Guidehouse

ComEd Multi-Family Retrofits - IE Impact Evaluation Report

Energy Efficiency / Demand Response Plan: Program Year 2019 (CY2019) (1/1/2019-12/31/2019)

Presented to
ComEd

FINAL

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1. INTRODUCTION

This report presents the results of the impact evaluation of ComEd's CY2019 Multi Family Retrofits - IE (Multi-Family Retrofits) Program. It includes a summary of the energy and demand impacts for the total program broken out by relevant measure and program structure details. The appendix provides the impact analysis methodology and details of the Total Resource Cost inputs. CY2019 covers January 1, 2019 through December 31, 2019.

The Multi Family Retrofits Program offers direct installation of energy efficiency measures and replacement of inefficient equipment as well as educational information to further save money on energy bills. Eligible measures include LED and energy efficient lighting retrofits, programmable thermostats, advanced power strips, water efficiency devices, weatherization measures, pipe insulation, refrigerators, heating and cooling equipment and custom energy saving measures for eligible properties. The program also offers installation of health and safety measures, including installation of vents, electrical repairs, and asbestos and mold remediation.

There are two different components for this program. The Multi-Family Retrofits Program is administered by ComEd and Peoples Gas and North Shore Gas companies and implemented by Elevate Energy. The evaluation of that component is presented in Section 2. The Multi-Family Retrofits IHWAP is administered by ComEd, Peoples GasL and North Shore Gas and Nicor Gas and implemented by Resource Innovations in partnership with the Illinois Home Weatherization Assistance Program (IHWAP). The evaluation of that component is presented in Section 3.

Both the components of the program provide retrofits in common areas and tenant spaces to eligible multi-family properties in the ComEd service territory and serve as a "one stop shop" to multi-family building owners and managers whose buildings are targeted to income eligible residents.

2. MULTI-FAMILY RETROFITS PROGRAM

2.1 Program Description

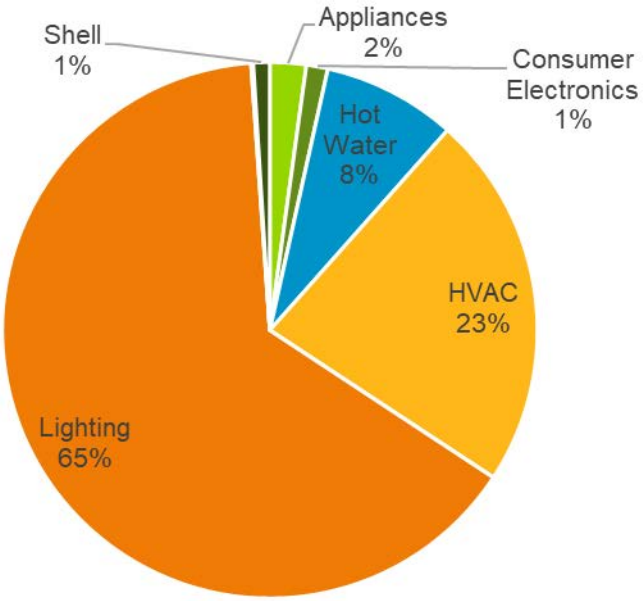
The program had 371 participants in CY2019 and distributed 32,524 measures as shown in the following table and graph. Lighting measures comprised 65% of the measure mix, followed by HVAC measures, which were 23% of all measures installed. Hot water measures represented 8% of the total measures installed, and the remaining 4% included appliances, consumer electronics and shell measures.

Table 2-1. CY2019 Volumetric Findings Detail

Participation	Quantity
Participants*	371
Total Measures†	32,524
Installed Projects‡	673

* Participants comprise of distinct ComEd Account Numbers
† Measure quantities for certain measures with units of kBtu/hr and Sq. Ft. have been adjusted to number of projects implemented to provide a more representative count
‡ Number of Unique Project IDs in the tracking data
Source: ComEd tracking data and evaluation team analysis

Figure 2-1. Number of Measures Installed by Type



Source: ComEd tracking data and evaluation team analysis

2.2 Program Savings Detail

Table 2-2 summarizes the incremental energy and demand savings the Multi-Family Retrofits Program achieved in CY2019. The 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.[1] The reasons for the discrepancy in the verified and ex ante energy and demand savings are detailed in Section 2.5.2. The largest discrepancy between the verified and ex ante savings is due to the In-Service Rate (ISR) for the Common Area (CA) lighting measures being assumed at 100%. The Illinois TRM (TRM) v 7.0 only allows the use of a 100% ISR value if the application form included a sign off that equipment is not placed into storage. Since this information was not provided along with the tracking data, the ex post savings are calculated using an ISR of 82.5% as per Section 4.5.4 of the TRM v7.0. It should be noted that the ex ante calculations in CY2018 also made this assumption.

[1] The evaluation will determine which gas savings will be counted toward goal while producing the portfolio-wide Summary Report.

Table 2-2. CY2019 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Non-Coincident Demand Savings (kW)	Summer Peak* Demand Savings (kW)
Electricity			
Ex Ante Gross Savings	4,240,711	NR	603
Program Gross Realization Rate	0.89	NA	0.96
Verified Gross Savings	3,781,962	1,147	577
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	3,781,962	1,147	577
Converted from Gas†			
Ex Ante Gross Savings	13,796,013	NA	NA
Program Gross Realization Rate	1.01	NA	NA
Verified Gross Savings	13,868,040	NA	NA
Program Net-to-Gross Ratio (NTG)	1.00	NA	NA
Verified Net Savings	13,868,040	NA	NA
Total Electric Plus Gas			
Ex Ante Gross Savings	18,036,724	NR	603
Program Gross Realization Rate	0.98	NA	0.96
Verified Gross Savings	17,650,002	1,147	577
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	17,650,002	1,147	577

NR = Not reported (refers a piece of data that was not reported, i.e., non-coincident demand savings)
NA = Not applicable (refers a piece of data cannot be produced or does not apply)
* The coincident summer peak period is defined as 1:00-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.
† Gas savings converted to kWh by multiplying therms * 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh). The evaluation will determine which gas savings will be 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

2.3 Cumulative Persisting Annual Savings

Table 2-3 to Table 2-5 and Figure 2-2 show the measure-specific and total verified gross savings for the Multi-Family Retrofits Program and the cumulative persisting annual savings (CPAS) for the measures installed in CY2019. The electric CPAS across all measures installed in 2019 is 3,781,962 kWh (Table 2-3). The CY2019 gas contribution to CPAS (converted to equivalent electricity) is 13,868,040 kWh (Table 2-4). Adding the gas and electric contributions produces 17,650,002 kWh of total CY2019 contribution to CPAS (Table 2-5). The “historic” rows in each table are the CPAS contribution back to CY2018. The “Program Total Electric CPAS” and the “Program Total Gas CPAS” are the sum of the CY2019 contribution and the historic contribution.

