7

INTRODUCTION

[READ IF CONTACT=1]

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

Our records show that <COMPANY> purchased <ENDUSE>, which was recently installed and received an incentive from ComEd. We are calling to do a follow-up study about <COMPANY>'s participation in this program, which is called the Smart Ideas for Your Business Program. Your answers will provide very important information that will help ComEd improve its program. I was told you're the person most knowledgeable about this project. Is this correct? [IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.]

This survey will take about 20-25 minutes. Is now a good time? [If no, schedule call-back]

[READ IF CONTACT=0]

Hello, this is _____ from Opinion Dynamics calling on behalf of ComEd. I would like to speak with the person most knowledgeable about recent changes in cooling, lighting, or other energy-related equipment for your firm at this location.

[IF NEEDED] Our records show that <COMPANY> purchased <ENDUSE>, which was recently installed and received an incentive from ComEd. We are calling to do a follow-up study about your firm's participation in this program, which is called the Smart Ideas for Your Business Program. Your answers will provide very important information that will help ComEd improve its program. I was told you're the person most knowledgeable about this project. Is that correct? [IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.]

This survey will take about 20-25 minutes. Is now a good time? [If no, schedule call-back]

SCREENING QUESTIONS

A1. Just to confirm, between June 1, 2014 and May 31, 2015 did <COMPANY> participate in ComEd's Smart Ideas for Your Business Program at <ADDRESS>? (IF NEEDED: This is a program where your business received an incentive for installing one or more energy-efficient products covered under the program.)

1 (Yes, participated as described)
2 (Yes, participated but at another location)
3 (NO, did NOT participate in program)
00 (Other, specify)
98 (Don't know)
99 (Refused)

[SKIP A2 IF A1=1,2]

A2. Is it possible that someone else dealt with the energy-efficient product installation?

1 (Yes, someone else dealt with it)
2 (No)
00 (Other, specify)

98 (Don't know)
99 (Refused)

[IF A2=1, ask to be transferred to that person. If not available, thank and terminate. If available, go back to A1]

[IF A1=2, 3, 00, 98, 99: Thank and terminate. Record disposition as "Could not confirm participation".]

Before we begin, I want to emphasize that this survey will only be about the <ENDUSE> you installed through the Smart Ideas for Your Business Program at <ADDRESS>. [IF NECESSARY, READ PROJECT DESCRIPTION: <PROJDESC>]

PY7 NET-TO-GROSS MODULE

Variables for the net-to-gross module:
<NTG> (B=Basic rigor level, S= Standard rigor level. All questions here are asked if the standard rigor level is designated. Basic rigor level is designated through skip patterns)
Smart Ideas for your Business (ComEd)
<PROGRAM> (Name of energy efficiency program)
<ENDUSE> (Type of measure installed; from program tracking dataset)
<VEND1> (Contractor who installed new equipment, from program tracking dataset)

<OTHERPTS> (Variable to be calculated based on responses. Equals 1- minus response to N3p.)
<MSAME> (Equals 1 if same customer had more than one project of the same measure type; from program tracking database)
<NSAME> (Number of additional projects of the same measure type implemented by the same customer; from program tracking database)
<FSAME> (Equals 1 if same customer also had a project of a different measure type at the same facility; from program tracking database)
<FDESC> (Type of project of a different measure type at the same facility; from program tracking database)

VENDOR INFORMATION

I would like to get some information on the VENDORS that may have helped you with the implementation of this equipment.

V1 Did you work with a contractor or vendor that helped you with the choice of this equipment?
1 (Yes)
2 (No)
8 (Don't Know)
9 (Refused)

[SKIP TO V4 IF V1=2, 8, or 9]

V3 Did you also use a DESIGN or CONSULTING Engineer?
1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

V4 Did your utility account manager assist you with the project that you implemented through the ComEd *Smart Ideas® for Your Business* Program? (IF NEEDED: A utility account manager is an employee of ComEd who is assigned to your company to provide assistance)
1 (Yes)
2 (No, don't have a utility account manager)
3 (No, have a utility account manager but they weren't involved)
8 (Don't know)
9 (Refused)

NET-TO-GROSS BATTERY

I'd now like to ask a few questions about the thought process you used that resulted in the energy efficient installations and incentive by the program. We want to understand how you thought about energy efficiency and what influenced your decision to install <MEASURE> through ComEd's program.

A2aa. Did this new energy efficiency equipment that you installed through the program replace existing equipment or was it added to control or work directly with existing equipment?
01 Replaced existing equipment
02 Added to control or work directly with existing equipment
00 Other (record VERBATIM)
98 (Don't know)
99 (Refused)

N00 In deciding to do a project of this type, there are usually a number of reasons why it may be undertaken. In your own words, can you tell me why this project was implemented? (IF NEEDED: Were there any other reasons?) (MULTIPLE RESPONSE OF THREE)

DO NOT READ
1 To replace old or outdated equipment
2 As part of a planned remodeling, build-out, or expansion
3 To gain more control over how the equipment was used
4 The maintenance downtime and associated expenses for the old equipment were too high
5 Had process problems and were seeking a solution
6 To improve equipment performance
7 To improve the product quality
8 To comply with codes set by regulatory agencies
9 To comply with company policies regarding regular/normal maintenance/replacement policy
10 To get an incentive from the program
11 To protect the environment
12 To reduce energy costs
13 To reduce energy use/power outages

14 To update to the latest technology
00 Other (RECORD VERBATIM)
98 (Don't know)
99 (Refused)

N2 When did you first learn about ComEd's Smart Ideas for your Business Program? Was it BEFORE or AFTER you DECIDED to implement the measure that qualified for the incentive? (NOTE TO INTERVIEWER: "the measure" refers to the specific energy efficient equipment installed through the program.)

