Guidehouse

ComEd Industrial Systems Impact Evaluation Report

Energy Efficiency / Demand Response Plan:
Program Year 2020 (CY2020)
(1/1/2020-12/31/2020)

Prepared for:

ComEd

FINAL

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1. Introduction

This report presents results from the CY2020 impact evaluation of ComEd's Industrial Systems Program. It summarizes the total energy and demand impacts for the program broken out by relevant measures and program structure details. The appendices provide the impact analysis methodology and details of the total resource cost (TRC) inputs. CY2020 covers January 1, 2020, through December 31, 2020.

2. Program Description

The Industrial Systems program offers a combination of technical assistance and financial incentives. Franklin Energy implements the program, performing industrial systems studies which assess the performance of the facility's industrial compressed air system, process cooling system, refrigeration system, or waste-water treatment plant to ensure efficient, economical operation. This service examines the system's operating characteristics to help identify energy saving measures, using a combination of capital investments and low or no cost measures. ComEd offers a one-time incentive payment of $0.12[1] per annual kWh saved after proper implementation of recommendations identified through the Industrial Systems Program. The total incentive cannot exceed 100% of the total implementation costs or 100% of the total incremental costs for improvements recommended in the study.

The program is referred to as Industrial Systems Optimization in the deemed NTG spreadsheet. In CY2020, the program had 347 participants with 443 measures, as Table 2-1 shows.

Table 2-1. CY2020 Volumetric Findings Detail

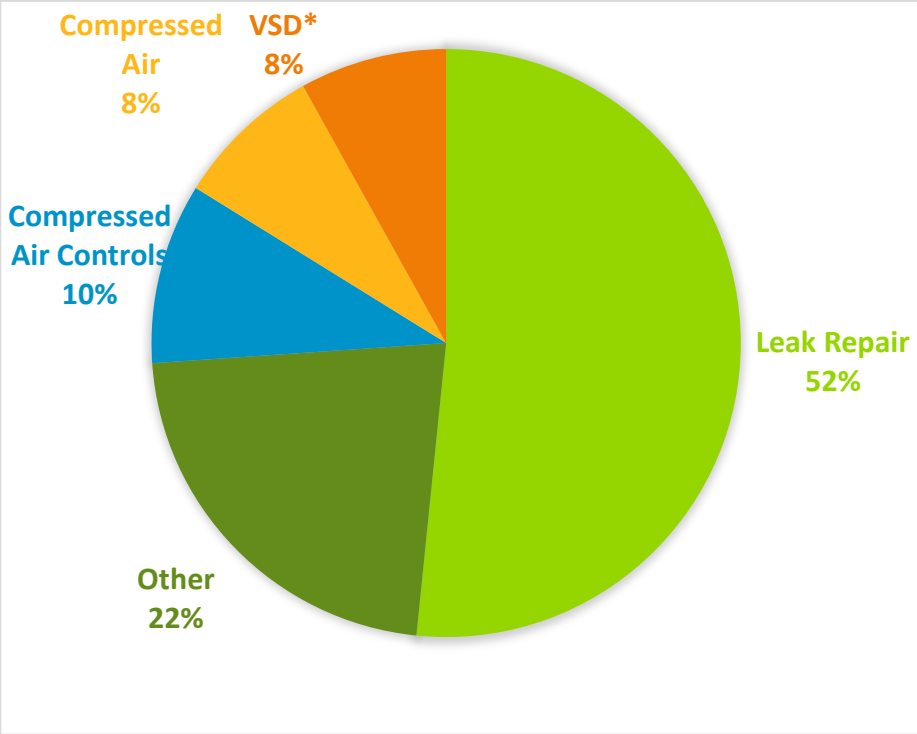
Participation	Total
Participants	347
Total Measures	443
Installed Projects	387

Source: ComEd tracking data and evaluation team analysis

Figure 2-1 displays the ex ante kilowatt-hour (kWh) savings installed by measure type. Leak repair projects had the largest number of measures and contributed the highest amount of claimed savings for the program.

[1] The exception to this is waste-water treatment aeration blowers with controls projects where the customer receives $0.21 per annual kWh saved

Figure 2-1. Ex Ante kWh Savings Installed by Measure Type



* Variable Speed Drive

Source: ComEd tracking data and evaluation team analysis

3. Program Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the Industrial Systems Program achieved in CY2020. The evaluation team did not identify any gas savings associated with the program.