Table 2-3. Cumulative Persisting Annual Savings (CPAS) – Electric

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings								
						2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	CA Lighting - CFL**	5.9	508,520	1.00	2,979,781		508,520	508,520	508,520	508,520	508,520	360,683	9,314	9,314
Lighting	CA Lighting - Outdoor	11.6	482,413	1.00	5,605,548		482,413	482,413	482,413	482,413	482,413	482,413	482,413	482,413
Lighting	CA Lighting - Incandescent**	8.5	414,166	1.00	1,855,450		414,166	414,166	159,327	159,327	159,327	159,327	159,327	159,327
Lighting	CA Lighting - T8 24/7	5.7	393,621	1.00	2,245,159		393,621	393,621	393,621	393,621	393,621	277,053		
Lighting	CA Lighting - Specialty**	7.2	311,978	1.00	1,690,507		311,978	311,978	311,978	311,978	311,978	50,354	9,603	9,603
HVAC	IU PTHP	8.0	280,004	1.00	1,263,341		280,004	280,004	280,004	84,666	84,666	84,666	84,666	84,666
Appliances	IU Refrigerator	17.0	210,737	1.00	1,565,952		210,737	210,737	210,737	210,737	210,737	210,737	27,412	27,412
Lighting	CA Lighting - T8	15.0	239,033	1.00	3,585,497		239,033	239,033	239,033	239,033	239,033	239,033	239,033	239,033
Lighting	IU Lighting Incandescent	10.0	196,511	1.00	892,000		196,511	196,511	62,372	62,372	62,372	62,372	62,372	62,372
Lighting	CA Lighting - T12 24/7	5.7	236,023	1.00	945,412		236,023	225,618	130,613	130,613	130,613	91,933		
Lighting	CA Lighting - Exit Sign	5.0	137,535	1.00	687,674		137,535	137,535	137,535	137,535	137,535			
Lighting	CA Lighting - T12	15.0	125,305	1.00	1,309,485		125,305	125,305	125,305	125,305	125,305	68,296	68,296	68,296
Shell	Insulation	20.0	96,880	1.00	1,883,294		96,880	96,880	96,880	96,880	96,880	96,880	96,880	96,880
Lighting	IU Lighting Specialty	10.0	43,287	1.00	251,510		43,287	43,287	43,287	43,287	43,287	7,015	7,015	7,015
Consumer Electronics	Advanced Power Strip	7.0	34,552	1.00	241,862		34,552	34,552	34,552	34,552	34,552	34,552	34,552	
Hot Water	IU Electric Aerator	10.0	19,945	1.00	199,445		19,945	19,945	19,945	19,945	19,945	19,945	19,945	19,945
Shell	Air Sealing	20.0	9,559	1.00	191,184		9,559	9,559	9,559	9,559	9,559	9,559	9,559	9,559
HVAC	IU Thermostat**	9.5	9,320	1.00	88,887		9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320
HVAC	IU ECM Blower Replacement	15.0	7,488	1.00	112,320		7,488	7,488	7,488	7,488	7,488	7,488	7,488	7,488
Hot Water	IU Gas Showerhead	10.0	6,130	1.00	61,299		6,130	6,130	6,130	6,130	6,130	6,130	6,130	6,130
Hot Water	IU Electric Showerhead	10.0	5,885	1.00	58,849		5,885	5,885	5,885	5,885	5,885	5,885	5,885	5,885
Hot Water	IU Gas Aerator	10.0	5,327	1.00	53,272		5,327	5,327	5,327	5,327	5,327	5,327	5,327	5,327
HVAC	IU Central AC	18.0	2,975	1.00	35,310		2,975	2,975	2,975	2,975	2,975	2,975	1,455	1,455
Lighting	CA Lighting - Occ Sensor	8.0	2,757	1.00	22,058		2,757	2,757	2,757	2,757	2,757	2,757	2,757	2,757
Refrigeration	Vending Miser	5.0	1,613	1.00	8,065		1,613	1,613	1,613	1,613	1,613			
Appliances	IU Room AC	12.0	398	1.00	4,012		398	398	398	398	303	303	303	303
HVAC	CA Boiler	20.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	CA Pipe Insulation	15.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	Pipe Steam Averaging Controls	20.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	IU Furnace	20.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	Steam Trap	6.0	-	1.00	-		-	-	-	-	-	-		
HVAC	IU AC Cover and Gap Sealer	5.0	-	1.00	-		-	-	-	-	-			
Hot Water	IU DHW Boiler	13.0	-	1.00	-		-	-	-	-	-	-	-	-
Hot Water	CA DHW Boiler	15.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	CA Boiler Reset Controls	20.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	CA Boiler Tune Up	3.0	-	1.00	-		-	-	-					
CY2019 Program Total Electric Contribution to CPAS			3,781,962		27,837,171		3,781,962	3,771,557	3,287,574	3,092,237	3,092,141	2,295,003	1,349,052	1,314,501
Historic Program Total Electric Contribution to CPAS‡						3,824,064	3,568,331	3,568,331	3,414,026	3,402,182	3,009,641	2,483,579	2,435,478	1,861,538
Program Total Electric CPAS						3,824,064	7,350,293	7,339,887	6,701,600	6,494,419	6,101,782	4,778,583	3,784,531	3,176,038
CY2019 Program Incremental Expiring Electric Savings§								10,406	483,982	195,338	95	797,138	945,951	34,552
Historic Program Incremental Expiring Electric Savings‡§							255,734	-	154,305	11,844	392,541	526,062	48,101	573,941
Program Total Incremental Expiring Electric Savings§							255,734	10,406	638,287	207,181	392,636	1,323,200	994,052	608,492

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	CA Lighting - CFL**	9,314	9,314	9,314	8,490	7,145	7,145	7,145					
Lighting	CA Lighting - Outdoor	482,413	482,413	482,413	299,000								
Lighting	CA Lighting - Incandescent**	65,544	2,142	2,142	1,328								
Lighting	CA Lighting - T8 24/7												
Lighting	CA Lighting - Specialty**	9,603	9,603	9,603	8,910	7,780	7,780	7,780					
HVAC	IU PTHP												
Appliances	IU Refrigerator	27,412	27,412	27,412	27,412	27,412	27,412	27,412	27,412	27,412			
Lighting	CA Lighting - T8	239,033	239,033	239,033	239,033	239,033	239,033	239,033					
Lighting	IU Lighting Incandescent	62,372	62,372										
Lighting	CA Lighting - T12 24/7												
Lighting	CA Lighting - Exit Sign												
Lighting	CA Lighting - T12	68,296	68,296	68,296	68,296	68,296	68,296	68,296					
Shell	Insulation	96,880	96,880	91,449	91,449	91,449	91,449	91,449	91,449	91,449	91,449	91,449	91,449
Lighting	IU Lighting Specialty	7,015	7,015										
Consumer Electronics	Advanced Power Strip												
Hot Water	IU Electric Aerator	19,945	19,945										
Shell	Air Sealing	9,559	9,559	9,559	9,559	9,559	9,559	9,559	9,559	9,559	9,559	9,559	9,559
HVAC	IU Thermostat**	4,774	4,774	4,774									
HVAC	IU ECM Blower Replacement	7,488	7,488	7,488	7,488	7,488	7,488	7,488					
Hot Water	IU Gas Showerhead	6,130	6,130										
Hot Water	IU Electric Showerhead	5,885	5,885										
Hot Water	IU Gas Aerator	5,327	5,327										
HVAC	IU Central AC	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455		
Lighting	CA Lighting - Occ Sensor												
Refrigeration	Vending Miser												
Appliances	IU Room AC	303	303	303	303								
HVAC	CA Boiler	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	CA Pipe Insulation	-	-	-	-	-	-	-					
HVAC	Pipe Steam Averaging Controls	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	IU Furnace	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Steam Trap												
HVAC	IU AC Cover and Gap Sealer												
Hot Water	IU DHW Boiler	-	-	-	-	-							
Hot Water	CA DHW Boiler	-	-	-	-	-	-	-					
HVAC	CA Boiler Reset Controls	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	CA Boiler Tune Up												
CY2019 Program Total Electric Contribution to CPAS		1,128,749	1,065,347	953,242	762,722	459,617	459,617	459,617	129,875	129,875	102,463	101,009	101,009
Historic Program Total Electric Contribution to CPAS‡		1,737,258	1,249,169	1,168,178	1,156,113	1,156,113	1,156,113	462,946	247,212	247,212	243,148	243,148	224,116
Program Total Electric CPAS		2,866,007	2,314,515	2,121,421	1,918,835	1,615,731	1,615,731	922,563	377,087	377,087	345,612	344,157	325,125
CY2019 Program Incremental Expiring Electric Savings§		185,752	63,402	112,104	190,520	303,105	-	-	329,742	-	27,412	1,455	-
Historic Program Incremental Expiring Electric Savings‡§		124,280	488,089	80,990	12,065	-	-	693,167	215,734	-	4,064	-	19,032
Program Total Incremental Expiring Electric Savings§		310,031	551,492	193,095	202,585	303,105	-	693,167	545,476	-	31,475	1,455	19,032

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	CA Lighting - CFL**												
Lighting	CA Lighting - Outdoor												
Lighting	CA Lighting - Incandescent**												
Lighting	CA Lighting - T8 24/7												
Lighting	CA Lighting - Specialty**												
HVAC	IU PTHP												
Appliances	IU Refrigerator												
Lighting	CA Lighting - T8												
Lighting	IU Lighting Incandescent												
Lighting	CA Lighting - T12 24/7												
Lighting	CA Lighting - Exit Sign												
Lighting	CA Lighting - T12												
Shell	Insulation												
Lighting	IU Lighting Specialty												
Consumer Electronics	Advanced Power Strip												
Hot Water	IU Electric Aerator												
Shell	Air Sealing												
HVAC	IU Thermostat**												
HVAC	IU ECM Blower Replacement												
Hot Water	IU Gas Showerhead												
Hot Water	IU Electric Showerhead												
Hot Water	IU Gas Aerator												
HVAC	IU Central AC												
Lighting	CA Lighting - Occ Sensor												
Refrigeration	Vending Miser												
Appliances	IU Room AC												
HVAC	CA Boiler												
HVAC	CA Pipe Insulation												
HVAC	Pipe Steam Averaging Controls												
HVAC	IU Furnace												
HVAC	Steam Trap												
HVAC	IU AC Cover and Gap Sealer												
Hot Water	IU DHW Boiler												
Hot Water	CA DHW Boiler												
HVAC	CA Boiler Reset Controls												
HVAC	CA Boiler Tune Up												
CY2019 Program Total Electric Contribution to CPAS		-	-	-	-	-	-	-	-	-	-	-	-
Historic Program Total Electric Contribution to CPAS‡		224,116	224,116	224,116	224,116	-	-	-	-	-	-	-	-
Program Total Electric CPAS		224,116	224,116	224,116	224,116	-	-	-	-	-	-	-	-
CY2019 Program Incremental Expiring Electric Savings§		101,009	-	-	-	-	-	-	-	-	-	-	-
Historic Program Incremental Expiring Electric Savings‡§		-	-	-	-	224,116	-	-	-	-	-	-	-
Program Total Incremental Expiring Electric Savings§		101,009	-	-	-	224,116	-	-	-	-	-	-	-

Note: The green highlighted cell shows program total first year electric savings. The gray cells are blank, indicating values irrelevant to the CY2019 contribution to CPAS.