1 (Before)
2 (After)
8 (Don't know)
9 (Refused)

N3 Next, I'm going to ask you to rate the importance of the program as well as other factors that might have influenced your decision to implement the measure that qualified for the incentive. 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 extremely important. Now using this scale please rate the importance of each of the following in your decision to implement the measure at this time. [FOR N3b-n, RECORD 0 to 10; 96=Not Applicable; 98=Don't Know; 99=Refused]

(If needed: How important in your DECISION to implement the project was…)

N3b. Availability of the PROGRAM incentive

[ASK IF N3b=8, 9, 10]

N3bb. Why do you give it this rating? [OPEN END; 98=Don't know; 99=Refused]

N3c. Information provided through the technical assistance you received from the program's field staff

[SKIP N3cc IF NTG=B]
[ASK IF N3c=8, 9, 10]

N3cc. Why do you give it this rating? [OPEN END; 98=Don't know; 99=Refused]

[ASK N3d IF V1=1]

N3d. Recommendation from an equipment vendor or contractor that helped you with the choice of the equipment

N3e. Previous experience with this type of equipment

N3f. Recommendation from ComEd or DNV/GL program staff

[SKIP N3ff IF NTG=B]
[ASK N3ff IF N3f=8, 9, 10]

N3ff. Why do you give it this rating?

N3h. Information from ComEd marketing materials

[SKIP N3hh IF NTG=B]
[ASK IF N3h=8, 9, 10]

N3hh. Why do you give it this rating?

[ASK N3i IF V3=1]

N3i. A recommendation from a design or consulting engineer

N3j. Standard practice in your business/industry

[SKIP N3k IF V4>1]

N3k. Endorsement or recommendation by a ComEd account manager

[SKIP N3kk IF NTG=B]

[ASK IF N3k=8, 9, 10]

N3kk. Why do you say that?

N3l. Corporate policy or guidelines

N3m. Payback on the investment

N3n. Were there any other factors we haven't discussed that were influential in your decision to install this MEASURE?

00 [Record verbatim]
96 (Nothing else influential)
98 (Don't Know)
99 (Refused)

[ASK N3nn IF N3n=00]

N3nn. Using the same zero to 10 scale, how would you rate the influence of this factor? [RECORD 0 to 10; 98=Don't Know; 99=Refused]

Thinking about this differently, I would like you to compare the importance of the PROGRAM with the importance of other factors in implementing the <ENDUSE> project.

[READ IF (N3D, N3E, N3I, N3J, N3L, N3M, OR N3N)=8,9,10; ELSE SKIP TO N3p]

You just told me that the following other factors were important:

[READ IN ONLY ITEMS WHERE THEY GAVE A RATING OF 8 or higher]

(N3D) Equipment Vendor recommendation
(N3E) Previous experience with this measure
(N3I) Recommendation from a design or consulting engineer
(N3J) Standard practice in your business/industry
(N3L) Corporate policy or guidelines
(N3M) Payback on investment
(N3N) Other factor

N3p 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 given to program: [RECORD 0 to 10; 98=Don't Know; 99=Refused]

[CALCULATE VARIABLE "OTHERPTS" AS: 10 MINUS N3p RESPONSE; IF N3p=98, 99, SET OTHERPTS=BLANK]

N3o And how many points would you give to other factors? [RECORD 0 to 10; 98=Don't Know; 99=Refused] [The response should be <OTHERPTS> because both numbers should equal 10. If response is not <OTHERPTS> ask INC1]

INC1 The last question asked you to divide a TOTAL of 10 points between the program and other factors. You just noted that you would give <N3p RESPONSE> points to the program. Does that mean you would give <OTHERPTS> points to other factors?

1 (Yes)
2 (No)
98 (Don't know)
99 (Refused)

[IF INC1=2, go back to N3p]

CONSISTENCY CHECK ON PROGRAM IMPORTANCE SCORE

[ASK IF (N3p>7 AND ALL OF (N3b, N3c, N3f, N3h, AND N3k)=0,1,2), ELSE SKIP TO N4aa]

N4 You just gave <N3p 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 PROGRAM INCENTIVE, you gave a rating of ...<N3B RESPONSE> ... out of ten, indicating that the program incentive was not that important to you. Can you tell me why?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N4b When I asked you about THE INFORMATION PROVIDED THROUGH THE TECHNICAL ASSISTANCE, you gave a rating of ...<N3C RESPONSE> ... out of ten, indicating that the information provided was not that important to you. Can you tell me why?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N4c When I asked you about THE RECOMMENDATION FROM A Smart Ideas for your Business COMED PROGRAM STAFF PERSON, you gave a rating of ...<N3F RESPONSE> ... out of ten, indicating that the information provided was not that important to you. Can you tell me why?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N4d When asked about THE INFORMATION from COMED's MARKETING MATERIALS, you gave a rating of ...<N3H RESPONSE> ... out of ten, indicating that this information from the program or utility marketing materials was not that important to you. Can you tell me why?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[SKIP N4e IF V4>1 or N3k=96,98,99]

N4e When asked about THE ENDORSEMENT or RECOMMENDATION by YOUR UTILTY ACCOUNT MANAGER, you gave a rating of <N3K RESPONSE> ... out of ten, indicating that this Account manager endorsement was not that important to you. Can you tell me why?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[ASK IF N3p<3 AND ANY ONE OF (N3b, N3c, N3f, N3h, OR N3k=8,9,10) ELSE SKIP TO N5]

N4aa You just gave <N3p 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 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 important to you. Just to make sure I understand, would you explain why the program was not very important in your decision to install this equipment?

