Guidehouse

ComEd Incentives – Standard Impact Evaluation Report

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

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1. Introduction

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

2. Program Description

As part of the Business Incentives Program,[1] the Standard Program offers prescriptive financial incentives and a streamlined application to facilitate the implementation of energy efficiency improvements for nonresidential (commercial, industrial, and public) customers and market segments through a program network of trade allies and service providers. Starting in CY2018, public sector facilities became eligible to participate in the Standard Program. Eligible measures include energy efficient indoor and outdoor lighting, HVAC equipment, refrigeration, energy management systems (EMSs), commercial kitchen equipment, variable speed drives (VSDs), compressed air equipment, and other qualifying products. The program also targets new system installation opportunities (e.g., networked lighting controls) by offering incentives that bundle equipment and controls technologies. ICF International, Inc. is the program implementation contractor; IFC collaborates with DNV GL for the program's day-to-day operations.

The program had 2,687 participants and 13,048 measure installations, as Table 2-1 shows.

Table 2-1. CY2020 Volumetric Findings Detail

Participation	Private	Public	Total
Participants	2,132	555	2,687
Total Projects	2,739	822	3,561
Total Measure Installations*	10,765	2,283	13,048
Lighting Measures	9,513	2,005	11,518
HVAC Measures	420	106	526
VSD Measures	167	120	287
Refrigeration Measures	325	0	325
Compressed Air Measures	139	1	140
Industrial Systems Measures	23	0	23
Food Service Equipment Measures	94	2	96
Laboratory Measures	21	1	22
EMS Measures	63	48	111

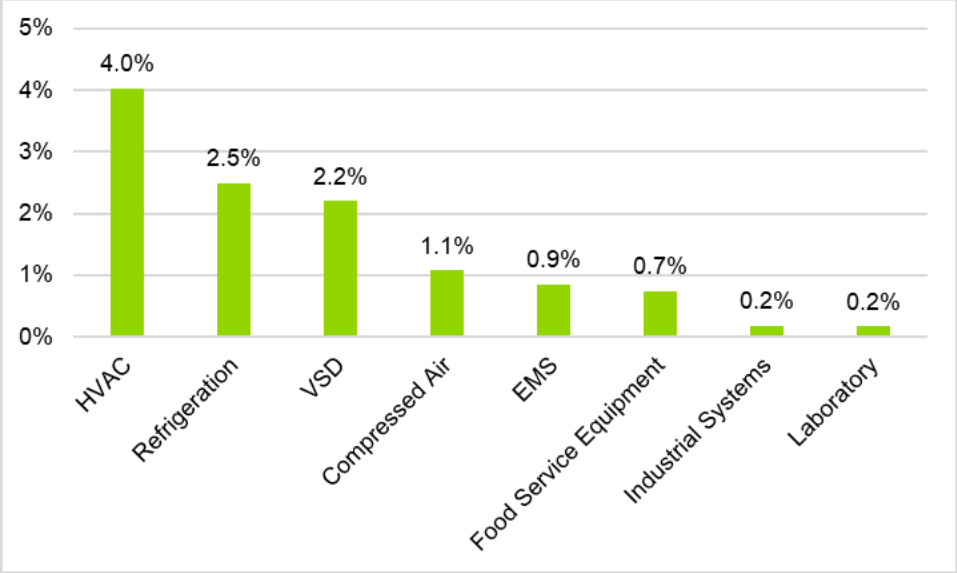
*Measure installations refers to the number of line items in the tracking data.

Source: ComEd tracking data and evaluation team analysis

[1] The Business Incentives Program consists of the non-residential Standard and Custom Programs. The incentive structure is either on a standard, per-unit basis as with most lighting measures, or is custom, with the incentive based on the calculated annual energy savings for the customer.

In CY2020, lighting measure installations accounted for 88% of the measure mix. Non-lighting measure installations accounted for 12% of the measure mix. Figure 2-1 shows the distribution of the non-lighting measures installed by end use type.

Figure 2-1. Distribution of Non-Lighting Measure Installations by End Use



Source: ComEd tracking data and evaluation team analysis

3. Program Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the Standard Program achieved in CY2020. Gas savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim, either via joint or non-joint programs.[2] Total verified net savings (without gas savings) are 235,996,042 kWh and the program gross realization rate is 0.95.[3]

[2] The evaluation determines which gas savings are counted toward goal while producing the portfolio-wide summary report.

[3] The evaluation sample was designed to achieve 90/10 precision. Guidehouse determined that a supplemental sample of small lighting projects was needed to improve precision values prior to submitting a redraft. The evaluation results of the supplement sample are included in this report.

Table 3-1. CY2020 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Summer Peak* Demand Savings (kW)
Electricity		
Ex Ante Gross Savings	303,923,398	48,090
Program Gross Realization Rate	0.95	0.97
Verified Gross Savings	288,119,133	46,709
Program Net-to-Gross Ratio (NTG)	Lighting: 0.83 Non-Lighting: 0.78	Lighting: 0.83 Non-Lighting: 0.78
Verified Net Savings	235,996,042	38,516
Converted from Gas†		
Ex Ante Gross Savings	155,674,177	NA
Program Gross Realization Rate	0.94	NA
Verified Gross Savings	147,029,595	NA
Program Net-to-Gross Ratio (NTG)	Non-Lighting: 0.78	NA
Verified Net Savings	114,683,084	NA
Total Electric Plus Gas		
Ex Ante Gross Savings	459,597,575	48,090
Program Gross Realization Rate	0.95	0.97
Verified Gross Savings	435,148,728	46,709
Program Net-to-Gross Ratio (NTG)	Lighting: 0.83 Non-Lighting: 0.78	Lighting: 0.83 Non-Lighting: 0.78
Verified Net Savings	350,679,126	38,516

NA = not applicable (refers to a piece of that data 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.

† Gas savings converted to kilowatt-hours (kWh) by multiplying therms by 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh). The evaluation determines which gas savings are converted to kWh and counted toward ComEd's electric savings goal while producing the portfolio-wide summary report. According to Section 8-103B(b-25) of the Illinois Public Utilities Act, :In no event shall more than 10% of each year's applicable annual incremental goal as defined in paragraph (7) of subsection (g) of this Section be met through savings of fuels other than electricity."

Source: ComEd tracking data and evaluation team analysis

4. Cumulative Persisting Annual Savings

Table 4-1 to Table 4-3 show the measure-specific and total verified gross savings for the Standard Program and the cumulative persisting annual savings (CPAS) for the measures installed 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 235,996,042 kWh (Table 4-1). The CY2020 gas contribution to CPAS (converted to equivalent electricity) is 114,683,084 kWh (Table 4-2). Adding the gas and electric contributions produces 350,679,126 kWh of total CY2020 contribution to CPAS (Table 4-3). The historic rows in each table are the CPAS contribution back to CY2018. The Program Total Electric CPAS and Program Total Gas CPAS rows are the sum of the CY2020 contribution and the historic contribution.

Due to the large number of Standard Program measures, the CPAS values presented in the tables of Section 4 are aggregated by research category. The net savings reflect a year-over-

year sum of all measures within a research category. The effective useful life (EUL) values reflect averages, weighted by energy savings, of all measures within a research category.

Table 4-1 accounts for midlife adjustments to lighting measures with T12 baselines, as required by the Illinois Statewide Technical Reference Manual version 8.0 (TRM v8.0). Section 6 (Table 6-2 and Table 6-3) discusses the T12 adjustment approach the evaluation team used based on guidance from the TRM v8.0. The team estimated that, overall, 5% of the savings from affected LED measures involved T12 baselines.

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
Lighting	Lighting	11.8	225,262,363	0.83	2,185,452,824			186,967,761	186,967,761	186,967,761	186,825,598	185,782,158	182,929,074	174,659,487
Non-Lighting	HVAC	19.8	12,149,782	0.78	187,555,816			9,476,830	9,476,830	9,476,830	9,387,259	9,385,546	9,332,892	9,332,892
Non-Lighting	VSD	15.0	10,584,825	0.78	123,842,456			8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164
Non-Lighting	Refrigeration	10.6	10,225,073	0.78	84,329,002			7,975,557	7,975,557	7,975,557	7,975,557	7,864,526	7,613,923	7,613,923
Non-Lighting	Compressed Air	12.7	5,821,828	0.78	57,618,520			4,541,026	4,541,026	4,541,026	4,541,026	4,541,026	4,541,026	4,541,026
Non-Lighting	Industrial Systems	19.7	3,474,292	0.78	53,391,633			2,709,948	2,709,948	2,709,948	2,709,948	2,709,948	2,595,862	2,595,862
Non-Lighting	Food Service Equipment	14.5	543,960	0.78	6,142,724			424,288	424,288	424,288	424,288	424,288	424,288	424,288
Non-Lighting	Laboratory	2.1	450,827	0.78	742,451			351,645	351,645	3,012	3,012	3,012	3,012	3,012
EMS	EMS	15.0	19,606,183	0.78	229,392,345			15,292,823	15,292,823	15,292,823	15,292,823	15,292,823	15,292,823	15,292,823
CY2020 Program Total Electric Contribution to CPAS			288,119,133		2,928,467,772			235,996,042	235,996,042	235,647,409	235,415,675	234,259,492	230,989,064	222,719,478
Historic Program Total Electric Contribution to CPAS‡						193,038,555	393,456,792	393,353,190	393,140,609	392,637,349	389,800,710	384,062,615	380,610,443	374,075,958
Program Total Electric CPAS						193,038,555	393,456,792	629,349,232	629,136,651	628,284,758	625,216,385	618,322,106	611,599,508	596,795,436
CY2020 Program Incremental Expiring Electric Savings§									-	348,633	231,734	1,156,184	3,270,427	8,269,587
Historic Program Incremental Expiring Electric Savings‡§								103,602	212,581	503,260	2,836,639	5,738,095	3,452,172	6,534,485
Program Total Incremental Expiring Electric Savings§								103,602	212,581	851,893	3,068,373	6,894,279	6,722,599	14,804,071