* A deemed value. Source: is to be found on theIllinois SAG web site here: https://www.ilsag.info/ntg_2019.

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

‡ Historical savings go back to CY2018

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

**The EUL for this measure is weighted average of the measures that were combined together.

Source: Evaluation team analysis

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

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	Verified Net Therms Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	CA Lighting - CFL**	5.9	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	CA Lighting - Outdoor	11.6	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	CA Lighting - Incandescent**	8.5	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	CA Lighting - T8 24/7	5.7	-	1.00	-		-	-	-	-	-	-		
Lighting	CA Lighting - Specialty**	7.2	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	IU PTHP	8.0	-	1.00	-		-	-	-	-	-	-	-	-
Appliances	IU Refrigerator	17.0	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	CA Lighting - T8	15.0	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	IU Lighting Incandescent	10.0	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	CA Lighting - T12 24/7	5.7	-	1.00	-		-	-	-	-	-	-		
Lighting	CA Lighting - Exit Sign	5.0	-	1.00	-		-	-	-	-	-			
Lighting	CA Lighting - T12	15.0	-	1.00	-		-	-	-	-	-	-	-	-
Shell	Insulation	20.0	51,817	1.00	1,004,018		51,817	51,817	51,817	51,817	51,817	51,817	51,817	51,817
Lighting	IU Lighting Specialty	10.0	-	1.00	-		-	-	-	-	-	-	-	-
Consumer Electronics	Advanced Power Strip	7.0	-	1.00	-		-	-	-	-	-	-	-	
Hot Water	IU Electric Aerator	10.0	-	1.00	-		-	-	-	-	-	-	-	-
Shell	Air Sealing	20.0	61,991	1.00	1,239,825		61,991	61,991	61,991	61,991	61,991	61,991	61,991	61,991
HVAC	IU Thermostat**	9.5	4,174	1.00	36,866		4,174	4,174	4,174	4,174	4,174	4,174	4,174	4,174
HVAC	IU ECM Blower Replacement	15.0	-	1.00	-		-	-	-	-	-	-	-	-
Hot Water	IU Gas Showerhead	10.0	7,134	1.00	71,336		7,134	7,134	7,134	7,134	7,134	7,134	7,134	7,134
Hot Water	IU Electric Showerhead	10.0	-	1.00	-		-	-	-	-	-	-	-	-
Hot Water	IU Gas Aerator	10.0	4,822	1.00	48,220		4,822	4,822	4,822	4,822	4,822	4,822	4,822	4,822
HVAC	IU Central AC	18.0	-	1.00	-		-	-	-	-	-	-	-	-
Lighting	CA Lighting - Occ Sensor	8.0	-	1.00	-		-	-	-	-	-	-	-	-
Refrigeration	Vending Miser	5.0	-	1.00	-		-	-	-	-	-			
Appliances	IU Room AC	12.0	-	1.00	-		-	-	-	-	-	-	-	-
HVAC	CA Boiler	20.0	52,790	1.00	1,055,793		52,790	52,790	52,790	52,790	52,790	52,790	52,790	52,790
HVAC	CA Pipe Insulation	15.0	73,402	1.00	1,101,033		73,402	73,402	73,402	73,402	73,402	73,402	73,402	73,402
HVAC	Pipe Steam Averaging Controls	20.0	19,640	1.00	392,807		19,640	19,640	19,640	19,640	19,640	19,640	19,640	19,640
HVAC	IU Furnace	20.0	1,257	1.00	17,385		1,257	1,257	1,257	1,257	1,257	1,257	703	703
HVAC	Steam Trap	6.0	186,720	1.00	1,120,320		186,720	186,720	186,720	186,720	186,720	186,720		
HVAC	IU AC Cover and Gap Sealer	5.0	2,323	1.00	11,613		2,323	2,323	2,323	2,323	2,323			
Hot Water	IU DHW Boiler	13.0	101	1.00	1,220		101	101	101	101	91	91	91	91
Hot Water	CA DHW Boiler	15.0	3,264	1.00	41,930		3,264	3,264	3,264	3,264	3,264	2,561	2,561	2,561
HVAC	CA Boiler Reset Controls	20.0	2,700	1.00	53,992		2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700
HVAC	CA Boiler Tune Up	3.0	1,017	1.00	3,050		1,017	1,017	1,017					
CY2019 Program Total Gas Contribution to CPAS (Therms)			473,150		6,199,407		473,150	473,150	473,150	472,134	472,124	469,098	281,824	281,824
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡					181,704,610		13,868,040	13,868,040	13,868,040	13,838,245	13,837,955	13,749,262	8,260,273	8,260,273
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§						12,834,959	12,834,959	12,834,959	12,694,875	12,694,875	12,544,564	9,898,602	9,898,602	9,898,602
Program Total Gas CPAS (kWh Equivalent)‡						12,834,959	26,702,999	26,702,999	26,562,915	26,533,120	26,382,519	23,647,864	18,158,875	18,158,875
CY2019 Program Incremental Expiring Gas Savings (Therms)‖								-	-	1,017	10	3,026	187,274	-
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖								-	-	29,795	290	88,693	5,488,990	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§‖							-	-	140,085	-	150,310	2,645,963	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖							-	-	140,085	29,795	150,601	2,734,655	5,488,990	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	CA Lighting - CFL**	-	-	-	-	-	-	-					
Lighting	CA Lighting - Outdoor	-	-	-	-								
Lighting	CA Lighting - Incandescent**	-	-	-	-								
Lighting	CA Lighting - T8 24/7	-											
Lighting	CA Lighting - Specialty**	-	-	-	-	-	-	-					
HVAC	IU PTHP												
Appliances	IU Refrigerator	-	-	-	-	-	-	-	-	-			
Lighting	CA Lighting - T8	-	-	-	-	-	-	-					
Lighting	IU Lighting Incandescent	-	-										
Lighting	CA Lighting - T12 24/7												
Lighting	CA Lighting - Exit Sign												
Lighting	CA Lighting - T12	-	-	-	-	-	-	-					
Shell	Insulation	51,817	51,817	49,312	49,312	49,312	48,274	48,274	48,274	48,274	48,274	48,274	48,274
Lighting	IU Lighting Specialty	-	-										
Consumer Electronics	Advanced Power Strip												
Hot Water	IU Electric Aerator	-	-										
Shell	Air Sealing	61,991	61,991	61,991	61,991	61,991	61,991	61,991	61,991	61,991	61,991	61,991	61,991
HVAC	IU Thermostat**	1,157	1,157	1,157									
HVAC	IU ECM Blower Replacement	-	-	-	-	-	-	-					
Hot Water	IU Gas Showerhead	7,134	7,134					-					
Hot Water	IU Electric Showerhead	-	-										
Hot Water	IU Gas Aerator	4,822	4,822										
HVAC	IU Central AC	-	-	-	-	-	-	-	-	-	-		
Lighting	CA Lighting - Occ Sensor												
Refrigeration	Vending Miser												
Appliances	IU Room AC	-	-	-	-								
HVAC	CA Boiler	52,790	52,790	52,790	52,790	52,790	52,790	52,790	52,790	52,790	52,790	52,790	52,790
HVAC	CA Pipe Insulation	73,402	73,402	73,402	73,402	73,402	73,402	73,402					
HVAC	Pipe Steam Averaging Controls	19,640	19,640	19,640	19,640	19,640	19,640	19,640	19,640	19,640	19,640	19,640	19,640
HVAC	IU Furnace	703	703	703	703	703	703	703	703	703	703	703	703
HVAC	Steam Trap												
HVAC	IU AC Cover and Gap Sealer												
Hot Water	IU DHW Boiler	91	91	91	91	91							
Hot Water	CA DHW Boiler	2,561	2,561	2,561	2,561	2,561	2,561	2,561					
HVAC	CA Boiler Reset Controls	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700	2,700
HVAC	CA Boiler Tune Up												
CY2019 Program Total Gas Contribution to CPAS (Therms)		278,807	278,807	264,347	263,190	263,190	262,061	262,061	186,098	186,098	186,098	186,098	186,098
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		8,171,834	8,171,834	7,748,018	7,714,105	7,714,105	7,680,996	7,680,996	5,454,519	5,454,519	5,454,519	5,454,519	5,454,519
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§		9,615,847	8,232,966	8,232,966	8,232,966	8,232,966	8,232,966	4,322,666	4,322,666	4,322,666	4,322,666	4,322,666	2,042,538
Program Total Gas CPAS (kWh Equivalent)‡		17,787,681	16,404,800	15,980,984	15,947,071	15,947,071	15,913,962	12,003,662	9,777,185	9,777,185	9,777,185	9,777,185	7,497,057
CY2019 Program Incremental Expiring Gas Savings (Therms)‖		3,017	-	14,460	1,157	-	1,130	-	75,963	-	-	-	-
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖		88,439	-	423,816	33,913	-	33,109	-	2,226,477	-	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§‖		282,755	1,382,881	-	-	-	-	3,910,300	-	-	-	-	2,280,128
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖		371,194	1,382,881	423,816	33,913	-	33,109	3,910,300	2,226,477	-	-	-	2,280,128