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

[IF A2aa=1 (MEASURE=REPLACEMENT), THEN ASK]

N5 Using a scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if ComEd's efficiency program had not been available, what is the likelihood that you would have installed exactly the same equipment? [RECORD 0 to 10; 98=Don't know; 99=Refused]

[IF A2aa=2 (MEASURE=ADD-ON) THEN ASK]

N5aa Using a scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the **PROGRAM** had **not** been available, what is the likelihood that you would have installed exactly the same item/equipment at the same time as you did? [RECORD 0 to 10; 98=Don't know; 99=Refused]

[IF A2aa=1 (MEASURE=REPLACEMENT) AND N5>0 THEN ASK, ELSE SKIP TO N5A]

Next, I'd like to ask a couple of questions to help us estimate at what point in the future you would definitely have replaced your existing equipment. We understand that you can't know exactly when you would have done this, especially so far into the future. We're just trying to get a sense of how long you think the current equipment or process would have kept serving your company's needs before you had to or chose to replace it.

N5ab. If the program had not been available, how likely is it that you would have installed exactly the same project or efficiency of equipment within **1 year** of when you installed your <ENDUSE> project?

Please use a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely" [RECORD 0 to 10; 98=Don't know; 99=Refused]

[IF N5ab<8 THEN ASK, ELSE SKIP TO N7a]

N5ac. If the program had not been available, how likely is it that you would have installed exactly the same project or efficiency of equipment within **3 years** of when you installed your <ENDUSE> project? (IF NEEDED: Please use a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely") [RECORD 0 to 10; 98=Don't know; 99=Refused]

[IF N5ac<8 THEN ASK, ELSE SKIP TO N7a]

N5ad. If the program had not been available, how likely is it that you would have installed exactly the same project or efficiency of equipment within **5 years** of when you installed your <ENDUSE> project? (IF NEEDED: Please use a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely") [RECORD 0 to 10; 98=Don't know; 99=Refused]

[IF N5ad=(0,1,2) THEN SKIP TO N5ae, ELSE ASK N7a]

N7a Without the program, when do you think you would have installed the <ENDUSE>? (Prompt, if necessary.)

0 (at the same time you did)
1 (up to 6 months later)
2 (7 months to 1 year later)
3 (more than 1 year up to 2 years later)
4 (more than 2 years up to 3 years later)
5 (more than 3 years up to 4 years later)
6 (more than 4 years later)
8 (Don't know)
9 (Refused)

[ASK N7b IF N7a=6]

N7b. Why do you think it would have been over 4 years later?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N5ae. Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not installed the program qualifying equipment, which of the following alternatives would you have been MOST likely to do?

1. Install fewer units
2. Install standard efficiency equipment or whatever required by code
3. install equipment more efficient than code but less efficient than what you installed through the program
4. repair or overhaul the existing equipment
5. do nothing (keep the existing equipment as is)
00. something else (specify what _____)
98. (Don't know)
99. (Refused)

CONSISTENCY CHECKS

[ASK N5a-d IF N3b=8,9,10 AND N5=8,9,10]

N5a I have a follow-up question on one of your earlier responses. When you answered ...<N3B RESPONSE> ... for the question about the influence of the incentive, I would interpret that to mean that the incentive was quite important to your decision to install. Then, when you answered <N5 RESPONSE> for how likely you would be to install the same equipment without the incentive, it sounds like the incentive was not very important in your installation decision.

I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain the role the incentive played in your decision to install this efficient equipment?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N5b Would you like for me to change your score on the importance of the incentive? You gave a score of <N3B_RESPONSE>. Or would you like to change your score on the likelihood you would install <MEASURE> without the incentive? You gave a rating of <N5_RESPONSE>. We can change both if you wish. .

1 (Change importance of incentive rating)
2 (Change likelihood to install the same equipment rating)
3 (Change both)
4 (No, don't change)
8 (Don't know)
9 (Refused)

[ASK IF N5b=1,3]

N5c How important was… availability of the PROGRAM incentive? (IF NEEDED: in your DECISION to implement the project) [Scale of 0 to 10, where 0 means not at all important and 10 means extremely important; 98=Don't know, 99=Refused]

[ASK IF N5b=2,3]

N5d If the utility program had not been available, what is the likelihood that you would have installed exactly the same equipment? [Scale of 0 to 10, where 0 means "Not at all likely" and 10 means "Extremely likely"; 98=Don't know, 99=Refused]

CONSISTENCY CHECK #3: TIMING OF INSTALLATION DECISION VS. ALL THREE PROGRAM SCORES

[ASK IF N2=2 AND (ANY OF N3b/N5c, N3f, N3h=8,9,10 OR N3p>70 OR N5/N5d<3)