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	Lighting	166,451,784	161,520,038	160,883,850	152,945,153	104,494,788	54,108,928	48,420,395	45,528,288	-	-	-	-
Non-Lighting	HVAC	9,332,892	9,322,500	9,295,677	8,349,065	8,016,890	8,016,890	8,016,890	8,016,890	6,657,242	6,657,242	6,657,242	6,657,242
Non-Lighting	VSD	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	-	-	-	-
Non-Lighting	Refrigeration	7,613,923	5,769,786	2,789,899	2,636,753	2,636,753	2,636,753	2,601,618	2,601,618	47,297	-	-	-
Non-Lighting	Compressed Air	4,541,026	4,541,026	4,541,026	4,025,888	4,025,888	4,025,888	65,300	65,300	-	-	-	-
Non-Lighting	Industrial Systems	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,350,906	2,350,906	2,350,906	2,350,906
Non-Lighting	Food Service Equipment	424,288	424,288	421,544	421,544	421,544	353,166	353,166	353,166	-	-	-	-
Non-Lighting	Laboratory	3,012	3,012	3,012	3,012	3,012	3,012	3,012	3,012	-	-	-	-
EMS	EMS	15,292,823	15,292,823	15,292,823	15,292,823	15,292,823	15,292,823	15,292,823	15,292,823	-	-	-	-
CY2020 Program Total Electric Contribution to CPAS		214,511,774	207,725,499	204,079,856	194,526,263	145,743,724	95,289,485	85,605,230	82,713,122	9,055,444	9,008,148	9,008,148	9,008,148
Historic Program Total Electric Contribution to CPAS‡		340,840,750	264,876,747	230,539,822	165,409,174	122,485,588	102,663,346	56,811,745	13,762,479	13,762,479	13,762,479	13,762,479	8,338,751
Program Total Electric CPAS		555,352,525	472,602,245	434,619,678	359,935,437	268,229,312	197,952,831	142,416,976	96,475,602	22,817,924	22,770,627	22,770,627	17,346,899
CY2020 Program Incremental Expiring Electric Savings§		8,207,703	6,786,276	3,645,642	9,553,593	48,782,540	50,454,238	9,684,255	2,892,108	73,657,678	47,297	-	-
Historic Program Incremental Expiring Electric Savings‡§		33,235,208	75,964,003	34,336,925	65,130,648	42,923,586	19,822,242	45,851,601	43,049,266	-	-	-	5,423,728
Program Total Incremental Expiring Electric Savings§		41,442,912	82,750,279	37,982,567	74,684,241	91,706,125	70,276,481	55,535,856	45,941,374	73,657,678	47,297	-	5,423,728

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	Lighting	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	HVAC	6,657,242	6,657,242	6,657,242	6,657,242	30,554	30,554	-	-	-	-	-	-
Non-Lighting	VSD	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Compressed Air	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Industrial Systems	2,350,906	425,749	425,749	425,749	425,749	425,749	-	-	-	-	-	-
Non-Lighting	Food Service Equipment	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Laboratory	-	-	-	-	-	-	-	-	-	-	-	-
EMS	EMS	-	-	-	-	-	-	-	-	-	-	-	-
CY2020 Program Total Electric Contribution to CPAS		9,008,148	7,082,991	7,082,991	7,082,991	456,303	456,303	-	-	-	-	-	-
Historic Program Total Electric Contribution to CPAS‡		7,296,096	7,296,096	7,296,096	59,150	59,150	-	-	-	-	-	-	-
Program Total Electric CPAS		16,304,243	14,379,087	14,379,087	7,142,141	515,454	456,303	-	-	-	-	-	-
CY2020 Program Incremental Expiring Electric Savings§		-	1,925,156	-	-	6,626,688	-	456,303	-	-	-	-	-
Historic Program Incremental Expiring Electric Savings‡§		1,042,655	-	0	7,236,946	0	59,150	-	-	-	-	-	-
Program Total Incremental Expiring Electric Savings§		1,042,655	1,925,156	0	7,236,946	6,626,688	59,150	456,303	-	-	-	-	-

Note: The green highlighted cell shows program total first-year electric savings. The gray cells are blank, indicating no values or no contribution to calculating CPAS in CY2020.

*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 EUL.

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Table 4-2. Cumulative Persisting Annual Savings (CPAS) – Gas

End Use Type	Research Category	EUL	CY2020 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	Verified Net Therms Savings								
						2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	Lighting	NA	-	0.83	-			-	-	-	-	-	-	-
Non-Lighting	HVAC	9.7	51,185	0.78	386,864			39,924	39,924	39,924	39,924	39,924	34,184	34,184
Non-Lighting	VSD	NA	-	0.78	-			-	-	-	-	-	-	-
Non-Lighting	Refrigeration	NA	-	0.78	-			-	-	-	-	-	-	-
Non-Lighting	Compressed Air	NA	-	0.78	-			-	-	-	-	-	-	-
Non-Lighting	Industrial Systems	NA	-	0.78	-			-	-	-	-	-	-	-
Non-Lighting	Food Service Equipment	15.0	68,875	0.78	805,835			53,722	53,722	53,722	53,722	53,722	53,722	53,722
Non-Lighting	Laboratory	15.0	603	0.78	7,052			470	470	470	470	470	470	470
EMS	EMS	15.0	4,895,700	0.78	57,279,693			3,818,646	3,818,646	3,818,646	3,818,646	3,818,646	3,818,646	3,818,646
CY2020 Program Total Gas Contribution to CPAS (Therms)			5,016,363		58,479,445			3,912,763	3,912,763	3,912,763	3,912,763	3,912,763	3,907,023	3,907,023
CY2020 Program Total Gas Contribution to CPAS (kWh Equivalent)‡						-	-	114,683,084	114,683,084	114,683,084	114,683,084	114,683,084	114,514,841	114,514,841
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§						52,270,178	69,103,090	69,103,090	69,103,090	69,103,090	69,103,090	69,103,090	69,103,090	69,103,090
Program Total Gas CPAS (kWh Equivalent)‡						52,270,178	69,103,090	183,786,174	183,786,174	183,786,174	183,786,174	183,786,174	183,617,931	183,617,931
CY2020 Program Incremental Expiring Gas Savings (Therms)‖									-	-	-	-	5,740	-
CY2020 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖									-	-	-	-	168,243	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§‖								-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖								-	-	-	-	-	168,243	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	Lighting	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	HVAC	34,184	34,184	34,184	13,004	829	829	829	829	-	-	-	-
Non-Lighting	VSD	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Compressed Air	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Industrial Systems	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Food Service Equipment	53,722	53,722	53,722	53,722	53,722	53,722	53,722	53,722	-	-	-	-
Non-Lighting	Laboratory	470	470	470	470	470	470	470	470	-	-	-	-
EMS	EMS	3,818,646	3,818,646	3,818,646	3,818,646	3,818,646	3,818,646	3,818,646	3,818,646	-	-	-	-
CY2020 Program Total Gas Contribution to CPAS (Therms)		3,907,023	3,907,023	3,907,023	3,885,843	3,873,668	3,873,668	3,873,668	3,873,668	-	-	-	-
CY2020 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		114,514,841	114,514,841	114,514,841	113,894,058	113,537,210	113,537,210	113,537,210	113,537,210	-	-	-	-
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§		69,103,090	67,633,349	66,826,516	66,826,516	66,826,516	66,826,516	16,026,078	-	-	-	-	-
Program Total Gas CPAS (kWh Equivalent)‡		183,617,931	182,148,190	181,341,357	180,720,574	180,363,725	180,363,725	129,563,288	113,537,210	-	-	-	-
CY2020 Program Incremental Expiring Gas Savings (Therms)‖		-	-	-	21,180	12,175	-	-	-	3,873,668	-	-	-
CY2020 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖		-	-	-	620,783	356,849	-	-	-	113,537,210	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§‖		-	1,469,741	806,834	-	-	-	50,800,438	16,026,078	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖		-	1,469,741	806,834	620,783	356,849	-	50,800,438	16,026,078	113,537,210	-	-	-

Note: The green highlighted cell shows program total first-year gas savings in kWh equivalents. The gray cells are blank, indicating no values or no contribution to calculating CPAS in CY2020.
NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.
† Lifetime savings are the sum of CPAS savings through the EUL.
‡ kWh equivalent savings are calculated by multiplying therm savings by 29.31.
§ Historic savings go back to CY2018.
‖ Incremental expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n.
Source: Evaluation team analysis