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	CA Lighting - CFL**												
Lighting	CA Lighting - Outdoor												
Lighting	CA Lighting - Incandescent**												
Lighting	CA Lighting - T8 24/7												
Lighting	CA Lighting - Specialty**												
HVAC	IU PTHP												
Appliances	IU Refrigerator												
Lighting	CA Lighting - T8												
Lighting	IU Lighting Incandescent												
Lighting	CA Lighting - T12 24/7												
Lighting	CA Lighting - Exit Sign												
Lighting	CA Lighting - T12												
Shell	Insulation												
Lighting	IU Lighting Specialty												
Consumer Electronics	Advanced Power Strip												
Hot Water	IU Electric Aerator												
Shell	Air Sealing												
HVAC	IU Thermostat**												
HVAC	IU ECM Blower Replacement												
Hot Water	IU Gas Showerhead												
Hot Water	IU Electric Showerhead												
Hot Water	IU Gas Aerator												
HVAC	IU Central AC												
Lighting	CA Lighting - Occ Sensor												
Refrigeration	Vending Miser												
Appliances	IU Room AC												
HVAC	CA Boiler												
HVAC	CA Pipe Insulation												
HVAC	Pipe Steam Averaging Controls												
HVAC	IU Furnace												
HVAC	Steam Trap												
HVAC	IU AC Cover and Gap Sealer												
Hot Water	IU DHW Boiler												
Hot Water	CA DHW Boiler												
HVAC	CA Boiler Reset Controls												
HVAC	CA Boiler Tune Up												
CY2019 Program Total Gas Contribution to CPAS (Therms)		-	-	-	-	-	-	-	-	-	-	-	-
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		-	-	-	-	-	-	-	-	-	-	-	-
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§		2,042,538	2,042,538	2,042,538	2,042,538	-	-	-	-	-	-	-	-
Program Total Gas CPAS (kWh Equivalent)‡		2,042,538	2,042,538	2,042,538	2,042,538	-	-	-	-	-	-	-	-
CY2019 Program Incremental Expiring Gas Savings (Therms)||		186,098	-	-	-	-	-	-	-	-	-	-	-
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡||		5,454,519	-	-	-	-	-	-	-	-	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§||		-	-	-	-	2,042,538	-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡||		5,454,519	-	-	-	2,042,538	-	-	-	-	-	-	-

Note: The green highlighted cell shows program total first year gas savings in kWh equivalents. The gray cells are blank, indicating no values or do not contribute to calculating CPAS in CY2019.

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

† 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.

|| Expiring savings are equal to CPAS Yn-1 - CPAS Y_n.

**The EUL for this measure is weighted average of the measures that were combined together.

Source: Evaluation team analysis

Table 2-5. Cumulative Persisting Annual Savings (CPAS) – Total

End Use Type	Research Category	EUL	CY2019 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	CA Lighting - CFL**	5.9	508,520	1.00	2,903,286		508,520	508,520	508,520	508,520	508,520	360,683		
Lighting	CA Lighting - Outdoor	11.6	482,413	1.00	5,605,548		482,413	482,413	482,413	482,413	482,413	482,413	482,413	482,413
Lighting	CA Lighting - Incandescent**	8.5	414,166	1.00	1,849,838		414,166	414,166	159,327	159,327	159,327	159,327	159,327	159,327
Lighting	CA Lighting - T8 24/7	5.7	393,621	1.00	2,245,159		393,621	393,621	393,621	393,621	393,621	277,053		
Lighting	CA Lighting - Specialty**	7.2	311,978	1.00	1,629,448		311,978	311,978	311,978	311,978	311,978	50,354	9,603	9,603
HVAC	IU PTHP	8.0	280,004	1.00	1,263,341		280,004	280,004	280,004	84,666	84,666	84,666	84,666	84,666
Appliances	IU Refrigerator	17.0	210,737	1.00	1,565,952		210,737	210,737	210,737	210,737	210,737	210,737	27,412	27,412
Lighting	CA Lighting - T8	15.0	239,033	1.00	3,585,497		239,033	239,033	239,033	239,033	239,033	239,033	239,033	239,033
Lighting	IU Lighting Incandescent	10.0	196,511	1.00	892,000		196,511	196,511	62,372	62,372	62,372	62,372	62,372	62,372
Lighting	CA Lighting - T12 24/7	5.7	236,023	1.00	945,412		236,023	225,618	130,613	130,613	130,613	91,933		
Lighting	CA Lighting - Exit Sign	5.0	137,535	1.00	687,674		137,535	137,535	137,535	137,535	137,535			
Lighting	CA Lighting - T12	15.0	125,305	1.00	1,309,485		125,305	125,305	125,305	125,305	125,305	68,296	68,296	68,296
Shell	Insulation	20.0	1,615,623	1.00	31,311,050		1,615,623	1,615,623	1,615,623	1,615,623	1,615,623	1,615,623	1,615,623	1,615,623
Lighting	IU Lighting Specialty	10.0	43,287	1.00	251,510		43,287	43,287	43,287	43,287	43,287	7,015	7,015	7,015
Consumer Electronic	Advanced Power Strip	7.0	34,552	1.00	241,862		34,552	34,552	34,552	34,552	34,552	34,552	34,552	
Hot Water	IU Electric Aerator	10.0	19,945	1.00	199,445		19,945	19,945	19,945	19,945	19,945	19,945	19,945	19,945
Shell	Air Sealing	20.0	1,826,523	1.00	36,530,458		1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523
HVAC	IU Thermostat**	9.5	131,672	1.00	1,130,750		131,672	131,672	131,672	131,672	131,672	131,672	131,672	131,672
HVAC	IU ECM Blower Replacement	15.0	7,488	1.00	112,320		7,488	7,488	7,488	7,488	7,488	7,488	7,488	7,488
Hot Water	IU Gas Showerhead	10.0	215,217	1.00	2,152,166		215,217	215,217	215,217	215,217	215,217	215,217	215,217	215,217
Hot Water	IU Electric Showerhead	10.0	5,885	1.00	58,849		5,885	5,885	5,885	5,885	5,885	5,885	5,885	5,885
Hot Water	IU Gas Aerator	10.0	146,659	1.00	1,466,594		146,659	146,659	146,659	146,659	146,659	146,659	146,659	146,659
HVAC	IU Central AC	18.0	2,975	1.00	35,310		2,975	2,975	2,975	2,975	2,975	2,975	1,455	1,455
Lighting	CA Lighting - Occ Sensor	8.0	2,757	1.00	22,058		2,757	2,757	2,757	2,757	2,757	2,757	2,757	2,757
Refrigeration	Vending Miser	5.0	1,613	1.00	8,065		1,613	1,613	1,613	1,613	1,613			
Appliances	IU Room AC	12.0	398	1.00	4,012		398	398	398	398	303	303	303	303
HVAC	CA Boiler	20.0	1,547,265	1.00	30,945,297		1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265
HVAC	CA Pipe Insulation	15.0	2,151,418	1.00	32,271,271		2,151,418	2,151,418	2,151,418	2,151,418	2,151,418	2,151,418	2,151,418	2,151,418
HVAC	Pipe Steam Averaging Controls	20.0	575,659	1.00	11,513,171		575,659	575,659	575,659	575,659	575,659	575,659	575,659	575,659
HVAC	IU Furnace	20.0	36,836	1.00	509,542		36,836	36,836	36,836	36,836	36,836	36,836	20,609	20,609
HVAC	Steam Trap	6.0	5,472,762	1.00	32,836,571		5,472,762	5,472,762	5,472,762	5,472,762	5,472,762	5,472,762		
HVAC	IU AC Cover and Gap Sealer	5.0	68,076	1.00	340,382		68,076	68,076	68,076	68,076	68,076			
Hot Water	IU DHW Boiler	13.0	2,951	1.00	35,745		2,951	2,951	2,951	2,951	2,660	2,660	2,660	2,660
Hot Water	CA DHW Boiler	15.0	95,676	1.00	1,228,974		95,676	95,676	95,676	95,676	95,676	75,059	75,059	75,059
HVAC	CA Boiler Reset Controls	20.0	79,125	1.00	1,582,502		79,125	79,125	79,125	79,125	79,125	79,125	79,125	79,125
HVAC	CA Boiler Tune Up	3.0	29,795	1.00	89,384		29,795	29,795	29,795					
CY2019 Program Total Contribution to CPAS			17,650,002		209,359,928		17,650,002	17,639,596	17,155,614	16,930,482	16,930,096	16,044,266	9,600,011	9,565,460
Historic Program Total Contribution to CPAS‡						16,659,024	16,403,290	16,403,290	16,108,900	16,097,057	15,554,206	12,382,181	12,334,080	11,760,139
Program Total CPAS						16,659,024	34,053,292	34,042,887	33,264,515	33,027,539	32,484,302	28,426,447	21,934,091	21,325,599
CY2019 Program Incremental Expiring Savings§								10,406	483,982	225,132	386	885,831	6,444,255	34,552
Historic Program Incremental Expiring Savings‡§							255,734	-	294,390	11,844	542,851	3,172,025	48,101	573,941
Program Total Incremental Expiring Savings§							255,734	10,406	778,372	236,976	543,237	4,057,855	6,492,356	608,492