N5e In response to an earlier question, you noted that you learned about the program AFTER you had already decided to install the <ENDUSE> that qualified for the incentive. However, based on

- READ IF N3b/N5c=8,9,10: "the rating of <N3b/N5c RESPONSE> you gave to the program incentive"
- READ IF N3f=8,9,10: "the rating of <N3f RESPONSE> you gave to the recommendation from a ComEd or DNV/GL program staff person"
- READ IF N3h=8,9,10: "the rating of <N3h RESPONSE> you gave to information you received through the Smart Ideas or ComEd marketing materials"
- READ IF N3p>70: "the <N3p RESPONSE> you allocated to the program"
- READ IF N5/N5d<3: the likelihood of only <N5/N5d> out of 10 that you would have installed exactly the same equipment without the program,

it sounded like the program was important in your decision to install the high efficiency equipment.

I want to make sure I'm understanding your answers correctly, or if the questions may have been unclear. Will you explain the role the incentive program played in your selection of the efficiency level of the installed equipment as well as the scope of the project? [OPEN END; 98=Don't Know, 99=Refused]

[ASK IF N3j>7]

N6 In an earlier question, you rated the importance of STANDARD PRACTICE in your industry very highly in your decision making. Could you please rate the importance of the PROGRAM, relative to this standard industry practice, in influencing your decision to install this measure? Would you say the program was much more important, somewhat more important, equally important, somewhat less important, or much less important than the industry's standard practice?

1 (Much more important)
2 (Somewhat more important)
3 (Equally important)
4 (Somewhat less important)
5 (Much less important)
8 (Don't know)
9 (Refused)

PAYBACK BATTERY [ASK N8-N10a IF N3m=6,7,8,9,10]

I'd like to find out more about the payback criteria <COMPANY> uses for its investments.

N8 What financial calculations does <COMPANY> make before proceeding with installation of a MEASURE like this one?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N9 What is the payback cut-off point <COMPANY> uses (in months) before deciding to proceed with an investment? Would you say…

1 0 to 6 months
2 7 months to 1 year
3 more than 1 year up to 2 years
4 more than 2 years up to 3 years
5 more than 3 years up to 5 years
6 Over 5 years
8 (Don't know)
9 (Refused)

N10 Does your company generally implement projects that meet the required financial cut-off point?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

[ASK N10aa IF N10=2]

N10aa Why doesn't your company generally implement projects that meet the required financial cut-off point?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N10a Did the incentive play an important role in moving your project within the acceptable payback cutoff point?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

CORPORATE POLICY BATTERY [ASK N11-N17 IF N3L=6,7,8,9,10 AND NTG=S]

N11 Does your organization have an environmental policy to reduce environmental emissions or energy use? Some examples would be to "buy green" or use sustainable approaches to business investments.

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

[ASK N12-N17 IF N11=1]

N12 What specific policy influenced your decision to adopt or install the <ENDUSE> through the Smart Ideas for your Business program?

00 [RECORD VERBATIM]
98 (Don't know)
99 (Refused)

N12a When did your organization adopt that policy?

00 [RECORD VERBATIM]
98 (Don't know)
99 (Refused)

N13 Had that policy caused you to adopt energy efficient <ENDUSE> at this facility before participating in the ComEd efficiency program?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

[ASK N15-N16 IF N13=1 OR N14=1]

N15 Did your organization receive an incentive for a previous installation of <ENDUSE>?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

[ASK N16 IF N15=1]

N16 To the best of your ability, please describe…. [Record VERBATIM; 98=Don't know; 99=Refused]

a. the amount of incentive received
b. the approximate timing
c. the name of the program that provided the incentive

[ASK N17 IF N13=1 OR N14=1]

N17 If I understand you correctly, you said that <COMPANY> 's corporate policy has caused you to install energy efficient <ENDUSE> previously at this and/or other facilities. I want to make sure I fully understand how this corporate policy influenced your decision versus the Smart Ideas for your Business program. Can you please clarify that?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

STANDARD PRACTICE BATTERY [ASK N18-N22 IF N3j=6,7,8,9,10 AND NTG=S]

N18 Approximately, how long has use of energy efficient <ENDUSE> been standard practice in your industry?

M [00 Record Number of Months; 98=Don't know, 99=Refused]
Y [00 Record Number of Years; 98=Don't know, 99=Refused]

N19 Does <COMPANY> ever deviate from the standard practice?
1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

[ASK IF N19=1]
N19a Please describe the conditions under which <COMPANY> deviates from this standard practice.
00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N20 How did this standard practice influence your decision to install the <ENDUSE> through the Smart Ideas for Your Business program
00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N20a Could you please rate the importance of the Smart Ideas for Your Business program, versus this standard industry practice in influencing your decision to install the <ENDUSE>. Would you say the Smart Ideas for Your Business program was…
1 Much more important
2 Somewhat more important
3 Equally important
4 Somewhat less important
5 Much less important
8 (Don't know)
9 (Refused)

N21 What industry group or trade organization do you look to to establish standard practice for your industry?
00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

N22 How do you and other firms in your industry receive information on updates in standard practice?
00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

DESIGN ASSISTANCE

N23 Who provided the most assistance in the design or specification of the <ENDUSE> you installed through the program? (If necessary, probe from the list below.)