Table 4-3. Cumulative Persisting Annual Savings (CPAS) – Total

End Use Type	Research Category	EUL	CY2020 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings (Including Those Converted from Gas Savings) 2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	Lighting	11.8	225,262,363	0.83	2,185,452,824			186,967,761	186,967,761	186,967,761	186,825,598	185,782,158	182,929,074	174,659,487
Non-Lighting	HVAC	18.7	13,650,014	0.78	198,894,800			10,647,011	10,647,011	10,647,011	10,557,440	10,555,727	10,334,831	10,334,831
Non-Lighting	VSD	15.0	10,584,825	0.78	123,842,456			8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164
Non-Lighting	Refrigeration	10.6	10,225,073	0.78	84,329,002			7,975,557	7,975,557	7,975,557	7,975,557	7,864,526	7,613,923	7,613,923
Non-Lighting	Compressed Air	12.7	5,821,828	0.78	57,618,520			4,541,026	4,541,026	4,541,026	4,541,026	4,541,026	4,541,026	4,541,026
Non-Lighting	Industrial Systems	19.7	3,474,292	0.78	53,391,633			2,709,948	2,709,948	2,709,948	2,709,948	2,709,948	2,595,862	2,595,862
Non-Lighting	Food Service Equipment	14.9	2,562,681	0.78	29,761,760			1,998,891	1,998,891	1,998,891	1,998,891	1,998,891	1,998,891	1,998,891
Non-Lighting	Laboratory	2.6	468,494	0.78	949,154			365,425	365,425	16,793	16,793	16,793	16,793	16,793
EMS	EMS	15.0	163,099,158	0.78	1,908,260,144			127,217,343	127,217,343	127,217,343	127,217,343	127,217,343	127,217,343	127,217,343
CY2020 Program Total Contribution to CPAS			435,148,728		4,642,500,294			350,679,126	350,679,126	350,330,493	350,098,759	348,942,576	345,503,906	337,234,319
Historic Program Total Contribution to CPAS‡						245,308,733	462,559,882	462,456,280	462,243,699	461,740,439	458,903,800	453,165,705	449,713,533	443,179,048
Program Total CPAS						245,308,733	462,559,882	813,135,405	812,922,825	812,070,932	809,002,559	802,108,280	795,217,439	780,413,367
CY2020 Program Incremental Expiring Savings§									-	348,633	231,734	1,156,184	3,438,670	8,269,587
Historic Program Incremental Expiring Savings‡§								103,602	212,581	503,260	2,836,639	5,738,095	3,452,172	6,534,485
Program Total Incremental Expiring Savings§								103,602	212,581	851,893	3,068,373	6,894,279	6,890,842	14,804,071

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	Lighting	166,451,784	161,520,038	160,883,850	152,945,153	104,494,788	54,108,928	48,420,395	45,528,288	-	-	-	-
Non-Lighting	HVAC	10,334,831	10,324,438	10,297,616	8,730,221	8,041,197	8,041,197	8,041,197	8,041,197	6,657,242	6,657,242	6,657,242	6,657,242
Non-Lighting	VSD	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	8,256,164	-	-	-	-
Non-Lighting	Refrigeration	7,613,923	5,769,786	2,789,899	2,636,753	2,636,753	2,636,753	2,601,618	2,601,618	47,297	-	-	-
Non-Lighting	Compressed Air	4,541,026	4,541,026	4,541,026	4,025,888	4,025,888	4,025,888	65,300	65,300	-	-	-	-
Non-Lighting	Industrial Systems	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,595,862	2,350,906	2,350,906	2,350,906	2,350,906
Non-Lighting	Food Service Equipment	1,998,891	1,998,891	1,996,146	1,996,146	1,996,146	1,927,768	1,927,768	1,927,768	-	-	-	-
Non-Lighting	Laboratory	16,793	16,793	16,793	16,793	16,793	16,793	16,793	16,793	-	-	-	-
EMS	EMS	127,217,343	127,217,343	127,217,343	127,217,343	127,217,343	127,217,343	127,217,343	127,217,343	-	-	-	-
CY2020 Program Total Contribution to CPAS		329,026,616	322,240,340	318,594,698	308,420,322	259,280,933	208,826,695	199,142,440	196,250,332	9,055,444	9,008,148	9,008,148	9,008,148
Historic Program Total Contribution to CPAS‡		409,943,840	332,510,096	297,366,337	232,235,689	189,312,104	169,489,862	72,837,823	13,762,479	13,762,479	13,762,479	13,762,479	8,338,751
Program Total CPAS		738,970,456	654,750,436	615,961,035	540,656,011	448,593,037	378,316,556	271,980,263	210,012,811	22,817,924	22,770,627	22,770,627	17,346,899
CY2020 Program Incremental Expiring Savings§		8,207,703	6,786,276	3,645,642	10,174,376	49,139,389	50,454,238	9,684,255	2,892,108	187,194,888	47,297	-	-
Historic Program Incremental Expiring Savings‡§		33,235,208	77,433,744	35,143,759	65,130,648	42,923,586	19,822,242	96,652,038	59,075,344	-	-	-	5,423,728
Program Total Incremental Expiring Savings§		41,442,912	84,220,020	38,789,401	75,305,024	92,062,974	70,276,481	106,336,293	61,967,452	187,194,888	47,297	-	5,423,728

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	Lighting	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	HVAC	6,657,242	6,657,242	6,657,242	6,657,242	30,554	30,554	-	-	-	-	-	-
Non-Lighting	VSD	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Compressed Air	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Industrial Systems	2,350,906	425,749	425,749	425,749	425,749	425,749	-	-	-	-	-	-
Non-Lighting	Food Service Equipment	-	-	-	-	-	-	-	-	-	-	-	-
Non-Lighting	Laboratory	-	-	-	-	-	-	-	-	-	-	-	-
EMS	EMS	-	-	-	-	-	-	-	-	-	-	-	-
CY2020 Program Total Contribution to CPAS		9,008,148	7,082,991	7,082,991	7,082,991	456,303	456,303	-	-	-	-	-	-
Historic Program Total Contribution to CPAS‡		7,296,096	7,296,096	7,296,096	59,150	59,150	-	-	-	-	-	-	-
Program Total CPAS		16,304,243	14,379,087	14,379,087	7,142,141	515,454	456,303	-	-	-	-	-	-
CY2020 Program Incremental Expiring Savings§		-	1,925,156	-	-	6,626,688	-	456,303	-	-	-	-	-
Historic Program Incremental Expiring Savings‡§		1,042,655	-	0	7,236,946	0	59,150	-	-	-	-	-	-
Program Total Incremental Expiring Savings§		1,042,655	1,925,156	0	7,236,946	6,626,688	59,150	456,303	-	-	-	-	-

Note: The green highlighted cell shows program total first-year electric savings (including direct electric savings and those converted from gas). The gray cells are blank, indicating no values or no contribution to calculating CPAS in CY2020.

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

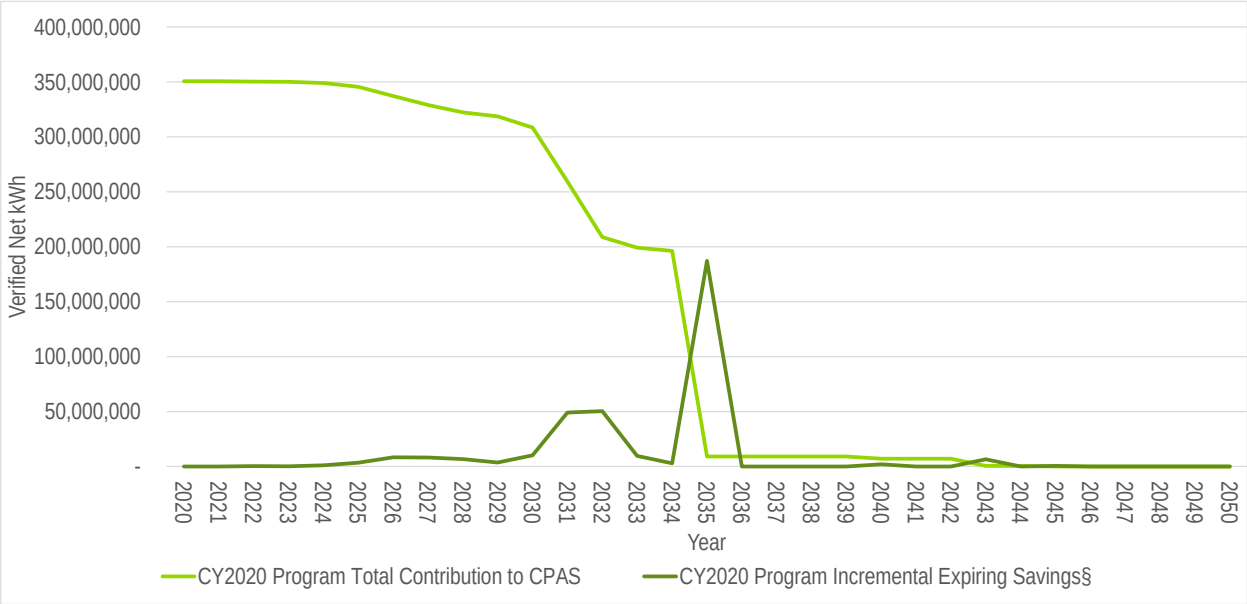
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic 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