Table 3-1. CY2020 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Summer Peak* Demand Savings (kW)
Electricity		
Ex Ante Gross Savings	44,764,106	6,930
Program Gross Realization Rate	1.21	1.34
Verified Gross Savings	53,945,823	9,309
Program Net-to-Gross Ratio (NTG)	0.77	0.78
Verified Net Savings	41,538,284	7,261
Converted from Gas		
Ex Ante Gross Savings	0	NA
Program Gross Realization Rate	NA	NA
Verified Gross Savings	0	NA
Program Net-to-Gross Ratio (NTG)	NA	NA
Verified Net Savings	0	NA
Total Electric Plus Gas		
Ex Ante Gross Savings	44,764,106	6,930
Program Gross Realization Rate	1.21	1.34
Verified Gross Savings	53,945,823	9,309
Program Net-to-Gross Ratio (NTG)	0.77	0.78
Verified Net Savings	41,538,284	7,261

NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
*The coincident summer peak period is defined as 1:00 p.m.-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.

Source: ComEd tracking data and evaluation team analysis

4. Cumulative Persisting Annual Savings

Table 4-1 shows the cumulative persisting annual savings (CPAS) for the program in CY2020. Figure 4-1 shows the savings across the useful life of the measures. The electric CPAS across all measures installed in 2020 is 41,538,284 kWh (Table 4-1). The historic row is the CPAS contribution back to CY2018. The Program Total Electric CPAS row is the sum of the CY2020 contribution and the historic contribution.

The evaluation team found no gas savings attributable to ComEd for this program; as such, electric CPAS is equivalent to total CPAS.

Table 4-1. Cumulative Persisting Annual Savings (CPAS) – Electric

End Use Type	Research Category	EUL	CY2020 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Industrial Systems	Leak Repair	3.0	27,842,056	0.77	64,315,150			21,438,383	21,438,383	21,438,383				
Industrial Systems	Other	13.0	8,818,582	0.77	88,274,009			6,790,308	6,790,308	6,790,308	6,790,308	6,790,308	6,790,308	6,790,308
Industrial Systems	Compressed Air Controls	13.0	5,359,498	0.77	53,648,573			4,126,813	4,126,813	4,126,813	4,126,813	4,126,813	4,126,813	4,126,813
Industrial Systems	Compressed Air	13.0	4,365,217	0.77	43,695,825			3,361,217	3,361,217	3,361,217	3,361,217	3,361,217	3,361,217	3,361,217
Industrial Systems	VSD	15.0	4,352,096	0.77	50,266,707			3,351,114	3,351,114	3,351,114	3,351,114	3,351,114	3,351,114	3,351,114
Industrial Systems	Air Nozzles	15.0	1,812,730	0.77	20,937,036			1,395,802	1,395,802	1,395,802	1,395,802	1,395,802	1,395,802	1,395,802
Industrial Systems	Chiller	23.0	845,881	0.77	14,980,555			651,328	651,328	651,328	651,328	651,328	651,328	651,328
Industrial Systems	Operational Adjustments	5.0	330,560	0.77	1,272,656			254,531	254,531	254,531	254,531	254,531		
Industrial Systems	HVAC Controls	15.0	130,334	0.77	1,505,360			100,357	100,357	100,357	100,357	100,357	100,357	100,357
Industrial Systems	No Loss Drains	10.0	88,868	0.77	684,283			68,428	68,428	68,428	68,428	68,428	68,428	68,428
CY2020 Program Total Electric Contribution to CPAS			53,945,823		339,580,154			41,538,284	41,538,284	41,538,284	20,099,901	20,099,901	19,845,369	19,845,369
Historic Program Total Electric Contribution to CPAS‡						17,990,719	17,990,719	17,694,526	11,918,391	11,918,391	11,918,391	11,918,391	11,918,391	11,918,391
Program Total Electric CPAS						17,990,719	17,990,719	59,232,810	53,456,675	53,456,675	32,018,292	32,018,292	31,763,760	31,763,760
CY2020 Program Incremental Expiring Electric Savings§									-	-	21,438,383	-	254,531	-
Historic Program Incremental Expiring Electric Savings‡§								296,193	5,776,135	-	-	-	-	-
Program Total Incremental Expiring Electric Savings§								296,193	5,776,135	-	21,438,383	-	254,531	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Industrial Systems	Leak Repair												
Industrial Systems	Other	6,790,308	6,790,308	6,790,308	6,790,308	6,790,308	6,790,308						
Industrial Systems	Compressed Air Controls	4,126,813	4,126,813	4,126,813	4,126,813	4,126,813	4,126,813						
Industrial Systems	Compressed Air	3,361,217	3,361,217	3,361,217	3,361,217	3,361,217	3,361,217						
Industrial Systems	VSD	3,351,114	3,351,114	3,351,114	3,351,114	3,351,114	3,351,114	3,351,114	3,351,114				
Industrial Systems	Air Nozzles	1,395,802	1,395,802	1,395,802	1,395,802	1,395,802	1,395,802	1,395,802	1,395,802				
Industrial Systems	Chiller	651,328	651,328	651,328	651,328	651,328	651,328	651,328	651,328	651,328	651,328	651,328	651,328
Industrial Systems	Operational Adjustments												
Industrial Systems	HVAC Controls	100,357	100,357	100,357	100,357	100,357	100,357	100,357	100,357				
Industrial Systems	No Loss Drains	68,428	68,428	68,428									
CY2020 Program Total Electric Contributio		19,845,369	19,845,369	19,845,369	19,776,941	19,776,941	19,776,941	5,498,602	5,498,602	651,328	651,328	651,328	651,328
Historic Program Total Electric Contributio		11,918,391	11,918,391	11,918,391	11,918,391	5,901,156	5,901,156	-	-	-	-	-	-
Program Total Electric CPAS		31,763,760	31,763,760	31,763,760	31,695,332	25,678,097	25,678,097	5,498,602	5,498,602	651,328	651,328	651,328	651,328
CY2020 Program Incremental Expiring Elec		-	-	-	68,428	-	-	14,278,339	-	4,847,274	-	-	-
Historic Program Incremental Expiring Elec		-	-	-	-	6,017,235	-	5,901,156	-	-	-	-	-
Program Total Incremental Expiring Electri		-	-	-	68,428	6,017,235	-	20,179,495	-	4,847,274	-	-	-