1 (Designer)
2 (Consultant)
3 (Equipment distributor)
4 (Installer)
5 (ComEd/Smart Ideas for your Business account manager)
6 (ComEd staff)
00 (Other, specify)
98 (Don't know)
99 (Refused)

[SKIP N24 IF N23=98, 99]

N24 Please describe the type of assistance that they provided.

00 Record VERBATIM
98 Don't know
99 Refused

ADDITIONAL PROJECTS

[ASK N26 IF MSAME=1]

Our records show that <COMPANY> also received an incentive from Smart Ideas for your Business ComEd for <NSAME> other <ENDUSE> project(s).

N26 Was it a single decision to complete all of those <ENDUSE> projects for which you received an incentive from Smart Ideas for your Business or did each project go through its own decision process?

1 (Single Decision)
2 (Each project went through its own decision process)
00 (Other, specify)
98 (Don't know)
99 (Refused)

[ASK N27 IF FSAME=1 ELSE SKIP TO EARLY REPLACEMENT BATTERY]

Our records show that <COMPANY> also received an incentive from Smart Ideas for your Business for a <FDESC> project at < ADDRESS >.

N27 Was the decision making process for the <FDESC> project the same as for the <ENDUSE> project we have been talking about?

1 (Same decision making process)
2 (Different decision making process)
00 (Other, specify)
98 (Don't know)
99 (Refused)

EARLY REPLACEMENT BATTERY

[SKIP TO SPILLOVER MODULE, IF NOT QN00=01-09]

Earlier, when I asked you a question about why you decided to implement the project, you gave reasons related to [READ LIST OF ISSUES MENTIONED IN N00]. Now I would like to ask some follow up questions regarding the responses you gave me.

[ASK IF N00=1,ELSE SKIP TO ER4],

ER1. Approximately how old was the existing equipment, in years?

___ Estimated Age
98 (Don't know)
99 (Refused)

[ASK IF ER1=98]

ER1a. Approximately in what year was the existing equipment purchased?

___ Estimated Year of Purchase
98 (Don't know)
99 (Refused)

ER2Y. How much longer do you think it would have lasted?

YEAR___ Estimated Remaining Useful Life
98 (Don't know)
99 (Refused)

ER3. Would it be possible to obtain a copy of the original invoice for this equipment?

1. Yes [ARRANGE FOR DELIVERY]
2 No
98 (Don't know)
99 (Refused)

[ASK IF ER3=1]

EMAIL. Can you please provide your email address so that we might contact you and obtain the invoice? [OPEN END]

[ASK IF N00=2]

ER4. Can you please describe the remodeling, build out or capacity expansion that you did and the role the project played in it?

00 (Other, specify)
98 (Don't know)
99 (Refused)

[ASK IF N00=3]

ER5. Can you please describe how the existing equipment had operated before you upgraded it, and why you sought increased control over it?

00 (Other, specify)
98 (Don't know)
99 (Refused)

[ASK IF N00=4, ELSE SKIP TO ER10]

ER6. What percentage of downtime did you experience in the past year?

_____Downtime Estimate

98 (Don't know)

99 (Refused)

ER7. What percentage of downtime did you experience in the previous years?

_____Previous Year Downtime Estimate

98 (Don't know)

99 (Refused)

ER8. Over the last 5 years, have maintenance costs been increasing, decreasing or staying about the same?

1. Increasing
2. Decreasing
3. Staying the same

98 (Don't know)

99 (Refused)

ER9Y. In your opinion, based on the economics of operating this equipment, for how many more years could you have kept this equipment functioning?

_____Estimate of Remaining Useful Life (in years)

98 (Don't know)

99 (Refused)

ER9M. In your opinion, based on the economics of operating this equipment, for how many more years could you have kept this equipment functioning?

MONTH

_____Estimate of Remaining Useful Life

98 (Don't know)

99 (Refused)

[ASK IF N00=5, ELSE SKIP TO ER12]

ER10. Can you briefly describe the process problems that you experienced prior to this project?

00 (Other, specify)

98 (Don't know)

99 (Refused)

ER11. Was it critical that these process problems be resolved as soon as possible?

1. Yes

2 No

98 (Don't know)

99 (Refused)

[ASK IF N00=6]

ER12. Which of the following statements best describes the performance and operating condition of the equipment you replaced through the ComEd Smart Ideas for your Business program?

1. Existing equipment was fully functioning, and without significant issues
2. Existing equipment was fully functioning with minor issues

3. Existing equipment was fully functioning, but with significant issues
4. Existing equipment had failed or did not function.
5. Existing equipment was obsolete
00. Other (RECORD VERBATIM)
96. Not applicable, ancillary equipment (VSD, EMS, controls, etc.)
98 (Don't know)
99 (Refused)

[ASK IF N00=7, ELSE SKIP TO ER15]
ER13. Can you briefly describe these product quality improvements that this project provided?]

00 (Other, specify)
98 (Don't know)
99 (Refused)

ER14. Was it critical that these product quality improvements be made as soon as possible?

1. Yes
2 No
98 (Don't know)
99 (Refused)

[ASK IF N00=8, ELSE SKIP TO ER19]
ER15. Can you briefly describe the specific code/regulatory requirements that this project addressed?

00 (Other, specify)
98 (Don't know)
99 (Refused)

ER16. Was it critical that your company comply with this code(s) as soon as possible?