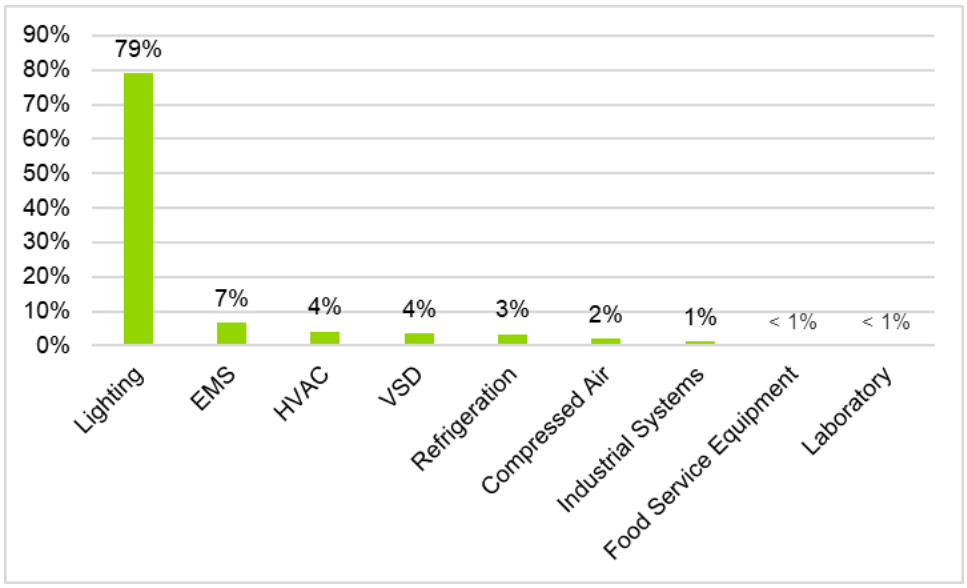
§Expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n.

Source: Evaluation team analysis

5. Program Savings by Measure

The program includes measures across nine measure categories, as Figure 5-1 shows. Lighting measures contributed the most savings.

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



Source: ComEd tracking data and evaluation team analysis

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)
Lighting	Lighting	232,381,497	0.97	225,262,363	0.83	186,967,761	11.8
Non-Lighting	HVAC	13,621,182	0.89	12,149,782	0.78	9,476,830	19.8
Non-Lighting	VSD	11,637,890	0.91	10,584,825	0.78	8,256,164	15.0
Non-Lighting	Refrigeration	11,146,377	0.92	10,225,073	0.78	7,975,557	10.6
Non-Lighting	Compressed Air	6,024,648	0.97	5,821,828	0.78	4,541,026	12.7
Non-Lighting	Industrial Systems	3,853,340	0.90	3,474,292	0.78	2,709,948	19.7
Non-Lighting	Food Service Equipm	526,598	1.03	543,960	0.78	424,288	14.5
Non-Lighting	Laboratory	459,451	0.98	450,827	0.78	351,645	2.1
EMS	EMS	24,272,415	0.81	19,606,183	0.78	15,292,823	15.0
	Total	303,923,398	0.95	288,119,133	NA	235,996,042	NA

NA = not applicable (refers to a piece of data that 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)
Lighting	Lighting	41,849.02	1.00	41,654.76	0.83	34,573.45
Non-Lighting	HVAC	1,628.51	0.81	1,311.25	0.78	1,022.78
Non-Lighting	VSD	1,085.58	0.75	817.14	0.78	637.37
Non-Lighting	Refrigeration	1,555.62	0.89	1,381.37	0.78	1,077.47
Non-Lighting	Compressed Air	937.29	0.76	713.06	0.78	556.18
Non-Lighting	Industrial Systems	912.51	0.79	722.61	0.78	563.64
Non-Lighting	Food Service Equipme	68.12	0.97	66.10	0.78	51.56
Non-Lighting	Laboratory	53.39	0.80	42.54	0.78	33.18
EMS	EMS	0.00	NA	0.00	0.78	0.00
	Total	48,090.04	0.97	46,708.84	NA	38,515.63

NA = not applicable (refers to a piece of data that 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 5-3. CY2020 Energy Savings by Measure – Gas

End Use Type	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)	NTG*	Verified Net Savings (Therms)	EUL (years)
Lighting	Lighting	0	NA	0	0.83	0	11.8
Non-Lighting	HVAC	27,229	1.88	51,185	0.78	39,924	19.8
Non-Lighting	VSD	0	NA	0	0.78	0	15.0
Non-Lighting	Refrigeration	0	NA	0	0.78	0	10.6
Non-Lighting	Compressed Air	0	NA	0	0.78	0	12.7
Non-Lighting	Industrial Systems	0	NA	0	0.78	0	19.7
Non-Lighting	Food Service Equipment	52,857	1.30	68,875	0.78	53,722	14.5
Non-Lighting	Laboratory	603	1.00	603	0.78	470	2.1
EMS	EMS	5,230,610	0.94	4,895,700	0.78	3,818,646	15.0
	Total Therms	5,311,299	0.94	5,016,363	NA	3,912,763	NA
	Total kWh Converted From Therms†	155,674,177	0.94	147,029,595	NA	114,683,084	NA

NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.
† Gas savings converted to kWh by multiplying therms by 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh).

Source: ComEd tracking data and evaluation team analysis

Table 5-4. CY2020 Energy Savings by Measure – Total Combining Electricity and Gas

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Lighting	Lighting	232,381,497	0.97	225,262,363	0.83	186,967,761
Non-Lighting	HVAC	14,419,274	0.95	13,650,014	0.78	10,647,011
Non-Lighting	VSD	11,637,890	0.91	10,584,825	0.78	8,256,164
Non-Lighting	Refrigeration	11,146,377	0.92	10,225,073	0.78	7,975,557
Non-Lighting	Compressed Air	6,024,648	0.97	5,821,828	0.78	4,541,026
Non-Lighting	Industrial Systems	3,853,340	0.90	3,474,292	0.78	2,709,948
Non-Lighting	Food Service Equipm	2,075,849	1.23	2,562,681	0.78	1,998,891
Non-Lighting	Laboratory	477,118	0.98	468,494	0.78	365,425
EMS	EMS	177,581,582	0.92	163,099,158	0.78	127,217,343
	Total†	459,597,575	0.95	435,148,728	NA	350,679,126

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

Source: ComEd tracking data and evaluation team analysis

The Standard Program offers two measures that save water,[4] but there were no projects with those measures in CY2020.

[4] Pre-rinse spray valves and ENERGY STAR steam cookers

6. Impact Analysis Findings and Recommendations

6.1 Impact Parameter Estimates

The evaluation team calculated the verified gross and net savings (energy and coincident peak demand) resulting from the CY2020 Standard Program using algorithms defined by the TRM v8.0 or ComEd CY2020 workpapers. Table 6-1 presents the key parameters and references used in the verified gross and net savings calculations, indicating which were examined through CY2020 evaluation research and which were deemed.

Table 6-1. Savings Parameters

Gross Savings Input Parameters	Value	Units	Deemed or Evaluated?	Source
Quantity	Varies	Varies	Evaluated	Program Tracking Database
Net-to-Gross (NTG)	Varies	NA	Deemed	Illinois SAG Consensus*
Deemed Lighting Measure Savings Parameters: Hours of Use (HOU), Coincidence Factor, Interactive Effects	Varies	NA	Deemed	TRM v8.0†
Lighting Measure ΔWatts (deemed by TRM v8.0)	Varies	Watts	Deemed	TRM v8.0†
Lighting Measure ΔWatts (not deemed by TRM v8.0)	Varies	Watts	Evaluated	Program Documentation and CY2020 Measurement and Verification (M&V)
Deemed HVAC, Food Service, and Refrigeration Measures, principally: Electric Chillers, HVAC Equipment VSDs, Air Compressors, Motors, and Anti-Sweat Heater Controls	Varies	kWh	Deemed	TRM v8.0†
Non-Deemed Non-Lighting Measures, principally: Industrial VSD, EMS, Refrigeration Cases/Doors, Refrigerated Cycling Dryers, Demand-Controlled Ventilation (DCV), Laboratory Measures	Varies	kWh	Evaluated	Program Documentation and CY2020 M&V
Verified Realization Rate on Ex Ante Gross Savings	Varies	NA	Evaluated	CY2020 Evaluation
EUL	Varies	Years	Deemed	TRM v8.0†

NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
*A deemed value. Source found on the Illinois SAG website: https://www.ilsag.info/ntg_2020.
† TRM is the Illinois Statewide Technical Reference Manual version 8.0 from http://www.ilsag.info/technical-reference-manual.html.

Source: ComEd tracking data and evaluation team analysis

6.2 T12 Baseline Adjustment

ComEd provided tracking data detail that enabled the evaluation team to identify T12 baselines in lighting measures. The TRM v8.0 does allow existing baselines to be used for lighting measures that are not a one-for-one replacement. The team estimated that, overall, 5% of the savings from affected LED measures involved T12 baselines and a one-for-one replacement. The affected measures were identified as follows:

- Indoor LED Fixtures and Retrofits
- Indoor Networked Lighting Measures

- Outdoor & Garage - LED Fixtures and Retrofits

The evaluation team applied the T12 adjustment by mapping the identified T12 fixtures to equivalent T8 fixtures after one-third of the EUL of that installation had expired. This adjustment affects the CPAS, not the first-year savings. The team calculated the weighted average T12 adjustment factor to be 63%.[5] For more detail on these adjustments, see Table 6-2 and Table 6-3.