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Industrial Systems	Leak Repair												
Industrial Systems	Other												
Industrial Systems	Compressed Air Controls												
Industrial Systems	Compressed Air												
Industrial Systems	VSD												
Industrial Systems	Air Nozzles												
Industrial Systems	Chiller	651,328	651,328	651,328	651,328								
Industrial Systems	Operational Adjustments												
Industrial Systems	HVAC Controls												
Industrial Systems	No Loss Drains												
CY2020 Program Total Electric Contributio		651,328	651,328	651,328	651,328	-	-	-	-	-	-	-	-
Historic Program Total Electric Contributio		-	-	-	-	-	-	-	-	-	-	-	-
Program Total Electric CPAS		651,328	651,328	651,328	651,328	-	-	-	-	-	-	-	-
CY2020 Program Incremental Expiring Elec		-	-	-	-	651,328	-	-	-	-	-	-	-
Historic Program Incremental Expiring Elec		-	-	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Electri		-	-	-	-	651,328	-	-	-	-	-	-	-

Note: The green highlighted cell shows program total first-year electric savings. The gray cells are blank, indicating values irrelevant to the CY2020 contribution to CPAS.

*A deemed value. Source found on the Illinois Stakeholder Advisory Group (SAG) website: https://www.ilsag.info/ntg_2020.