1. Yes
2 No
98 (Don't know)
99 (Refused)

[ASK IF N00=9, ELSE SKIP TO SPILLOVER MODULE]
ER19. Can you briefly describe the specific company policies regarding regular/normal maintenance/replacement policy(ies) that were relevant to this project?

00 (Other, specify)
98 (Don't know)
99 (Refused)

ER20. Was it critical that your company comply with these policies as soon as possible?

1. Yes
2 No
98 (Don't know)
99 (Refused)

NAVIGANT

PY7 SPILLOVER MODULE

Thank you for discussing the new <ENDUSE> that you installed through the Smart Ideas for Your Business Program. Next, I would like to discuss any energy efficient equipment you might have installed OUTSIDE of the program.

SP1 Since receiving an incentive for the project we just discussed, did you implement any ADDITIONAL energy efficiency measures at this facility or at your other facilities within ComEd's service territory that did NOT receive incentives through any utility or government program?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

[ASK SP1a-SP1c IF SP1=1, ELSE SKIP TO FIRMOGRAPHICS?]

SP1a. Do you plan to apply for incentives for these energy efficiency measure(s) through a utility program in the future?

1 Yes [SKIP TO SP1b]
2 No [SKIP TO SP2]
8 (Don't know) [SKIP TO SP2]
9 (Refused) [SKIP TO SP2]

SP1b. Which program(s) do you plan to apply to for incentives for these measures?

00 Record VERBATIM
98 (Don't know)
99 (Refused)

SP1c. Approximately when do you plan to apply for incentives through these programs?

00 Record VERBATIM
98 (Don't know)
99 (Refused)

[ASK IF SP1=1, ELSE SKIP TO FIRMOGRAPHICS?]

SP2 What was the first measure that you implemented? (IF RESPONSE IS GENERAL, E.G., "LIGHTING EQUIPMENT", PROBE FOR SPECIFIC MEASURE. PROBE FROM LIST, IF NECESSARY.)

1 (Lighting: T8 lamps)
2 (Lighting: T5 lamps)
3 (Lighting: Highbay Fixture Replacement)
4 (Lighting: CFLs)
5 (Lighting: Controls / Occupancy sensors)
6 (Lighting: LED lamps)
7 (Cooling: Unitary/Split Air Conditioning System)

8 (Cooling: Room air conditioners)
9 (Cooling: Variable Frequency Drives (VFD/VSD) on HVAC Motors)
10 (Motors: Efficient motors)
11 (Refrigeration: Strip curtains)
12 (Refrigeration: Anti-sweat controls)
13 (Refrigeration: EC motor for WALK-IN cooler/freezer)
14 (Refrigeration: EC motor for REACH-IN cooler/freezer)
00 (Other, specify)
96 (Didn't implement any measures)
98 (Don't know)
99 (Refused)

[SKIP TO FIRMOGRAPHICS IF SP2=96, 98, 99]

SP3. What was the second measure? (IF RESPONSE IS GENERAL, E.G., "LIGHTING EQUIPMENT", PROBE FOR SPECIFIC MEASURE. PROBE FROM LIST, IF NECESSARY.)

1 (Lighting: T8 lamps)
2 (Lighting: T5 lamps)
3 (Lighting: Highbay Fixture Replacement)
4 (Lighting: CFLs)
5 (Lighting: Controls / Occupancy sensors)
6 (Lighting: LED lamps)
7 (Cooling: Unitary/Split Air Conditioning System)
8 (Cooling: Room air conditioners)
9 (Cooling: Variable Frequency Drives (VFD/VSD) on HVAC Motors)
10 (Motors: Efficient motors)
11 (Refrigeration: Strip curtains)
12 (Refrigeration: Anti-sweat controls)
13 (Refrigeration: EC motor for WALK-IN cooler/freezer)
14 (Refrigeration: EC motor for REACH-IN cooler/freezer)
00 (Other, specify)
96 (There was no second measure)
98 (Don't know)
99 (Refused)

[SKIP SP4 IF SP3=96, 98, 99]

SP4 What was the third measure? (IF RESPONSE IS GENERAL, E.G., "LIGHTING EQUIPMENT", PROBE FOR SPECIFIC MEASURE. PROBE FROM LIST, IF NECESSARY.)

1 (Lighting: T8 lamps)
2 (Lighting: T5 lamps)
3 (Lighting: Highbay Fixture Replacement)
4 (Lighting: CFLs)
5 (Lighting: Controls / Occupancy sensors)
6 (Lighting: LED lamps)
7 (Cooling: Unitary/Split Air Conditioning System)
8 (Cooling: Room air conditioners)
9 (Cooling: Variable Frequency Drives (VFD/VSD) on HVAC Motors)
10 (Motors: Efficient motors)
11 (Refrigeration: Strip curtains)
12 (Refrigeration: Anti-sweat controls)
13 (Refrigeration: EC motor for WALK-IN cooler/freezer)
14 (Refrigeration: EC motor for REACH-IN cooler/freezer)
00 (Other, specify)
96 (There was no third measure)
98 (Don't know)
99 (Refused)

SP5 I have a few questions about the FIRST measure that you installed. (If needed, read back measure: <SP2 RESPONSE>) [OPEN END]

a. Can you briefly explain why you decided to install this energy efficiency measure on your own, rather than going through a utility incentive program?
b. Why did you not install this measure through the Smart Ideas for your Business Program?
c. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of this measure.
d. Please describe the EFFICIENCY of this measure.
e. How many of this measure did you install?
ee. When did you install this measure?