Table 6-2. Energy Savings Affected by T12 Baseline Shift

Measure Name	No T12 Baseline Ex Ante Gross Savings (kWh)	T12 Baseline Ex Ante Gross Savings (kWh)	Total Ex Ante Gross Savings (kWh)	Percentage of Savings involving T12 Baseline
Indoor LED Fixtures and Retrofits	127,412,211	10,711,395	138,123,606	7.8%
Outdoor & Garage - LED Fixtures and Retrofits	52,712,035	230,045	52,942,080	0.4%
Indoor Networked Lighting Measures	23,680,197	12,549	23,692,746	0.1%
Total	203,804,444	10,953,988	214,758,432	5.1%

Source: ComEd tracking data and evaluation team analysis

The evaluation team calculated the mid-life adjustment factors at the measure installation-level, based on the existing T12 fixture description and equivalent T8 wattages. Table 6-3 summarizes the adjustment factors for each of the measure that had T12 baselines present.

Table 6-3. T12 Savings Adjustment Factor Details

Measure Name	Verified Gross Savings (kWh/year)	Mid-Life Adjusted Verified Gross Savings (kWh/year)	Average Mid-Life Adjustment Factor
Indoor LED Fixtures and Retrofits	10,235,460	6,447,094	63%
Outdoor & Garage - LED Fixtures and Retrofits	214,102	128,217	60%
Indoor Networked Lighting Measures	12,456	11,153	90%
Total	10,462,018	6,586,464	63%

Source: ComEd tracking data and evaluation team analysis

6.3 Other Impact Findings and Recommendations

The evaluation team has developed several recommendations based on findings from the CY2020 evaluation listed below. These findings suggest ways to improve the measure-level realization rates.

6.3.1 Overall Findings

Finding 1. The evaluation team sampled separately for lighting, non-lighting, and EMS projects. The lighting project strata achieved an electric energy savings weighted realization rate (RR_{kWh}) of 0.97, non-lighting achieved 0.90, and EMS achieved 0.82.[6] The overall program gross realization rate was 0.95.

[5] This adjustment factor was 60% and 56% in CY2019 and CY2018, respectively.

[6] These figures represent strata-level results instead of the measure-level results shown in the Section 5 tables. Strata-level results are a weighted estimate with statistical precision categorized at the project level.

Finding 2. Lighting measures contributed 79% of the total net savings. These measures include fixture replacements, localized controls (i.e., occupancy sensors), and networked lighting controls.

6.3.2 Tracking Data Findings

Finding 3. The lighting measure baseline information in the tracking data does not use standardized naming conventions, which results in many unique fixture names. In CY2020, the tracking data contained 2,455 unique references to baseline lighting equipment. The implementer reports that this field will have standardized values in in CY2021.

Recommendation 1. Guidehouse recommends the implementer use a standardized or discrete list of fixture names or naming conventions (i.e., a dropdown list of typical names such as 4' 4LT12, EE ballast) to identify the lighting baseline types. Correcting this will reduce the evaluation labor required to account for the T12 midlife adjustment.

Finding 4. The final tracking data did not include relevant data fields for many of the HVAC Tune-Up measures.[7] Due to the size of the Standard Program, the large number of measures it includes, and the type of evaluation that it undergoes, it is helpful to have all the data fields that are associated with the measures. A number of these data fields were included in the tracking data received for the tracking system review, but not in the final tracking data. These fields include heating system capacity (kBtu/h) and heating system efficiency.

Recommendation 2. Guidehouse recommends that ComEd provide all eTrack fields in the tracking data for the Standard Program. This should eliminate iterative data requests during the evaluation cycle.

6.3.3 eTRACK Findings

Finding 5. The implementer used integrated energy efficiency ratio (IEER) values to calculate demand savings for the rooftop air conditioner measure. The TRM v8.0 demand savings algorithm for rooftop air conditioner peak demand savings uses energy efficiency ratio (EER) values, which represents equipment operation during full-load conditions.[8] As shown in Table 6-4 the 11 measure installations that appeared in the CY2020 sample achieved a total demand realization rate of 0.40.[9] This measure is the Standard Program's eighth largest source of ex ante peak demand savings and accounts for 1.3% of the program's peak demand savings. Guidehouse also reported this issue in the CY2019 Standard Program Impact Evaluation Report.

Table 6-4. Impact Summary of RTU Demand Savings Error Within Sample

Measure	Sampled Project Quantity	Sampled Measure Installation Quantity	Ex Ante kW	Verified kW	RR_{kW}
Rooftop Unit	4	11	90.04	36.44	0.40

Source: ComEd tracking data and evaluation team analysis

[7] These include packaged RTU sealing, thermostat, and economizer repair and optimization measures
[8] 4.4.15 Single-Package and Split System Unitary Air Conditioners. TRM v8.0, volume 2.
[9] The affected projects are 66824, 66886, 67209 and 68771.

Recommendation 3. The evaluation team recommends the implementer correct the demand savings algorithm in the CY2021 program workpaper for the rooftop unit.

Finding 6. The ex ante gas savings calculation for the thermostat measure contains a unit conversion error that results in significant underreporting of gas savings. The formula in the eTrack calculation[10] fails to convert the cooling tons to Btu/h, dividing the kBtu/h by 100,000 Btu/h/therm rather than 1,000 kBtu/h/therm. The result of this error is the ex ante gas savings appear 1,000 times smaller than they should be. The impact of this error is summarized in Table 6-5.

Table 6-5. Impact Summary of Thermostat Algorithm Errors

Project ID	AFUE Value in eTrack	Measure Installation Quantity	Ex Ante therms	Verified therms	RR_{therms}
STND-69515	80	1	0.000	40.51	NA
STND-67209	80	2	0.839	7,578.00	9,032.18
STND-69166	84	1	0.002	185.78	92,890.00
STND-69281	80	6	0.040	4,034.36	100,859.06
STND-69845	0.8	3	2.491	248.99	99.95
STND-69899	0.8	4	2.872	2,871.79	999.93
STND-70208	0.08	2	0.358	357.24	997.88
STND-70711	0.08	5	0.003	292.29	97,429.50
Total		24	6.605	15,608.96	2,363.20

Source: ComEd tracking data and evaluation team analysis

Recommendation 4. Guidehouse recommends the implementer correct the gas savings algorithm for the thermostat measure in eTrack.

Finding 7. The ex ante gas savings calculation for the thermostat measure also contains a data entry error that results in incorrect gas savings values. One of the eTrack algorithm input fields is for annual fuel utilization efficiency (AFUE), which represents the heating efficiency term in the TRM v8.0 algorithm.[11] The default value in the workpapers is 80% unless known. The values entered in eTrack include 80, 0.80, and 0.08, and are detailed in Table 6-5.

Recommendation 5. The evaluation team recommends the eTrack field have constraints to the value that can be entered (i.e., value must be between 0.7 and 1.0). Another option would be to communicate within in the eTrack field name the correct units for the entered value.

Finding 8. The ex ante gas savings calculation of the packaged RTU sealing measure contains a unit conversion error that results in underreporting of gas savings. The formula in eTrack fails to convert the cooling tons to kBtu/h as specified in the TRM v8.0 and program workpapers.[12] The formula in eTrack divides cooling tons by 1,200 when this formula should multiply cooling tons by 12 kBtu/h per ton and then divide by 100 kBtu/h per therm. The result of this error is the

[10] Therms equals "(EFLHgas*Tonnage*12*(1/AFUE)*Savingsgas)/100000*(1-ElectricHeat)"

[11] TRM v8.0, 4.4.48 Small Commercial Thermostats – Provisional Measure:
$\Delta Therms = (EFLH_{heat} * Capacity * 1/AFUE * Heating\_Reduction) / 100{,}000\ Btu/Therm$

[12] TRM v8.0, 4.4.43 Packaged RTU Sealing: $\Delta Therm = (kBtu/hr) / 100 / Efficiency_{before} * EFLH * \%Savings$

ex ante gas savings appear 144 times smaller than they should be. The impact of this error within the sample is summarized in Table 6-6.

Table 6-6. Impact Summary of Packaged RTU Sealing Algorithm Error Within Sample

Measure	Sampled Project Quantity	Sampled Measure Installation Quantity	Ex Ante therms	Verified therms	RR_{therms}
Packaged RTU Sealing	11	44	21	3,047	144.00

Source: ComEd tracking data and evaluation team analysis

Recommendation 6. The evaluation team recommends the implementer correct the gas savings algorithm for the packaged RTU sealing measure in eTrack.

Finding 9. The ex ante gas savings calculation of the energy recovery ventilator measure contains an error. The formula in the eTrack Excel-based calculation is missing parentheses around the ΔT term.[13] The result of this omission is that the ex ante gas savings appear much smaller than they should be. There was only one instance of this measure in CY2020 and it achieved verified gross savings of 1,063 therms and a realization rate of 41.11.[14]

Recommendation 7. The evaluation team recommends the implementer correct the gas savings algorithm for the energy recovery measure in eTrack.