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	CA Lighting - CFL**												
Lighting	CA Lighting - Outdoor	482,413	482,413	482,413	299,000								
Lighting	CA Lighting - Incandescent**	65,544											
Lighting	CA Lighting - T8 24/7												
Lighting	CA Lighting - Specialty**												
HVAC	IU PTHP												
Appliances	IU Refrigerator	27,412	27,412	27,412	27,412	27,412	27,412	27,412	27,412	27,412			
Lighting	CA Lighting - T8	239,033	239,033	239,033	239,033	239,033	239,033	239,033					
Lighting	IU Lighting Incandescent	62,372	62,372										
Lighting	CA Lighting - T12 24/7												
Lighting	CA Lighting - Exit Sign												
Lighting	CA Lighting - T12	68,296	68,296	68,296	68,296	68,296	68,296	68,296					
Shell	Insulation	1,615,623	1,615,623	1,536,795	1,536,795	1,536,795	1,506,347	1,506,347	1,506,347	1,506,347	1,506,347	1,506,347	1,506,347
Lighting	IU Lighting Specialty	7,015	7,015										
Consumer Electronic	Advanced Power Strip												
Hot Water	IU Electric Aerator	19,945	19,945										
Shell	Air Sealing	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523	1,826,523
HVAC	IU Thermostat**	38,687	38,687										
HVAC	IU ECM Blower Replacement	7,488	7,488	7,488	7,488	7,488	7,488	7,488					
Hot Water	IU Gas Showerhead	215,217	215,217										
Hot Water	IU Electric Showerhead	5,885	5,885										
Hot Water	IU Gas Aerator	146,659	146,659										
HVAC	IU Central AC	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455	1,455		
Lighting	CA Lighting - Occ Sensor												
Refrigeration	Vending Miser												
Appliances	IU Room AC	303	303	303	303								
HVAC	CA Boiler	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265	1,547,265
HVAC	CA Pipe Insulation	2,151,418	2,151,418	2,151,418	2,151,418	2,151,418	2,151,418	2,151,418					
HVAC	Pipe Steam Averaging Controls	575,659	575,659	575,659	575,659	575,659	575,659	575,659	575,659	575,659	575,659	575,659	575,659
HVAC	IU Furnace	20,609	20,609	20,609	20,609	20,609	20,609	20,609	20,609	20,609	20,609	20,609	20,609
HVAC	Steam Trap												
HVAC	IU AC Cover and Gap Sealer												
Hot Water	IU DHW Boiler	2,660	2,660	2,660	2,660	2,660							
Hot Water	CA DHW Boiler	75,059	75,059	75,059	75,059	75,059	75,059	75,059					
HVAC	CA Boiler Reset Controls	79,125	79,125	79,125	79,125	79,125	79,125	79,125	79,125	79,125	79,125	79,125	79,125
HVAC	CA Boiler Tune Up												
CY2019 Program Total Contribution to CPAS		9,281,666	9,216,121	8,641,513	8,458,100	8,158,797	8,125,689	8,125,689	5,584,394	5,584,394	5,556,982	5,555,527	5,555,527
Historic Program Total Contribution to CPAS‡		11,353,105	9,482,135	9,401,145	9,389,079	9,389,079	9,389,079	4,785,612	4,569,878	4,569,878	4,565,814	4,565,814	2,266,654
Program Total CPAS		20,634,771	18,698,256	18,042,658	17,847,179	17,547,877	17,514,768	12,911,301	10,154,272	10,154,272	10,122,796	10,121,342	7,822,182
CY2019 Program Incremental Expiring Savings§		283,794	65,544	574,608	183,414	299,302	33,109	-	2,541,295	-	27,412	1,455	-
Historic Program Incremental Expiring Savings‡§		407,034	1,870,970	80,990	12,065	-	-	4,603,468	215,734	-	4,064	-	2,299,160
Program Total Incremental Expiring Savings§		690,828	1,936,514	655,598	195,479	299,302	33,109	4,603,468	2,757,029	-	31,475	1,455	2,299,160

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	CA Lighting - CFL**												
Lighting	CA Lighting - Outdoor												
Lighting	CA Lighting - Incandescent**												
Lighting	CA Lighting - T8 24/7												
Lighting	CA Lighting - Specialty**												
HVAC	IU PTHP												
Appliances	IU Refrigerator												
Lighting	CA Lighting - T8												
Lighting	IU Lighting Incandescent												
Lighting	CA Lighting - T12 24/7												
Lighting	CA Lighting - Exit Sign												
Lighting	CA Lighting - T12												
Shell	Insulation												
Lighting	IU Lighting Specialty												
Consumer Electronic	Advanced Power Strip												
Hot Water	IU Electric Aerator												
Shell	Air Sealing												
HVAC	IU Thermostat**												
HVAC	IU ECM Blower Replacement												
Hot Water	IU Gas Showerhead												
Hot Water	IU Electric Showerhead												
Hot Water	IU Gas Aerator												
HVAC	IU Central AC												
Lighting	CA Lighting - Occ Sensor												
Refrigeration	Vending Miser												
Appliances	IU Room AC												
HVAC	CA Boiler												
HVAC	CA Pipe Insulation												
HVAC	Pipe Steam Averaging Controls												
HVAC	IU Furnace												
HVAC	Steam Trap												
HVAC	IU AC Cover and Gap Sealer												
Hot Water	IU DHW Boiler												
Hot Water	CA DHW Boiler												
HVAC	CA Boiler Reset Controls												
HVAC	CA Boiler Tune Up												
CY2019 Program Total Contribution to CPAS		-	-	-	-	-	-	-	-	-	-	-	-
Historic Program Total Contribution to CPAS‡		2,266,654	2,266,654	2,266,654	2,266,654	-	-	-	-	-	-	-	-
Program Total CPAS		2,266,654	2,266,654	2,266,654	2,266,654	-	-	-	-	-	-	-	-
CY2019 Program Incremental Expiring Savings§		5,555,527	-	-	-	-	-	-	-	-	-	-	-
Historic Program Incremental Expiring Savings‡§		-	-	-	-	2,266,654	-	-	-	-	-	-	-
Program Total Incremental Expiring Savings§		5,555,527	-	-	-	2,266,654	-	-	-	-	-	-	-

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 do not contribute to calculating CPAS in CY2019.

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

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

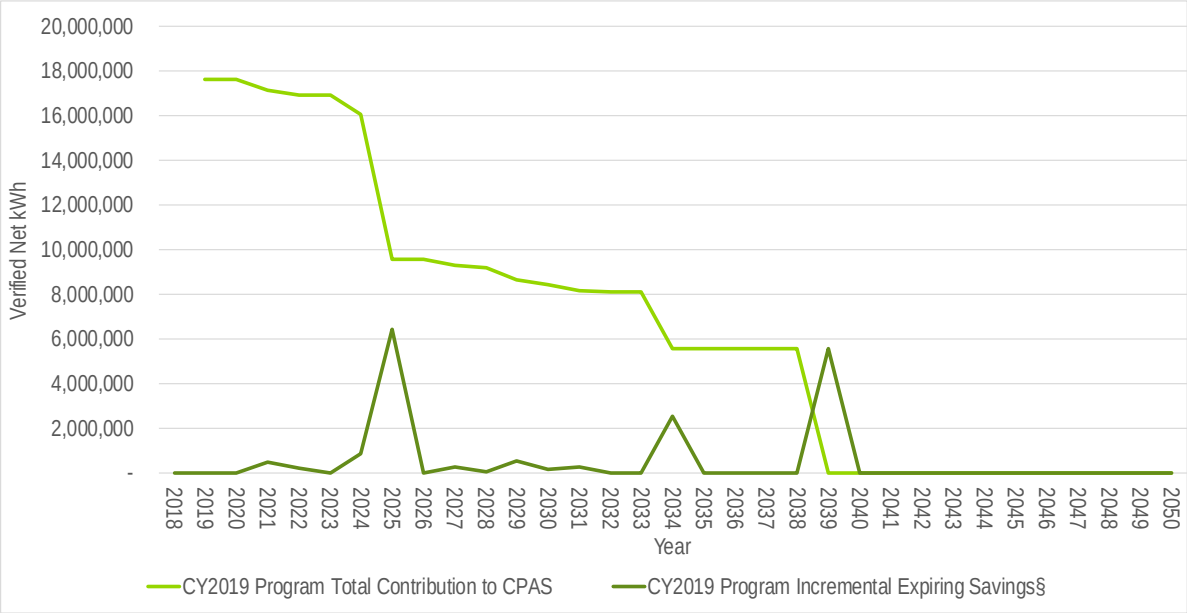
‡ Historic savings go back to CY2018.