SP5f. Was this measure specifically recommended by a program related study, report or program technical specialist?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

SP5g. How significant was your experience in the Smart Ideas for your Business Program in your decision to implement this measure, using a scale of 0 to 10, where 0 is not at all significant and 10 is extremely significant? [SCALE 0-10; 98=Don't Know; 99=Refused]

[SKIP SP5h IF SP5g = 98, 99]

SP5h. Can you explain specifically how your experience with the <PROGRAM> influenced your decision to install this additional high efficiency measure(s)? [OPEN END]

SP5i. If you had not participated in the Smart Ideas for your Business program, how likely is it that your organization would still have implemented this measure, using a 0 to 10, scale where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure? [SCALE 0-10; 98=Don't Know; 99=Refused]

CONSISTENCY CHECK ON PROGRAM IMPORTANCE RATING VS. NO PROGRAM RATING

[ASK CC1a IF SP5g=0,1,2 AND SP5i =0,1,2]

CC1a When you answered ...<SP5g RESPONSE> ... for the question about the influence of the Smart Ideas for your Business Program on your decision to install this measure, I would interpret that to mean the Program was not very important to your decision. However, when you answered the previous question, it sounds like it was not very likely that you would have installed this measure had you not participated in the Smart Ideas for your Business Program. Can you please explain the role the program made in your decision to implement this measure?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[ASK CC1b IF SP5g=8,9,10 AND SP5i =8,9,10]

CC1b When you answered ...<SP5g RESPONSE> ... for the question about the influence of the Smart Ideas for your Business Program on your decision to install this measure, I would interpret that to mean the Program was quite important to your decision. However, when you answered the previous question, it sounds like it was very likely that you would have installed this measure had you not participated in the Smart Ideas for your Business Program. Can you please explain the role the program made in your decision to implement this measure?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[SKIP TO FIRMOGRAPHICS IF SP3=96, 98, 99]

SP6 I have a few questions about the SECOND measure that you installed. (If needed, read back measure: <SP3 RESPONSE>) [OPEN END]

a. Can you briefly explain why you decided to install this energy efficiency measure(s) on your own, rather than going through a utility incentive program?
b. Why did you not install this measure through the Smart Ideas for Your Business Program?
c. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of this measure.
d. Please describe the EFFICIENCY of this measure.
e. How many of this measure did you install?
ee. When did you install this measure?

SP6f. Was this measure specifically recommended by a program related study, report or program technical specialist?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

SP6g. How significant was your experience in the Smart Ideas for Your Business Program in your decision to implement this Measure, using a scale of 0 to 10, where 0 is not at all significant and 10 is extremely significant? [SCALE 0-10; 98=Don't Know; 99=Refused]

[SKIP SP6h IF SP6g = 98, 99]

SP6h. Can you explain specifically how your experience with the <PROGRAM> influenced your decision to install this additional high efficiency measure(s)? [OPEN END]

SP6i. If you had not participated in the Smart Ideas for Your Business Program, how likely is it that your organization would still have implemented this measure, using a 0 to 10, scale where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure? [SCALE 0-10; 98=Don't Know; 99=Refused]

CONSISTENCY CHECK ON PROGRAM IMPORTANCE RATING VS. NO PROGRAM RATING

[ASK CC2a IF SP6g=0,1,2 AND SP6i =0,1,2]

CC2a When you answered ...<SP6g RESPONSE> ... for the question about the influence of the Smart Ideas for Your Business Program on your decision to install this measure, I would interpret that to mean the Program was not very important to your decision. However, when you answered the previous question, it sounds like it was not very likely that you would have installed this measure unless you had participated in the Smart Ideas for your Business Program. Can you please explain the role the program made in your decision to implement this measure?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[ASK CC2b IF SP6g=8,9,10 AND SP6i =8,9,10]

CC2b When you answered ...<SP6g RESPONSE> ... for the question about the influence of the Smart Ideas for Your Business Program on your decision to install this measure, I would interpret that to mean the Program was quite important to your decision. However, when you answered the previous question, it sounds like it was very likely that you would have installed this measure had you not participated in the Smart Ideas for your Business Program. Can you please explain the role the program made in your decision to implement this measure?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[SKIP TO FIRMOGRAPHICS IF SP4=96, 98, 99]

SP7 I have a few questions about the THIRD measure that you installed. (If needed, read back measure: <SP3 RESPONSE>) [OPEN END]

a. Can you briefly explain why you decided to install this energy efficiency measure(s) on your own, rather than going through a utility incentive program?
b. Why did you not install this measure through the Smart Ideas for your Business Program?
c. Please describe the SIZE, TYPE, and OTHER ATTRIBUTES of this measure.
d. Please describe the EFFICIENCY of this measure.
e. How many of this measure did you install?
ee. When did you install this measure?

SP7f. Was this measure specifically recommended by a program related study, report or program technical specialist?