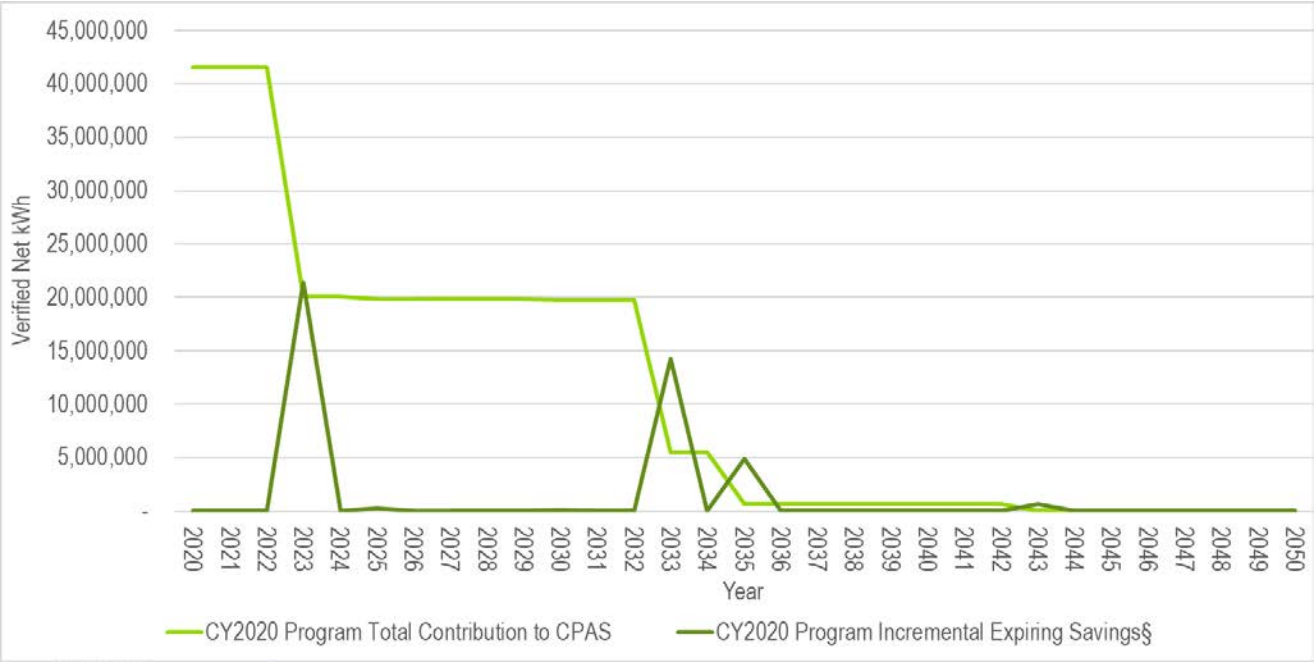
† Lifetime savings are the sum of CPAS savings through the effective useful life (EUL).

‡ Historical savings go back to CY2018.

§ Incremental expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n.

Source: Evaluation team analysis

Figure 4-1. Cumulative Persisting Annual Savings



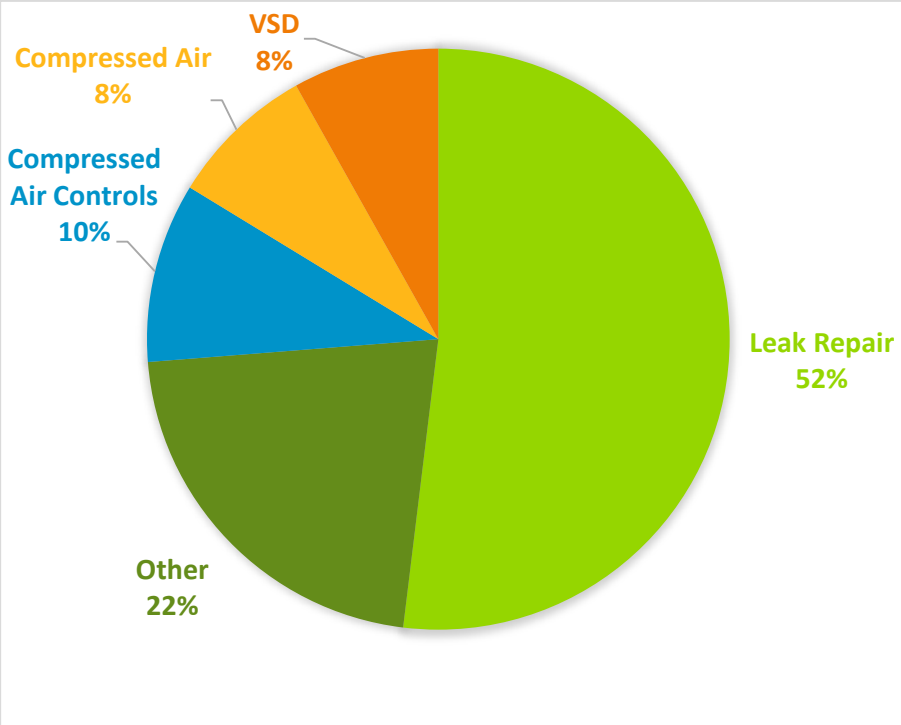
§ Expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n + Expiring Savings Y_{n-1}.