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

**The EUL for this measure is weighted average of the measures that were combined together.

Source: Evaluation team analysis

Figure 2-2. Cumulative Persisting Annual Savings



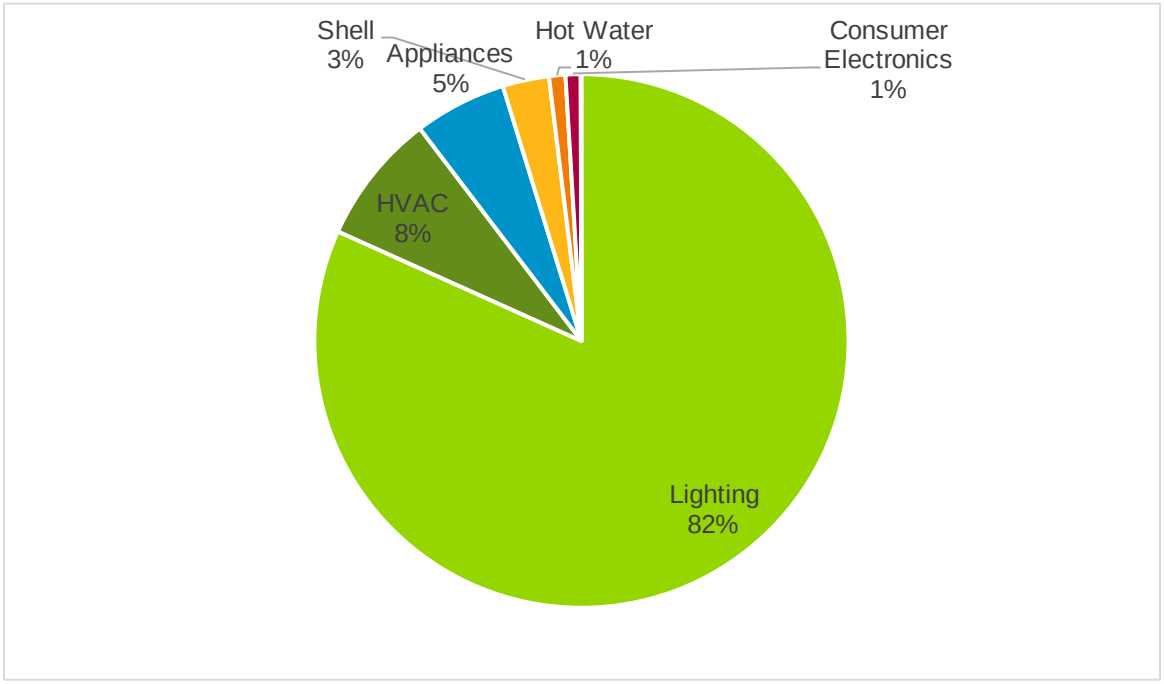
§ Expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n
Source: Evaluation team analysis

2.4 Program Savings by Measure

The energy and demand savings for each measure installed as a part of the program are shown in Table 2-6 through Table 2-10.

The program includes 36 measures as shown in the following tables. The LED lighting measures contributed the most savings, representing 82% of the verified net kWh savings, followed by HVAC measures which represent 8% of the verified net kWh savings. Appliance, shell, hot water and consumer electronics measures represent the balance of the savings (see Figure 2-3).

Figure 2-3. Verified Net Savings by Measure – Electric



Source: ComEd tracking data and evaluation team analysis

Table 2-6. CY2019 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	CA Lighting - CFL	554,445	0.92	508,520	1.00	508,520	5.9
Lighting	CA Lighting - Outdoor	482,414	1.00	482,413	1.00	482,413	11.6
Lighting	CA Lighting - Incandescent	429,033	0.97	414,166	1.00	414,166	8.5
Lighting	CA Lighting - T8 24/7	503,444	0.78	393,621	1.00	393,621	5.7
Lighting	CA Lighting - Specialty	404,351	0.77	311,978	1.00	311,978	7.2
HVAC	IU PTHP	281,725	0.99	280,004	1.00	280,004	8.0
Appliances	IU Refrigerator	210,737	1.00	210,737	1.00	210,737	17.0
Lighting	CA Lighting - T8	333,365	0.72	239,033	1.00	239,033	15.0
Lighting	IU Lighting Incandescent	208,882	0.94	196,511	1.00	196,511	10.0
Lighting	CA Lighting - T12 24/7	218,521	1.08	236,023	1.00	236,023	5.7
Lighting	CA Lighting - Exit Sign	160,471	0.86	137,535	1.00	137,535	5.0
Lighting	CA Lighting - T12	209,768	0.60	125,305	1.00	125,305	15.0
Shell	Insulation	96,995	1.00	96,880	1.00	96,880	20.0
Lighting	IU Lighting Specialty	51,221	0.85	43,287	1.00	43,287	10.0
Consumer Electronics	Advanced Power Strip	34,552	1.00	34,552	1.00	34,552	7.0
Hot Water	IU Electric Aerator	20,052	0.99	19,945	1.00	19,945	10.0
Shell	Air Sealing	9,559	1.00	9,559	1.00	9,559	20.0
HVAC	IU Thermostat	9,321	1.00	9,320	1.00	9,320	9.5
HVAC	IU ECM Blower Replacement	7,488	1.00	7,488	1.00	7,488	15.0
Hot Water	IU Gas Showerhead	0	NA	6,130	1.00	6,130	10.0
Hot Water	IU Electric Showerhead	5,921	0.99	5,885	1.00	5,885	10.0
Hot Water	IU Gas Aerator	0	NA	5,327	1.00	5,327	10.0
HVAC	IU Central AC	3,492	0.85	2,975	1.00	2,975	18.0
Lighting	CA Lighting - Occ Sensor	2,950	0.93	2,757	1.00	2,757	8.0
Refrigeration	Vending Miser	1,613	1.00	1,613	1.00	1,613	5.0
Appliances	IU Room AC	391	1.02	398	1.00	398	12.0
HVAC	CA Boiler	0	NA	0	1.00	0	20.0
HVAC	CA Pipe Insulation	0	NA	0	1.00	0	15.0
HVAC	Pipe Steam Averaging Controls	0	NA	0	1.00	0	20.0
HVAC	IU Furnace	0	NA	0	1.00	0	20.0
HVAC	Steam Trap	0	NA	0	1.00	0	6.0
HVAC	IU AC Cover and Gap Sealer	0	NA	0	1.00	0	5.0
Hot Water	IU DHW Boiler	0	NA	0	1.00	0	13.0
Hot Water	CA DHW Boiler	0	NA	0	1.00	0	15.0
HVAC	CA Boiler Reset Controls	0	NA	0	1.00	0	20.0
HVAC	CA Boiler Tune Up	0	NA	0	1.00	0	3.0
	Total	4,240,711	0.89	3,781,962	1.00	3,781,962	NA

NA = Not applicable

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

Note: The savings in this table includes secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd.

Source: ComEd tracking data and evaluation team analysis

Table 2-7. CY2019 Non-Coincident Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Non-Coincident Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Non-Coincident Demand Reduction (kW)	NTG*	Verified Net Non-Coincident Demand Reduction (kW)
Lighting	CA Lighting - CFL	NR	NA	72.04	1.00	72.04
Lighting	CA Lighting - Outdoor	NR	NA	0.00	1.00	0.00
Lighting	CA Lighting - Incandescent	NR	NA	85.31	1.00	85.31
Lighting	CA Lighting - T8 24/7	NR	NA	61.68	1.00	61.68
Lighting	CA Lighting - Specialty	NR	NA	52.75	1.00	52.75
HVAC	IU PTHP	NR	NA	19.59	1.00	19.59
Appliances	IU Refrigerator	NR	NA	24.04	1.00	24.04
Lighting	CA Lighting - T8	NR	NA	91.10	1.00	91.10
Lighting	IU Lighting Incandescent	NR	NA	197.35	1.00	197.35
Lighting	CA Lighting - T12 24/7	NR	NA	35.74	1.00	35.74
Lighting	CA Lighting - Exit Sign	NR	NA	21.03	1.00	21.03
Lighting	CA Lighting - T12	NR	NA	53.07	1.00	53.07
Shell	Insulation	NR	NA	84.75	1.00	84.75
Lighting	IU Lighting Specialty	NR	NA	69.07	1.00	69.07
Consumer Electronics	Advanced Power Strip	NR	NA	4.21	1.00	4.21
Hot Water	IU Electric Aerator	NR	NA	232.47	1.00	232.47
Shell	Air Sealing	NR	NA	0.00	1.00	0.00
HVAC	IU Thermostat	NR	NA	6.87	1.00	6.87
HVAC	IU ECM Blower Replacement	NR	NA	0.00	1.00	0.00
Hot Water	IU Gas Showerhead	NR	NA	0.00	1.00	0.00
Hot Water	IU Electric Showerhead	NR	NA	27.30	1.00	27.30
Hot Water	IU Gas Aerator	NR	NA	0.00	1.00	0.00
HVAC	IU Central AC	NR	NA	5.02	1.00	5.02
Lighting	CA Lighting - Occ Sensor	NR	NA	2.18	1.00	2.18
Refrigeration	Vending Miser	NR	NA	0.00	1.00	0.00
Appliances	IU Room AC	NR	NA	1.88	1.00	1.88
HVAC	CA Boiler	NR	NA	0.00	1.00	0.00
HVAC	CA Pipe Insulation	NR	NA	0.00	1.00	0.00
HVAC	Pipe Steam Averaging Controls	NR	NA	0.00	1.00	0.00
HVAC	IU Furnace	NR	NA	0.00	1.00	0.00
HVAC	Steam Trap	NR	NA	0.00	1.00	0.00
HVAC	IU AC Cover and Gap Sealer	NR	NA	0.00	1.00	0.00
Hot Water	IU DHW Boiler	NR	NA	0.00	1.00	0.00
Hot Water	CA DHW Boiler	NR	NA	0.00	1.00	0.00
HVAC	CA Boiler Reset Controls	NR	NA	0.00	1.00	0.00
HVAC	CA Boiler Tune Up	NR	NA	0.00	1.00	0.00
	Total	NR	NA	1,147.44	1.00	1,147.44