Finding 10. The ex ante gas savings calculation of the economizer repair and optimization measure does not follow the intention of the TRM. The TRM fails to clearly define the units of two algorithm inputs: Oan and Oax.[15] According to the authors of the measure, these values should be entered into the algorithm as integers rather than percentages. The ex ante calculation enters these values as percentages in both the cooling and heating savings algorithm. Correcting this in the ex ante calculation will increase electric savings in some cases and increase gas savings in all cases. There were three projects that had this measure in CY2020, and those measures collectively achieved electric and gas realization rates of 3.16 and 195.98, respectively.

The evaluation team has communicated with the TRM administrator the need to correct the language in the TRM to avoid this issue in the future.

Recommendation 8. The evaluation team recommends the implementer update their calculation for this measure to use integer values instead of percentage values.

6.3.4 Quality Control Findings

Finding 11. Project 68061 included two installations of the VSDs on exhaust fans.[16] Measure 4.4.26 Variable Speed Drives for HVAC Supply and Return Fans in the TRM v8.0 applies only

[13] The eTrack calculation is = (1.08 * CFM * (T_{RA} – T_{DD} * TE_{ERV} * EFLH * OccHours / 24) / (100,000 * Eff_{Heat}), where ΔT = T_{RA} - T_{DD}.

[14] Project ID 66964, Measure ID 441979.

[15] Oan = minimum outside air (%); Oax = maximum outside air (%)

[16] Measure IDs 5449716 and 549720,

to supply and return fans, not exhaust fans. The evaluation team estimated savings for these installations using the exhaust fan application, resulting in a realization rate of 0.38.[17]

Recommendation 8. Guidehouse recommends the program limit applying the VSD on HVAC Fan or Pump <= 200 HP measure to supply and return fans only.

Finding 12. Project 63784 involved a water-cooled chiller installation. The chillers that were installed are smaller and less efficient than the ex ante calculations indicate. The installed units have a rated capacity of 348 tons, an integrated part-load value (IPLV) efficiency of 0.3885 kW/ton, and a full-load efficiency of 0.6567 kW/ton; the ex ante savings are based on a capacity of 381 tons, an IPLV of 0.3340, and a full-load efficiency of 0.591 kW/ton. This measure installation received a realization rate of 0.43.

Recommendation 9. Guidehouse recommends the implementer confirm the chiller efficiency values with project documentation.

6.3.5 Program Implementation Findings

Finding 13. Between January 1, 2020 and February 28, 2020, the implementer did not distinguish between the ER and TOS project type when determining the baseline for lighting measures. The TRM instructs the following: "The Standard Rx Program will assume a Time of Sale baseline for all one to one replacements, and early replacement for lighting redesign and early retirement for delamping." This clause affected five projects in the sample and resulted in realization rate of 0.45 for the affected measure installations.

Table 6-7. Sampled Measure Installations Affected by ER-TOS Baseline Determination

Project ID	Measure Installation ID	Ex Ante kWh	Verified kWh	ΔkWh	Realization Rate
STND-67398	4649925	2,349	4,488	2,139	1.91
STND-67398	4649927	1,936	641	-1,295	0.33
STND-67398	4649919	27,923	6,228	-21,695	0.22
STND-67398	4649920	17,984	3,673	-14,311	0.20
STND-67398	4649921	122,069	33,010	-89,059	0.27
STND-65808	3909411	1,925	1,624	-301	0.84
STND-66726	4276253	11,037	9,729	-1,308	0.88
STND-66726	4276254	30,551	15,835	-14,716	0.52
STND-66726	4276256	1,162	1,756	594	1.51
STND-66129	4036944	19,299	18,210	-1,089	0.94
STND-66129	4036945	5,138	4,854	-284	0.94
STND-66129	4036946	18,684	16,894	-1,790	0.90
STND-66129	4674784[18]	2,324	1,020	-1,304	0.44
STND-67459	4670431	3,283	2,861	-422	0.87
Total		265,664	120,823	-144,841	0.45

[17] The calculation assumed VSDs will only yield savings when the air handling units are in economizer mode and at less than 100% airflow. The custom analysis used Typical Meteorological Year, Third Edition (TMY3) weather data to estimate the number of hours per year that an air handling unit might be operating in economizer mode at less than 100% airflow. For this project, the annual hours were estimated to be 1,322.

[18] The 0.44 realization rate was partially due to another unrelated adjustment within the review.

Source: ComEd tracking data and evaluation team analysis

Finding 14. In three projects involving VSD air compressors, related compressed air efficiency measures appeared to be eligible, but they were not applied for nor incented. The following list summarizes the details of these three projects.

- 66735: A no-loss condensate drain integrated in the compressor package did not receive an incentive.
- 68466: A 520-cfm cycling refrigerated dryer was not applied for and did not receive an incentive. Two no-loss condensate drains were also not applied for nor incented: one integrated in the VSD air compressor and another integrated into the dryer.
- 69379: A no-loss condensate drain appearing on the invoice was not applied for nor was incented.

Guidehouse provided feedback on this issue during a regularly scheduled program meeting in 2018, where the evaluation team found that 26% of VSD air compressor projects include additional measures that were not applied for.[19] These may represent missed savings opportunities for the program.

Recommendation 10. Guidehouse recommends the implementer build customer and energy efficiency service provider awareness on the incentives available for compressed air efficiency measures.

Finding 15. Project 67867 involved the installation of two VSD air compressors. The TRM v8.0 and the program workpapers limit the savings to one VSD air compressor per distribution system. Multiple VSD air compressors installed on the same compressed air system are not likely to achieve additional deemed energy savings, though there may be non-energy benefits the customer is seeking.

Recommendation 11. Guidehouse recommends the program not incent multiple VSD air compressors in a single project without documentation that they serve separate compressed air distribution systems.

6.3.6 Workpaper Findings

Finding 16. The ex ante savings for the VSD air compressor measures assume a compressor factor based on a simple average of all four of the compressor types listed in the TRM v8.0 (shown below).

- Inlet modulation (IM)
- Load/no-load (LNL) with 1 gallon per cubic feet per minute (cfm) storage (LNL+1)
- Load/no-load with 3 gallon per cfm storage (LNL+3)
- Load/no-load with 5 gallon per cfm storage (LNL+5)

[19] A 2018 review of 31 compressed air projects sampled between PY7 and PY9 showed that eight included a missed opportunity (drain or dryer).

While the US Department of Energy Technical Support Document for air compressors supports equal weighting between IM and LNL controls,[20] it is rare to see existing storage levels at 3 gal/cfm or 5 gal/cfm.[21] The verified savings reflect a baseline compressor factor that is an average of modulation and LNL with 1 gal/cfm of storage types. This adjustment results in a realization rate of 1.26 or 1.21 for energy and demand, depending on the size of the compressors. VSD air compressors is a relatively significant measure in the Standard Program and is the ninth largest source of ex ante kWh.

Table 6-8. VSD Air Compressor Savings in CY2020 Population

Measure	Population		Sample			
	Measure Installation Quantity	Ex Ante kWh	Measure Installation Quantity	Ex Ante kWh	Verified kWh	RR_{kWh}
Compressed Air - Air Compressor(s) with Integrated VSD <= 200 HP	84	4,833,756	9	922,028	1,146,107	1.24

Source: ComEd tracking data and evaluation team analysis

Guidehouse provided feedback on this issue during the CY2021 workpaper reviews, and the implementer updated corrected this issue in the CY2021 program workpapers.

Finding 17. The heated blower purge desiccant compressed air dryer ex ante measure savings were based on a program workpaper that did not follow the TRM v8.0. The measure appeared in Project 66735 and the evaluation team adjusted to follow the TRM v8.0. The dryer included a dew point demand control that allows the dryer to achieve additional savings. TRM v9.0 has added the option to calculate the additional savings resulting from this control. Guidehouse verified the energy savings per TRM v8.0, with the added control savings factor from TRM v9.0. The measure received a realization rate of 0.27. The implementer has corrected this issue in the CY2021 program workpapers.

Finding 18. The LED refrigerated display case lighting for open and closed cases ex ante measure savings were based on a TRM default LED lamp wattage of 7.6 W per foot of lamp. This is an obsolete value in the TRM and is not representative of current LED products. The evaluation team used actual LED lamp wattage to determine verified savings. This measure has consistently received realization rates greater than 1.00 due to this adjustment. The TRM has updated this value to 4 W per foot of lamp in v9.0. This update will impact the seventh largest source of ex ante kWh.

[20] "Chapter 8. Life-Cycle Cost and Payback Period Analysis," p. 8-5. *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Air Compressors*. US Department of Energy. December 2016. https://beta.regulations.gov/document/EERE-2013-BT-STD-0040-0082

[21] The LNL+3 and LNL+5 compressor types were removed from the compressor factor average calculations. Based on experience with the ComEd customers and Industrial Systems Program participation history, these compressor types are not representative of the population. In a sample of 30 projects and 110 non-VSD compressors, five were LNL+3 and one was LNL+5.