Source: Evaluation team analysis

5. Program Savings by Measure

The largest verified net energy savings came from five measures, as the following tables show. The leak repair measure contributed the most savings, making up 52% of all energy savings (see Figure 5-1).

Figure 5-1. Verified Net Savings by Measure – Electric



Source: Evaluation team analysis

Table 5-1 and Table 5-2 provide the verified net energy and demand reduction by measure type. The sample was drawn by the evaluation team at the strata level and not at the measure level and thus produced a program-level realization rate, not a measure-level realization rate. The verified net savings for each measure was estimated by multiplying the program level realization rate with the ex ante savings estimates.

Table 5-1. CY2020 Energy Savings by Measure – Electric

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)	EUL (years)
Industrial Systems	Leak Repair	23,103,267	1.21	27,842,056	0.77	21,438,383	3.0
Industrial Systems	Other	7,317,637	1.21	8,818,582	0.77	6,790,308	13.0
Industrial Systems	Compressed Air Controls	4,447,298	1.21	5,359,498	0.77	4,126,813	13.0
Industrial Systems	Compressed Air	3,622,246	1.21	4,365,217	0.77	3,361,217	13.0
Industrial Systems	VSD	3,611,358	1.21	4,352,096	0.77	3,351,114	15.0
Industrial Systems	Air Nozzles	1,504,199	1.21	1,812,730	0.77	1,395,802	15.0
Industrial Systems	Chiller	701,910	1.21	845,881	0.77	651,328	23.0
Industrial Systems	Operational Adjustments	274,298	1.21	330,560	0.77	254,531	5.0
Industrial Systems	HVAC Controls	108,151	1.21	130,334	0.77	100,357	15.0
Industrial Systems	No Loss Drains	73,742	1.21	88,868	0.77	68,428	10.0
	Total	44,764,106	1.21	53,945,823	NA	41,538,284	NA

NA = not applicable (refers to a piece of data cannot be produced or does not apply).
*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

Source: ComEd tracking data and evaluation team analysis

Table 5-2. CY2020 Summer Peak Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
Industrial Systems	Leak Repair	4,479	1.34	6,016	0.78	4,693
Industrial Systems	Other	973	1.34	1,307	0.78	1,020
Industrial Systems	Compressed Air Controls	367	1.34	494	0.78	385
Industrial Systems	Compressed Air	396	1.34	532	0.78	415
Industrial Systems	VSD	409	1.34	550	0.78	429
Industrial Systems	Air Nozzles	210	1.34	282	0.78	220
Industrial Systems	Chiller	48	1.34	65	0.78	51
Industrial Systems	Operational Adjustments	31	1.34	42	0.78	33
Industrial Systems	HVAC Controls	6	1.34	8	0.78	6
Industrial Systems	No Loss Drains	10	1.34	13	0.78	10
	Total	6,930	1.34	9,309	NA	7,261

NA = not applicable (refers to a piece of data cannot be produced or does not apply).
*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.

Source: ComEd tracking data and evaluation team analysis

6. Impact Analysis Findings and Recommendations

6.1 Impact Parameter Estimates

The Industrial Systems Program does not have relevant impact parameters.

6.2 Other Impact Findings and Recommendations

The evaluation team developed several recommendations based on findings from the CY2020 evaluation.

Finding 1. Compressed air leak repair projects save less than 100,000 kWh on average, yet they made up almost 80% of all measures installed in CY2020. Due to the smaller size of these projects, each individual project doesn't usually warrant extensive metering, therefore a generic template is used to estimate savings for these measures. However, the sum of all these measures made up 52% of the verified net savings in CY2020. Therefore, further care should be made to ensure the template reflects site-specific conditions and the resulting calculations are as accurate as possible.