NR = Not reported
NA = Not applicable
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
Source: ComEd tracking data and evaluation team analysis

Table 2-8. CY2019 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	CA Lighting - CFL	79.15	0.91	71.76	1.00	71.76
Lighting	CA Lighting - Outdoor	0.00	NA	0.00	1.00	0.00
Lighting	CA Lighting - Incandescent	72.80	1.05	76.78	1.00	76.78
Lighting	CA Lighting - T8 24/7	71.79	0.86	61.68	1.00	61.68
Lighting	CA Lighting - Specialty	59.04	0.86	50.86	1.00	50.86
HVAC	IU PTHP	17.88	0.52	9.36	1.00	9.36
Appliances	IU Refrigerator	31.76	1.00	31.76	1.00	31.76
Lighting	CA Lighting - T8	65.51	1.25	81.99	1.00	81.99
Lighting	IU Lighting Incandescent	25.26	1.00	25.26	1.00	25.26
Lighting	CA Lighting - T12 24/7	31.16	1.15	35.74	1.00	35.74
Lighting	CA Lighting - Exit Sign	22.88	0.92	21.03	1.00	21.03
Lighting	CA Lighting - T12	40.98	1.17	47.77	1.00	47.77
Shell	Insulation	58.10	0.68	39.49	1.00	39.49
Lighting	IU Lighting Specialty	7.53	1.00	7.53	1.00	7.53
Consumer Electronics	Advanced Power Strip	3.37	1.00	3.37	1.00	3.37
Hot Water	IU Electric Aerator	5.11	1.00	5.11	1.00	5.11
Shell	Air Sealing	0.00	NA	0.00	1.00	0.00
HVAC	IU Thermostat	2.34	0.69	1.60	1.00	1.60
HVAC	IU ECM Blower Replacement	0.47	0.69	0.32	1.00	0.32
Hot Water	IU Gas Showerhead	0.00	NA	0.00	1.00	0.00
Hot Water	IU Electric Showerhead	0.76	1.00	0.76	1.00	0.76
Hot Water	IU Gas Aerator	0.00	NA	0.00	1.00	0.00
HVAC	IU Central AC	4.28	0.55	2.34	1.00	2.34
Lighting	CA Lighting - Occ Sensor	1.97	0.82	1.62	1.00	1.62
Refrigeration	Vending Miser	0.00	NA	0.00	1.00	0.00
Appliances	IU Room AC	0.60	0.94	0.56	1.00	0.56
HVAC	CA Boiler	0.00	NA	0.00	1.00	0.00
HVAC	CA Pipe Insulation	0.00	NA	0.00	1.00	0.00
HVAC	Pipe Steam Averaging Controls	0.00	NA	0.00	1.00	0.00
HVAC	IU Furnace	0.00	NA	0.00	1.00	0.00
HVAC	Steam Trap	0.00	NA	0.00	1.00	0.00
HVAC	IU AC Cover and Gap Sealer	0.00	NA	0.00	1.00	0.00
Hot Water	IU DHW Boiler	0.00	NA	0.00	1.00	0.00
Hot Water	CA DHW Boiler	0.00	NA	0.00	1.00	0.00
HVAC	CA Boiler Reset Controls	0.00	NA	0.00	1.00	0.00
HVAC	CA Boiler Tune Up	0.00	NA	0.00	1.00	0.00
	Total	602.74	0.96	576.72	1.00	576.72

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

Source: ComEd tracking data and evaluation team analysis

Table 2-9. CY2019 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	CA Lighting - CFL	0	NA	0	1.00	0	5.9
Lighting	CA Lighting - Outdoor	0	NA	0	1.00	0	11.6
Lighting	CA Lighting - Incandescent	0	NA	0	1.00	0	8.5
Lighting	CA Lighting - T8 24/7	0	NA	0	1.00	0	5.7
Lighting	CA Lighting - Specialty	0	NA	0	1.00	0	7.2
HVAC	IU PTHP	0	NA	0	1.00	0	8.0
Appliances	IU Refrigerator	0	NA	0	1.00	0	17.0
Lighting	CA Lighting - T8	0	NA	0	1.00	0	15.0
Lighting	IU Lighting Incandescent	0	NA	0	1.00	0	10.0
Lighting	CA Lighting - T12 24/7	0	NA	0	1.00	0	5.7
Lighting	CA Lighting - Exit Sign	0	NA	0	1.00	0	5.0
Lighting	CA Lighting - T12	0	NA	0	1.00	0	15.0
Shell	Insulation	51,863	1.00	51,817	1.00	51,817	20.0
Lighting	IU Lighting Specialty	0	NA	0	1.00	0	10.0
Consumer Electronics	Advanced Power Strip	0	NA	0	1.00	0	7.0
Hot Water	IU Electric Aerator	0	NA	0	1.00	0	10.0
Shell	Air Sealing	61,991	1.00	61,991	1.00	61,991	20.0
HVAC	IU Thermostat	4,174	1.00	4,174	1.00	4,174	9.5
HVAC	IU ECM Blower Replacement	0	NA	0	1.00	0	15.0
Hot Water	IU Gas Showerhead	7,134	1.00	7,134	1.00	7,134	10.0
Hot Water	IU Electric Showerhead	0	NA	0	1.00	0	10.0
Hot Water	IU Gas Aerator	4,822	1.00	4,822	1.00	4,822	10.0
HVAC	IU Central AC	0	NA	0	1.00	0	18.0
Lighting	CA Lighting - Occ Sensor	0	NA	0	1.00	0	8.0
Refrigeration	Vending Miser	0	NA	0	1.00	0	5.0
Appliances	IU Room AC	0	NA	0	1.00	0	12.0
HVAC	CA Boiler	49,796	1.06	52,790	1.00	52,790	20.0
HVAC	CA Pipe Insulation	73,411	1.00	73,402	1.00	73,402	15.0
HVAC	Pipe Steam Averaging Controls	19,640	1.00	19,640	1.00	19,640	20.0
HVAC	IU Furnace	1,612	0.78	1,257	1.00	1,257	20.0
HVAC	Steam Trap	186,720	1.00	186,720	1.00	186,720	6.0
HVAC	IU AC Cover and Gap Sealer	2,454	0.95	2,323	1.00	2,323	5.0
Hot Water	IU DHW Boiler	96	1.05	101	1.00	101	13.0
Hot Water	CA DHW Boiler	3,264	1.00	3,264	1.00	3,264	15.0
HVAC	CA Boiler Reset Controls	2,700	1.00	2,700	1.00	2,700	20.0
HVAC	CA Boiler Tune Up	1,017	1.00	1,017	1.00	1,017	3.0
	Total Therms	470,693	1.01	473,150	1.00	473,150	NA
	Total kWh Converted From Therms†	13,796,013	1.01	13,868,040	1.00	13,868,040	NA

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
† Gas savings converted to kWh by multiplying therms * 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh).
Source: ComEd tracking data and evaluation team analysis