Table 6-9. LED Case Lighting Savings in CY2020

Measure	Population		Sample			
	Measure Installation Quantity	Ex Ante kWh	Measure Installation Quantity	Ex Ante kWh	Verified kWh	RR_{kWh}
LED Refrigerated Display Case Lighting for Open and Closed Cases	175	6,263,190	6	98,402	185,341	1.88

Source: ComEd tracking data and evaluation team analysis

The implementer has updated this value in the CY2021 program workpaper to be consistent with TRM v9.0.

Appendix A. Impact Analysis Methodology

This appendix presents the evaluation estimates of gross savings and stratified measure-level realization rates. In the savings verification process, the evaluation sought to verify eligibility, quantity, and compliance with claimed per-unit savings values defined in TRM v8.0. This process verified that the TRM was applied correctly and consistently by the program, that the measure-level inputs to the algorithm were correct, and that the quantity of measures claimed through the program were correct, in place, and operational. Gross impact evaluation of non-deemed measures involved retrospective evaluation adjustments to gross savings on custom variables. For measures with custom variables, ComEd provided workpaper savings documentation, but verified savings were based on engineering reviews or billing or interval data reviews to determine eligibility and savings. The evaluation team did not conduct onsite metering due to COVID-19 pandemic concerns.

Other evaluation activities to verify gross energy savings involved the steps outlined in the following sections.

Sampling Design for Savings Verification

Guidehouse implemented a stratified random sampling design where projects were grouped into three sample strata: lighting, non-lighting, and EMS. A project was classified as lighting or non-lighting if more than 50% of savings are from lighting or non-lighting measures. A project was classified as an EMS project if it contained an EMS measure; otherwise it was classified as lighting or non-lighting based on which measures produced most of the project savings.

The evaluation team selected 110 projects: 37 lighting projects, 45 non-lighting projects, and 28 EMS projects.[22] The sample for the CY2020 gross impact evaluation was designed to provide a 90/10 confidence level and relative precision for gross impact realization rate results for lighting, non-lighting, and EMS measures as well as the overall program. The team defined strata by project size (separately for lighting, non-lighting, and EMS projects) based on ex ante gross energy savings boundaries that placed approximately one-third of program-level savings into each stratum (large, medium, and small) for nine total sub-strata. One EMS project and four lighting projects were designated as certainty projects because the team's sample design required them to be sampled due to their large size.[23]

Overall, the sample represented 17% (52,440,321 kWh) of the population of ex ante savings (303,923,398 kWh).

In CY2020, Guidehouse's initial sample design lowered the coefficient of variation (CV) for the lighting stratum from 0.5 (default) to 0.3 based on the assumption that the lighting stratum are relatively consistent. This assumption was supported by a review of precision and CV values from the most recent three evaluations of the Standard Program. The first three waves of sampling produced a program-level precision value of 14% (kWh) which missed the target of 10%. A supplemental sample of the small lighting strata was needed to improve the program-level precision to 8%. Table A-2 provides additional detail on precision.

[22] During the drafting of this report, Guidehouse determined that a supplemental sample of 8 small lighting projects was needed to improve precision values. The engineering file reviews of this supplement were included in this report. The initial sample was 102 which was increased to 110.

[23] EMS project 60026 and lighting projects 68760, 70626, 67023, and 67580.

Table A-1. Profile of the CY2020 Population and Gross Savings Verification Sample by Strata

Population Group	Sampling Strata	Population: Number of Projects (N)	Population: Ex Ante Claimed Gross Savings, kWh	Population: kWh Weights	Sample: Number of Projects (n)	Sample: Ex Ante kWh	Sample: Sampled % of Population kWh
Lighting	C	4	14,584,217	0.061	4	14,584,217	100%
	1	80	66,118,110	0.278	8	5,724,829	9%
	2	209	71,944,862	0.302	8	2,777,516	4%
	3	2,624	85,207,866	0.358	17	1,366,055	2%
Sub-total Lighting		*2,917*	*237,855,054*	*1.000*	*37*	*24,452,618*	*10%*
Non-Lighting	1	22	13,799,452	0.353	11	7,458,347	54%
	2	69	11,638,775	0.298	16	2,507,990	22%
	3	446	13,604,888	0.348	18	1,009,108	7%
Sub-total Non-Lighting		*537*	*39,043,115*	*1.000*	*45*	*10,975,446*	*28%*
EMS	C	1	4,773,404	0.177	1	4,773,404	100%
	1	3	4,374,357	0.162	3	4,374,357	100%
	2	10	8,078,971	0.299	8	5,955,590	74%
	3	93	9,798,496	0.363	16	1,908,906	19%
Sub-total EMS		*107*	*27,025,229*	*1.000*	*28*	*17,012,257*	*63%*
Program Total		3,561	303,923,398		110	52,440,321	17%

Source: ComEd tracking data and evaluation team analysis

Table A-2. Gross kWh Realization Rates and Relative Precision at 90% Confidence Level

Population Group	Sampling Strata	Mean kWh RR	Relative Precision at 90% Level of Confidence ± %, kWh	Mean kW RR	Relative Precision at 90% Level of Confidence ± %, kW	Standard Error, kWh
Lighting	C	0.99	0%	1.00	0%	0%
	1	0.99	2%	1.08	6%	1%
	2	0.99	2%	1.08	5%	1%
	3	0.93	17%	1.04	15%	9%
Sub-total Lighting		*0.97*	*10%*	*0.90*	*8%*	*5%*
Non-Lighting	1	0.74	13%	0.64	31%	5%
	2	1.08	10%	1.07	9%	6%
	3	0.92	13%	0.63	38%	7%
Sub-total Non-Lighting		*0.90*	*7%*	*0.63*	*21%*	*4%*
EMS	C	0.66	NA	0.97	NA	0%
	1	0.62	0%	NA	NA	0%
	2	1.00	3%	0.06	1148%	2%
	3	0.84	23%	0.98	29%	11%
Sub-total EMS		*0.82*	*9%*	*0.06*	*70%*	*5%*
Overall CY2020 Program		0.95	8%	0.98	8%	5%

Source: ComEd tracking data and evaluation team analysis

A.1.1 Engineering Review of Project Files

For each selected project, the evaluation team performed an in-depth application review to assess the engineering methods, parameters, and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimated ex post gross savings based on their documentation review and engineering analysis. The team completed desk file reviews on all sampled projects (no site visits in CY2020) to support deemed and non-deemed measure savings verification and program-level research.

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

A.1.2 Site-Specific Impact Estimates

Due to the COVID-19 pandemic, no onsite work was completed, and no onsite metering was performed. However, Guidehouse still used interval data in an attempt to verify the EMS measure savings. Typically, a regression model determines the verified savings for EMS measures, as long as the evaluation team deems the model is of acceptable quality. In CY2020, the team did not rely on models as the primary means of verification due to data quality and quantity issues. Instead of using the regression models to determine the verified savings value, the models were used as an indicator of whether savings were occurring or not. The evaluation team's EMS evaluation protocol this year was to use the regression model to determine whether any savings were occurring, except in cases where:

- The model showed savings or where the evaluation team deemed the model insufficient, the deemed savings values were verified.
- The model showed negative savings (and no explanation could determine), the verified savings was set to zero.
- The model showed significantly greater than ex ante savings, the regression savings was used as verified savings.

Energy and demand savings calculations are accomplished using methods that include short-term monitoring-based assessments, bin models, application of American Society of Heating, Refrigerating and Air-Conditioning Engineers methods and algorithms, analysis of pre- and post-installation billing and interval data, and other specialized algorithms and models.

For this study, summer peak hours are defined as non-holiday weekdays between 1:00 p.m. and 5:00 p.m. Central Prevailing Time from June 1 to August 31. Winter peak hours are defined as non-holiday weekdays between 6:00 a.m. and 8:00 a.m. CPT, and between 5:00 p.m. and 7:00 p.m. CPT, from January 1 to February 28. These definitions are in accordance with the PJM Manual 18B, effective August 22, 2019.[24]

Peak demand savings for baseline and post-retrofit conditions are the average demand kW savings for the 1:00 p.m. to 5:00 p.m. CPT weekday time period for summer and 6:00 a.m. to

[24] Manual 18B, p. 39: https://pjm.com/~/media/documents/manuals/m18b.ashx.

8:00 a.m. CPT and 5:00 p.m. to 7:00 p.m. CPT weekday time period for winter.[25] Gas Savings Verification

The primary gas-saving measure in the Standard Program is EMS, accounting for 98% of the program's total ex ante gas savings. The evaluation team typically evaluates the EMS measure's electric energy savings using a billing analysis approach that uses all the available post-installation usage data. However, the COVID-19 pandemic reduced the ability to rely on regression analyses because it forced an extended non-routine event. Additionally, in most circumstances, there is not enough heating season gas usage data to use the same approach to verify therms. Generally, the file reviews did not provide insight to the gas savings, with three exceptions: when the area (ft^2) of the project was adjusted, when the heating fuel was adjusted, and when the building type was adjusted. The electric regression analyses were only used to adjust the gas savings if they showed non-positive electric energy savings. For these projects, the gas savings was set to zero using the evaluator's judgment that if the EMS installation was producing no electric savings it was unlikely to produce gas savings. To otherwise verify the EMS gas savings, the team reviewed the tracking data for compliance with program workpapers and the TRM v8.0.

For all other gas-saving measures, rather than draw a sample, the evaluation team reviewed the program (population) tracking data for compliance with program workpapers and the TRM v8.0.