1 (Yes)
2 (No)
8 (Don't know)
9 (Refused)

SP7g. How significant was your experience in the Smart Ideas for your Business Program in your decision to implement this Measure, using a scale of 0 to 10, where 0 is not at all significant and 10 is extremely significant? [SCALE 0-10; 98=Don't Know; 99=Refused]

[SKIP SP7h IF SP7g = 98, 99]

SP7h. Can you explain specifically how your experience with the <PROGRAM> influenced your decision to install this additional high efficiency measure(s)? [OPEN END]

SP7i. If you had not participated in the Smart Ideas for your Business program, how likely is it that your organization would still have implemented this measure, using a 0 to 10, scale where 0 means you definitely WOULD NOT have implemented this measure and 10 means you definitely WOULD have implemented this measure? [SCALE 0-10; 98=Don't Know; 99=Refused]

CONSISTENCY CHECK ON PROGRAM IMPORTANCE RATING VS. NO PROGRAM RATING

[ASK CC3a IF SP7g=0,1,2 AND SP7i =0,1,2]

CC3a When you answered ...<SP7g RESPONSE> ... for the question about the influence of the Smart Ideas Program on your decision to install this measure, I would interpret that to mean the Program was not very important to your decision. However, when you answered the previous question, it sounds like it was not very likely that you would have installed this measure unless you had participated in the Smart Ideas Program. Can you please explain the role the program made in your decision to implement this measure?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

[ASK CC3b IF SP7g=8,9,10 AND SP7i =8,9,10]

CC3b When you answered ...<SP7g RESPONSE> ... for the question about the influence of the Smart Ideas Program on your decision to install this measure, I would interpret that to mean the Program was quite important to your decision. However, when you answered the previous question, it sounds like it was very likely that you would have installed this measure had you not participated in the Smart Ideas Program. Can you please explain the role the program made in your decision to implement this measure?

00 [Record VERBATIM]
98 (Don't know)
99 (Refused)

Firmographics

I only have a few general questions left.

F1a What is <COMPANY>'s business type? (PROBE, IF NECESSARY; IF MANUFACTURING, PROBE IF IT IS LIGHT INDUSTRY OR HEAVY INDUSTRY)

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)
15. (Property Management/Real Estate)
00. (Other, specify)
98. (Don't know)
99. (Refused)

F1b And is the business type of the facility in which the <ENDUSE> was installed the same?

1. Yes
2. No
8. (Don't know)
9. (Refused)

[ASK F1c IF F1b=2]

F1c What is the business type of the facility? (PROBE, IF NECESSARY – CLASS MANUFACTURING AS EITHER LIGHT OR HEAVY INDUSTRY)

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)
15. (Property Management/Real Estate)
00. (Other, specify)
98. (Don't know)
99. (Refused)

F2 Which of the following best describes the ownership of this facility?
1. <COMPANY> owns and occupies this facility
2. <COMPANY> owns this facility but it is rented to someone else
3. <COMPANY> rents this facility
8. (Don't know)
9. (Refused)

[SKIP if F2=1]

F3 Does <COMPANY> pay the electric bill?
1. Yes
2. No
8. (Don't know)
9. (Refused)

F4a How old is this facility? [NUMERIC OPEN END, 0 TO 150; 998=Don't know, 999=Refused]

[ASK F4b IF F4a=998]

F4b Do you know the approximate age? Would you say it is…
1. Less than 2 years
2. 2-4 years
3. 5-9 years
4. 10-19 years
5. 20-29 years
6. 30 years or more years
8. (Don't know)
9. (Refused)

F5a How many employees, including part-time, are employed at this facility? [NUMERIC OPEN END, 0 TO 2000; 9998=Don't know, 9999=Refused]

[ASK F5b IF F5a=9998]

F5b Do you know the approximate number of employees? Would you say it is…
1. Less than 10

2. 10-49
3. 50-99
4. 100-249
5. 250-499
6. 500 or more
8. (Don't know)
9. (Refused)

F6 Which of the following best describes the facility? This facility is…

1. <COMPANY>'s only location
2. one of several locations owned by <COMPANY>
3. the headquarters location of <COMPANY> with several locations

[SKIP F7 IF F2=2]

F7 In comparison to other companies in your industry, would you describe <COMPANY> as…

1. A small company
2. A medium-sized company
3. A large company
4. (Not applicable)
8. (Don't know)
9. (Refused)

6.2.2 Vendor Survey

Vendor NTG Survey Instrument – for ComEd Custom Programs
CI Custom– 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 … **<%ENDUSE>**… project sponsored by ComEd for ... **<%CUSTOMER>**... through the ComEd Smart Ideas for Your Business Program. 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 … **<%ENDUSE**>… project sponsored by ComEd for ...<**%CUSTOMER>...** through the ComEd Smart Ideas for Your Business Program?

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 **…<%ENDUSE**>… project sponsored by ComEd for **...<%CUSTOMER**>... through the ComEd Smart Ideas for Your Business Program. 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 of your firm's involvement in **…<%ENDUSE**>… project sponsored by ComEd?

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 was involved in **…<%ENDUSE>**… project 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 projects 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 projects 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 **<%MEASURE*x*>**?

#	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 <%**MEASURE*x***>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 <%**MEASURE*x***>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 <%**MEASURE*x***>s? And why is that?

77	RECORD VERBATIM		V10
88	Refused	V10	

99	Don't know	V10

V10. Of those installations of <%**MEASURE*x***>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 <%**MEASURE*x***>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 <%**MEASURE*x***>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 <%**MEASURE*x***>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 <%**MEASURE*x***>, equally in areas with and without incentives??

1	Yes	V16
2	No	V16
88	RefusedV16	
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