Recommendation 1. The evaluation team recommends ComEd do the following:

- The savings factor for a compressor with load/unload controls and 1 gallon/cfm storage will be significantly different than the factor for the same compressor with 3 gal/cfm storage. When using the template, ComEd should select the correct operating curve based on the actual compressor type and the air storage volume onsite.
- Where leak repair measures make up a significant portion of the system capacity, spot measurements of the compressors before and after the leak repairs should be noted and used to validate the savings.

- The Compressed Air Challenge Industry Sourcebook[2] states that a system can lose 20%-30% of compressor output to leaks but a leak cap of 35% is enforced by the implementers. For projects with savings over CAC recommended range, ComEd should perform further analysis and/or metering to validate the savings.

Finding 2. In projects where energy consumption is affected by weather, production, airflow or other similar factors, accurately estimating savings requires normalizing to a typical condition. This is applicable to many of the custom and industrial projects. The evaluation team found instances in its review where data normalization was not ideal. The regression model used for normalization in one project used an independent variable that had a poor correlation with the dependent variable. In another project, the range of outside air temperature (OAT) data used to build the regression model never dropped below 50°F, making the model inaccurately estimate the effect of winter temperatures.

Recommendation 2. ComEd should use caution when normalizing for production (or any other variable). Before doing any kind of normalization, ComEd should ensure there is a valid and statistically significant relationship between the dependent and independent variables chosen for the model. If this cannot be determined, the data should not be normalized. Additionally, where weather data is used to normalize, ensure that temperatures for both winter and summer months collected and used in the analysis.

Finding 3. The evaluation team found a big difference between the pre- and post-operating conditions for one site. Pre-retrofit data for this project was collected during the summer months (with only a handful of operating points below 55° wet bulb (WB) temperature), whereas the post-retrofit data was collected during the winter months (with only a handful of operating points above 50°F WB temperature). These differences in data make a comparison between pre- and post-retrofit difficult, as it is problematic to determine how much of the delta in energy consumption are due to differences in weather dependency versus actual energy savings because of the implementation of the measure.

Recommendation 3. When collecting trend data, ComEd should ensure that both the pre- and post-data represent similar operating conditions. For large projects, additional metering or trend data should be collected by ComEd as needed to do a valid comparison between the pre- and post-operation. If collecting additional data delays the project significantly, a multi-phase approach can be used. This approach allows the implementer to pay some of the savings in the first phase and the remaining savings in the second phase after validating with additional metered or trend data.

Finding 4. ComEd did not claim any therm impacts for any of the projects in the program. However, the evaluation team estimated a therm penalty for one project in the sample.

Recommendation 4. The evaluation team recommends ComEd analyze and report the natural gas impacts for all projects, where applicable.

[2] Found on the Compressed Air Challenge website:. https://www.compressedairchallenge.org/library/

Appendix A. Impact Analysis Methodology

Consistent with the evaluation plan, the evaluation team used a stratified random sampling approach to select the gross impact sample of 10 projects. The team sorted projects based on the level of ex ante kWh savings and placed the projects into 3 strata.

Table A-1 provides a profile of the gross impact measurement and verification (M&V) sample for the Industrial Systems Program compared with the program population. Table A-1 shows the resulting sample that was drawn by stratum and consists of 10 projects. These projects make up approximately 7.7 million kWh, which represents 17% of the ex ante impact claim for the program population. The table also shows the ex ante-based kWh sample weights for each of the three strata.

Table A-1. CY2020 Gross Impact Sample by Strata

Strata	Population Summary			Sample		
	Number of Tracking Records (N)	Ex Ante Gross Savings (kWh)	kWh Weights	Number of Tracking Records (n)	Ex Ante Gross Savings (kWh)	Sampled % of Popualtion kWh
1	9	14,345,811	0.32	4	5,938,948	0.41
2	53	15,522,899	0.35	3	1,651,329	0.11
3	325	14,895,396	0.33	3	70,907	0.00
Total	387	44,764,106	1.00	10	7,661,184	0.17

Source: ComEd tracking data and evaluation team analysis

Savings Rollup

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 using stratified random sampling: separate and combined ratio estimation.[3] In the case of a separate ratio estimator, a separate gross kWh savings realization rate is calculated for each stratum and then combined. In the case of a combined ratio estimator, the evaluation completes a single gross kWh savings realization rate calculation without first calculating separate gross realization rates by stratum.