[25] The winter weather standard is the dry bulb temperature adjusted (by 0.5 °F) for wind speed above 10 mph. The measurements were for hour-ending 19:00 on regional transmission organization (RTO) peak days.

Appendix B. Impact Analysis Detail

Table B-1 through Table B-4 present the program performance from the private and public sector participation and the overall population-level savings summary.

Table B-1. Population-Level Savings Summary

End Use Type	Ex Ante Gross Savings (kWh)	Verified Gross Savings (kWh)	RR_{kWh}	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Peak Demand Reduction (kW)	Weighted RR_{kW}	Ex Ante Gross Gas Savings (therms)	Verified Gross Gas Savings (therms)	RR_{therm}
Private-Lighting	212,794,693	206,819,337	0.97	38,474	38,518	1.00	5,606	5,647	1.01
Public-Lighting	25,060,361	23,901,330	0.95	4,146	3,950	0.95	-	-	NA
Sub-total Lighting	237,855,054	230,720,667	0.97	42,620	42,468	1.00	5,606	5,647	1.01
Private-Non-Lighting	35,202,450	31,626,528	0.90	4,591	3,485	0.76	66,610	106,406	1.60
Public-Non-Lighting	3,840,665	3,598,602	0.94	532	481	0.90	7,354	7,490	1.02
Sub-total Non-Lighting	39,043,115	35,225,130	0.90	5,123	3,965	0.77	73,964	113,896	1.54
Private-EMS	20,775,493	16,718,643	0.80	63	35	0.55	2,223,146	1,902,146	0.86
Public-EMS	6,249,736	5,454,693	0.87	285	241	0.85	3,008,584	2,994,675	1.00
Sub-total EMS	27,025,229	22,173,336	0.82	347	275	0.79	5,231,729	4,896,820	0.94
Total	303,923,398	288,119,133	0.95	48,090	46,709	0.97	5,311,299	5,016,363	0.94

Note: The electric realization rates presented in this table reflect the statistical sample realization rates extrapolated at the population level.
NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
Source: ComEd tracking data and evaluation team analysis

Table B-2. Private Sector Savings Summary

End Use Type	Ex Ante Gross Savings (kWh)	Verified Gross Savings (kWh)	RR_{kWh}	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Peak Demand Reduction (kW)	RR_{kW}	Ex Ante Gross Gas Savings (therms)	Verified Gross Gas Savings (therms)	RR_{therm}
Lighting	212,794,693	206,819,337	0.97	38,474	38,518	1.00	5,606	5,647	1.01
Non-Lighting	35,202,450	31,626,528	0.90	4,591	3,485	0.76	66,610	106,406	1.60
EMS	20,775,493	16,718,643	0.80	63	35	0.55	2,223,146	1,902,146	0.86
Total	268,772,636	255,164,508	0.95	43,128	42,037	0.97	2,295,362	2,014,198	0.88

Note: The electric realization rates presented in this table reflect the statistical sample realization rates extrapolated at the population level.
Source: ComEd tracking data and evaluation team analysis

Table B-3. Public Sector Savings Summary

End Use Type	Ex Ante Gross Savings (kWh)	Verified Gross Savings (kWh)	RR_{kWh}	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Peak Demand Reduction (kW)	RR_{kW}	Ex Ante Gross Gas Savings (therms)	Verified Gross Gas Savings (therms)	RR_{therm}
Lighting	25,060,361	23,901,330	0.95	4,146	3,950	0.95	0	0	NA
Non-Lighting	3,840,665	3,598,602	0.94	532	481	0.90	7,354	7,490	1.02
EMS	6,249,736	5,454,693	0.87	285	241	0.85	3,008,584	2,994,675	1.00
Total	35,150,762	32,954,625	0.94	4,963	4,671	0.94	3,015,937	3,002,164	1.00

Note: The electric realization rates presented in this table reflect the statistical sample realization rates extrapolated at the population level.
NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
Source: ComEd tracking data and evaluation team analysis

Table B-4. Program Savings by Building Type

Space Type	Ex Ante Gross Savings (kWh)	Verified Gross Savings (kWh)	RR_{kWh}	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Peak Demand Reduction (kW)	RR_{kW}	Ex Ante Gross Gas Savings (therms)	Verified Gross Gas Savings (therms)	RR_{therm}
Exterior	54,761,918	52,647,321	0.96	-	-	NA	-	-	NA
Manufacturing	36,345,838	35,244,977	0.97	6,908	6,834	0.99	445,348	445,348	1.00
Office	31,457,334	26,475,721	0.84	2,195	1,961	0.89	1,080,354	760,391	0.70
Warehouse	31,270,766	30,085,924	0.96	11,348	11,103	0.98	-	-	NA
Unknown2	30,505,081	28,563,197	0.94	4,610	3,961	0.86	54,568	93,504	1.71
Retail/Service - Indoor Mall/Department Store	21,696,642	21,215,434	0.98	5,240	5,326	1.02	10,911	10,911	1.00
Miscellaneous (24/7)	17,127,318	16,803,965	0.98	1,627	1,620	1.00	21,605	21,605	1.00
K-12 School	16,920,997	15,813,508	0.93	3,714	3,479	0.94	2,113,970	2,100,061	0.99
Grocery/Convenience/Drug Store	16,615,321	16,370,797	0.99	3,809	3,923	1.03	8,750	8,750	1.00
Miscellaneous	12,709,223	12,108,590	0.95	3,290	3,139	0.95	103,016	103,016	1.00
Retail/Service - Strip Mall	12,634,418	12,446,164	0.99	2,904	3,052	1.05	212	212	1.00
Hospital (24/7)	6,306,867	5,895,275	0.93	576	552	0.96	-	-	NA
MultiFamily - Common	4,259,605	3,876,243	0.91	159	139	0.88	118,957	118,957	1.00
College / University	3,711,408	3,337,413	0.90	546	500	0.92	893,436	893,436	1.00
Garage/24/7	3,653,915	3,599,001	0.98	462	484	1.05	-	-	NA
Healthcare Clinic/Office	1,464,517	1,290,344	0.88	178	137	0.77	104,749	104,749	1.00
Garage	981,279	926,309	0.94	282	262	0.93	-	-	NA
Hotel/Motel - Common	555,667	473,924	0.85	11	10	0.87	352,287	352,287	1.00
Restaurant	400,944	371,949	0.93	79	69	0.87	-	-	NA
Hotel/Motel - Guest	263,343	280,478	1.07	41	42	1.04	-	-	NA
Religious Building	206,402	223,408	1.08	94	101	1.07	2,860	2,860	1.00
Public	70,133	65,101	0.93	17	16	0.90	-	-	NA
Grocery/Convenience Store	4,464	4,089	0.92	-	-	NA	276	276	1.00
Total	303,923,398	288,119,133	0.95	48,090	46,709	0.97	5,311,299	5,016,363	0.94

Note: The electric realization rates presented in this table reflect the statistical sample realization rates extrapolated at the population level.
NA = not applicable (refers to a piece of data that cannot be produced or does not apply)
Source: ComEd tracking data and evaluation team analysis

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. Due to the large number of Standard Program measures, the values presented in the table are aggregated by research category.

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)
Lighting	Lighting	Each	10,671	11.8	Yes	225,262,363	41,654.76	0	0	0	-2,276,269	0.83	0.83	0.83	186,967,761	34,573.45	0	0	0	-1,889,303
Non-Lighting	HVAC	Each	522,182	19.8	No	12,149,782	1,311.25	51,185	0	0	0	0.78	0.78	0.78	9,476,830	1,022.78	39,924	0	0	0
Non-Lighting	VSD	Each	287	15.0	No	10,584,825	817.14	0	0	0	0	0.78	0.78	0.78	8,256,164	637.37	0	0	0	0
Non-Lighting	Refrigeration	Each	324	10.6	No	10,225,073	1,381.37	0	0	0	0	0.78	0.78	0.78	7,975,557	1,077.47	0	0	0	0
Non-Lighting	Compressed Air	Each	9,552	12.7	No	5,821,828	713.06	0	0	0	0	0.78	0.78	0.78	4,541,026	556.18	0	0	0	0
Non-Lighting	Industrial Systems	Each	23	19.7	No	3,474,292	722.61	0	0	0	0	0.78	0.78	0.78	2,709,948	563.64	0	0	0	0
Non-Lighting	Food Service Equipment	Each	96	14.5	No	543,960	66.10	68,875	0	0	0	0.78	0.78	0.78	424,288	51.56	53,722	0	0	0
Non-Lighting	Laboratory	Each	22	2.1	No	450,827	42.54	603	0	0	0	0.78	0.78	0.78	351,645	33.18	470	0	0	0
EMS	EMS	Each	111	15.0	No	19,606,183	0.00	4,895,700	0	0	0	0.78	0.78	0.78	15,292,823	0.00	3,818,646	0	0	0
	Total		NA	12.6		288,119,133	46,709	5,016,363	0	0	-2,276,269	NA	NA	NA	235,996,042	38,516	3,912,763	0	0	-1,889,303

Note: There was no participation in the water-saving measures in CY2020 for the Standard Program.

*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.

† ER measures are flagged as YES; otherwise a NO is indicated in the column.

Source: ComEd tracking data and evaluation team analysis