The evaluation team used the separate ratio estimation technique to estimate verified gross impacts for the Industrial Systems Program. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework,[4] which identifies best practices in program evaluation. The team matched these steps to the stratified random sampling method it used to create the sample for the program. The evaluation team used the standard error to estimate the error bound around the estimate of verified gross impacts.

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

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

Appendix B. Impact Analysis Detail

B.1 Savings by Strata

The Industrial Systems Program sample includes 10 sites across three strata. Table B-1 and Table B-2 break down the energy and demand savings by strata.

Table B-1. CY2020 Energy Savings by Strata

Strata	Sample Size	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
1	4	14,345,811	1.01	14,548,581	0.77	11,202,408
2	3	15,522,899	1.02	15,788,795	0.77	12,157,372
3	3	14,895,396	1.58	23,608,447	0.77	18,178,504
Total	10	44,764,106	1.21	53,945,823	0.77	41,538,284

*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.
Source: Evaluation team analysis

Table B-2. CY2020 Demand Savings by Strata

Strata	Sample Size	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
1	4	1,614	1.47	2,371	0.78	1,850
2	3	1,993	1.37	2,726	0.78	2,127
3	3	3,324	1.27	4,211	0.78	3,285
Total	10	6,930	1.34	9,309	0.78	7,261

*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.
Source: Evaluation team analysis

B.2 Savings by Project

Table B-3 provides the ex ante and verified energy savings for all 10 projects in the sample for the Industrial Systems Program.

Table B-3. CY2020 Energy Savings by Project for Sampled Projects

Project ID	Strata	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
IDS-40178	1	2,368,641	0.99	2,339,401	0.77	1,801,339
IDS-33788	1	1,547,793	1.00	1,547,793	0.77	1,191,801
IDS-40075	1	1,019,874	1.11	1,133,058	0.77	872,455
IDS-40455	1	1,002,640	1.00	1,002,640	0.77	772,033
IDS-40306	2	704,044	1.00	704,044	0.77	542,114
IDS-40180	2	672,599	1.04	700,885	0.77	539,681
IDS-40550	2	274,686	1.00	274,686	0.77	211,508
IDS-40696	3	29,523	2.40	71,000	0.77	54,670
IDS-40542	3	23,323	1.00	23,323	0.77	17,959
IDS-40744	3	18,061	1.00	18,061	0.77	13,907
Total Sample		7,661,184	1.02	7,814,891	0.77	6,017,466

*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020
Source: ComEd tracking data and evaluation team analysis

Table B-4 provides the ex ante and verified peak demand reduction for all 10 projects in the sample.

Table B-4. CY2020 Peak Demand Reduction by Project for Sampled Projects

Project ID	Strata	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
IDS-40178	1	283	1.70	480	0.78	374
IDS-33788	1	0	0.00	34	0.78	27
IDS-40075	1	119	1.11	132	0.78	103
IDS-40455	1	118	1.00	118	0.78	92
IDS-40306	2	80	1.00	80	0.78	63
IDS-40180	2	36	2.57	91	0.78	71
IDS-40550	2	37	1.00	37	0.78	29
IDS-40696	3	4	2.48	10	0.78	8
IDS-40542	3	10	1.00	10	0.78	8
IDS-40744	3	8	1.00	8	0.78	6
Total Sample		695	1.44	1,001	0.78	781

* A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020
Source: ComEd tracking data and evaluation team analysis

The evaluation team has provided ComEd with site-specific measurement and verification reports for each verified project. These site-specific evaluation reports summarize the ex ante savings, the team's findings from its data collection activities, and the final evaluation analysis and savings. Table B-3 and Table B-4 summarize the results for each project. The evaluation team uncovered some issues in five of the 10 projects, which resulted in energy or demand realization rates with a discrepancy of greater than 10% from a realization rate of 1.0. Some key observations from these site-specific evaluation results are discussed as follows for each project that saw large differences in savings.

- **Project IDS- 40075:** This project involves the installation of a cooling tower to provide process cooling to equipment that does not require chilled water. The realization rate for this project was 111% and made up 14% of the verified net kWh savings in the sample. Ex ante savings were estimated based on pre- and post-project trend data and production data. The evaluation team used a similar approach but made a few changes to the ex ante baseline calculations. Mainly, the ex post approach separated chiller efficiency from pump power. This change increased baseline power because the pump power is not normalized to the lower post-installation cooling load. Secondly, the overall average ex post power was slightly higher because it was not adjusted for outside air temperature.
- **Project IDS-40696:** This project involves the repair of the compressed air leaks in a manufacturing facility as part of the ComEd Fix-It-Now (FIN) program. The realization rate for this project was 240% and made up 1% of the verified net kWh savings in the sample. The increase in savings is primarily due to adjusting the control method of the compressor from load/no load to VSD. The savings were also increased by increasing the hours of operation based on interview with site contact. The increase in savings was slightly offset by adjusting the rated pressure specification of the compressor from 175 psig to 125 psig.

Appendix C. Total Resource Cost Detail

Table C-1 shows the TRC cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. Additional required cost data (e.g., measure costs, program-level incentive and non-incentive costs) is not included in this table and will be provided to the evaluation team later.

Table C-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag †	Gross Electric Energy Savings (kWh)	Gross Peak Demand Reduction (kW)	Gross Gas Savings (Therms)	Gross Secondary Savings due to Water Reduction (kWh)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Net Electric Energy Savings (kWh)†§	Net Peak Demand Reduction (kW)	Net Gas Savings (Therms)	Net Secondary Savings due to Water Reduction (kWh)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Industrial Systems	Leak Repair	Measure	354	3.0	No	27,842,056	6,016.11	0	0	0	0	0.77	0.78	0.77	21,438,383	4,692.56	0	0	0	0
Industrial Systems	Other	Measure	17	13.0	No	8,818,582	1,307.10	0	0	0	-12,032	0.77	0.78	0.77	6,790,308	1,019.53	0	0	0	-9,265
Industrial Systems	Compressed Air Controls	Measure	5	13.0	No	5,359,498	493.50	0	0	0	0	0.77	0.78	0.77	4,126,813	384.93	0	0	0	0
Industrial Systems	Compressed Air	Measure	21	13.0	No	4,365,217	532.46	0	0	0	0	0.77	0.78	0.77	3,361,217	415.32	0	0	0	0
Industrial Systems	VSD	Measure	6	15.0	No	4,352,096	549.65	0	0	0	0	0.77	0.78	0.77	3,351,114	428.73	0	0	0	0
Industrial Systems	Air Nozzles	Measure	24	15.0	No	1,812,730	282.35	0	0	0	0	0.77	0.78	0.77	1,395,802	220.23	0	0	0	0
Industrial Systems	Chiller	Measure	1	23.0	No	845,881	65.01	0	0	0	0	0.77	0.78	0.77	651,328	50.71	0	0	0	0
Industrial Systems	Operational Adjustments	Measure	5	5.0	No	330,560	41.88	0	0	0	0	0.77	0.78	0.77	254,531	32.67	0	0	0	0
Industrial Systems	HVAC Controls	Measure	2	15.0	No	130,334	7.52	0	0	0	0	0.77	0.78	0.77	100,357	5.87	0	0	0	0
Industrial Systems	No Loss Drains	Measure	8	10.0	No	88,868	13.15	0	0	0	0	0.77	0.78	0.77	68,428	10.26	0	0	0	0
	Total			8.2		53,945,823	9,309	0	0	0	-12,032	NA	NA	NA	41,538,284	7,261	0	0	0	-9,265

NA = not applicable (refers to a piece of data cannot be produced or does not apply).
Table C-1 represents the kWh savings from Table 5-1.
*The total of the EUL column is the weighted average measure life (WAML) and is calculated as the sum product of EUL and measure savings divided by total program savings.
† Early replacement (ER) measures are flagged as YES; otherwise, a NO is indicated in the column.
†§ The kWh savings account for electric heating penalties, where applicable. The electric heating penalties columns show the magnitude of adjustments applied to the program savings. Gas heating penalties represent the program therms heating penalties. The therms penalties are not required to be applied to the program savings.

Source: Evaluation team analysis