Table 2-10. CY2019 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	CA Lighting - CFL	554,445	0.92	508,520	1.00	508,520
Lighting	CA Lighting - Outdoor	482,414	1.00	482,413	1.00	482,413
Lighting	CA Lighting - Incandescent	429,033	0.97	414,166	1.00	414,166
Lighting	CA Lighting - T8 24/7	503,444	0.78	393,621	1.00	393,621
Lighting	CA Lighting - Specialty	404,351	0.77	311,978	1.00	311,978
HVAC	IU PTHP	281,725	0.99	280,004	1.00	280,004
Appliances	IU Refrigerator	210,737	1.00	210,737	1.00	210,737
Lighting	CA Lighting - T8	333,365	0.72	239,033	1.00	239,033
Lighting	IU Lighting Incandescent	208,882	0.94	196,511	1.00	196,511
Lighting	CA Lighting - T12 24/7	218,521	1.08	236,023	1.00	236,023
Lighting	CA Lighting - Exit Sign	160,471	0.86	137,535	1.00	137,535
Lighting	CA Lighting - T12	209,768	0.60	125,305	1.00	125,305
Shell	Insulation	1,617,092	1.00	1,615,623	1.00	1,615,623
Lighting	IU Lighting Specialty	51,221	0.85	43,287	1.00	43,287
Consumer Electronics	Advanced Power Strip	34,552	1.00	34,552	1.00	34,552
Hot Water	IU Electric Aerator	20,052	0.99	19,945	1.00	19,945
Shell	Air Sealing	1,826,523	1.00	1,826,523	1.00	1,826,523
HVAC	IU Thermostat	131,673	1.00	131,672	1.00	131,672
HVAC	IU ECM Blower Replacement	7,488	1.00	7,488	1.00	7,488
Hot Water	IU Gas Showerhead	209,084	1.03	215,217	1.00	215,217
Hot Water	IU Electric Showerhead	5,921	0.99	5,885	1.00	5,885
Hot Water	IU Gas Aerator	141,332	1.04	146,659	1.00	146,659
HVAC	IU Central AC	3,492	0.85	2,975	1.00	2,975
Lighting	CA Lighting - Occ Sensor	2,950	0.93	2,757	1.00	2,757
Refrigeration	Vending Miser	1,613	1.00	1,613	1.00	1,613
Appliances	IU Room AC	391	1.02	398	1.00	398
HVAC	CA Boiler	1,459,509	1.06	1,547,265	1.00	1,547,265
HVAC	CA Pipe Insulation	2,151,664	1.00	2,151,418	1.00	2,151,418
HVAC	Pipe Steam Averaging Controls	575,659	1.00	575,659	1.00	575,659
HVAC	IU Furnace	47,254	0.78	36,836	1.00	36,836
HVAC	Steam Trap	5,472,762	1.00	5,472,762	1.00	5,472,762
HVAC	IU AC Cover and Gap Sealer	71,921	0.95	68,076	1.00	68,076
Hot Water	IU DHW Boiler	2,819	1.05	2,951	1.00	2,951
Hot Water	CA DHW Boiler	95,676	1.00	95,676	1.00	95,676
HVAC	CA Boiler Reset Controls	79,125	1.00	79,125	1.00	79,125
HVAC	CA Boiler Tune Up	29,795	1.00	29,795	1.00	29,795
	Total†	18,036,724	0.98	17,650,002	1.00	17,650,002

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
† The total includes the electric equivalent of the total therms.
Source: ComEd tracking data and evaluation team analysis

The Multi-Family Retrofits program includes measures that save water. That reduction in water produces secondary kWh savings from water supply and wastewater treatment. Table 2-11 shows the secondary

measure level savings. The savings in this table are included within the electricity savings in the previous tables in this section.

Table 2-11. Secondary Energy Savings from Water Reduction by Measure – Electric

End Use Type	Research Category	Ex Ante Annual Water Savings (gallons)	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate (RR_{water})	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Lighting	CA Lighting - CFL	0	NR	NA	0	1.00	0
Lighting	CA Lighting - Outdoor	0	NR	NA	0	1.00	0
Lighting	CA Lighting - Incandescent	0	NR	NA	0	1.00	0
Lighting	CA Lighting - T8 24/7	0	NR	NA	0	1.00	0
Lighting	CA Lighting - Specialty	0	NR	NA	0	1.00	0
HVAC	IU PTHP	0	NR	NA	0	1.00	0
Appliances	IU Refrigerator	0	NR	NA	0	1.00	0
Lighting	CA Lighting - T8	0	NR	NA	0	1.00	0
Lighting	IU Lighting Incandescent	0	NR	NA	0	1.00	0
Lighting	CA Lighting - T12 24/7	0	NR	NA	0	1.00	0
Lighting	CA Lighting - Exit Sign	0	NR	NA	0	1.00	0
Lighting	CA Lighting - T12	0	NR	NA	0	1.00	0
Shell	Insulation	0	NR	NA	0	1.00	0
Lighting	IU Lighting Specialty	0	NR	NA	0	1.00	0
Consumer Electronics	Advanced Power Strip	0	NR	NA	0	1.00	0
Hot Water	IU Electric Aerator	197,118	988	0.89	880	1.00	880
Shell	Air Sealing	0	NR	NA	0	1.00	0
HVAC	IU Thermostat	0	NR	NA	0	1.00	0
HVAC	IU ECM Blower Replacement	0	NR	NA	0	1.00	0
Hot Water	IU Gas Showerhead	2,046,011	NR	NA	6,130	1.00	6,130
Hot Water	IU Electric Showerhead	48,530	243	0.85	207	1.00	207
Hot Water	IU Gas Aerator	1,782,539	NR	NA	5,327	1.00	5,327
HVAC	IU Central AC	0	NR	NA	0	1.00	0
Lighting	CA Lighting - Occ Sensor	0	NR	NA	0	1.00	0
Refrigeration	Vending Miser	0	NR	NA	0	1.00	0
Appliances	IU Room AC	0	NR	NA	0	1.00	0
HVAC	CA Boiler	0	NR	NA	0	1.00	0
HVAC	CA Pipe Insulation	0	NR	NA	0	1.00	0
HVAC	Pipe Steam Averaging Controls	0	NR	NA	0	1.00	0
HVAC	IU Furnace	0	NR	NA	0	1.00	0
HVAC	Steam Trap	0	NR	NA	0	1.00	0
HVAC	IU AC Cover and Gap Sealer	0	NR	NA	0	1.00	0
Hot Water	IU DHW Boiler	0	NR	NA	0	1.00	0
Hot Water	CA DHW Boiler	0	NR	NA	0	1.00	0
HVAC	CA Boiler Reset Controls	0	NR	NA	0	1.00	0
HVAC	CA Boiler Tune Up	0	NR	NA	0	1.00	0
	Total	**4,074,198**	**1,231**	**10.19**	**12,544**	**1.00**	**12,544**

NR = Not reported
NA = Not applicable
Note: The savings in this table reflects only secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd, not those claimed by gas utilities.
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
Source: ComEd tracking data and evaluation team analysis

2.5 Impact Analysis Findings and Recommendations

2.5.1 Impact Parameter Estimates

Guidehouse used the savings algorithms and inputs deemed by the TRM v7.0 and TRM v7.0 Errata, where applicable, to calculate the energy and demand savings for each measure installed as a part of the program in CY2019. Table 2-12 lists all the inputs used to calculate the savings, along with its source.

The lifetime energy and demand savings are estimated by multiplying the verified savings by the effective useful life for each measure.

Table 2-12. Savings Parameters

Measure	Custom Input Parameters	Deemed Input Parameters	Deemed* Input Data Source
CA DHW Boiler	#Units, T_Out, Eff_Exist, Eff_EE, Input Rating, Tank Volume, SL	MFHH, GPD, Days/yr, Specific Weight of Water, T_In, Eff_Base, Hours/yr	TRM v7.0 Section 4.3.7
CA Hydronic Boiler / CA Steam Boiler	Capacity, Eff_actual	EFLH, Eff_Base	TRM v7.0 Section 4.4.10
IU PTHP	Capacity_Cool, EER_Exist, EER_EE, Capacity_Heat, COP_Exist, COP_EE	EER_Base, EFLH_Cool, COP_Base, EFLH_Heat, CF	TRM v7.0 Section 4.4.13
CA Pipe Insulation	Q_base, Q_eff	EFLH, TRF, Eff_Boiler	TRM v7.0 Section 4.4.14
Steam Trap Repair/Replace	S_a, B	Hv, Hours, L, B	TRM v7.0 Section 4.4.16
CA Boiler Tune-up	Capacity, Eff_Before, Eff_i	EFLH	TRM v7.0 Section 4.4.2
Pipe Steam Averaging Controls	Capacity	EFLH, SF	TRM v7.0 Section 4.4.36
IU AC Cover and Gap Sealer	Q_inf, Eff	T_OA, T_SA, EFLH	TRM v7.0 Section 4.4.38
CA Boiler Reset Controls	B_Input	SF, EFLH	TRM v7.0 Section 4.4.4
Occupancy Sensor	Watts_Controlled	ESF, Hours, WHF_E, WHF_D, CF_Baseline, CF_OS	TRM v7.0 Section 4.5.10
LED Lighting	Watts_Base, Watts_EE	Hours, WHF_E, WHF_D, CF, ISR	TRM v7.0 Section 4.5.4, 4.5.5, 5.5.6, and 5.5.8
Vending Miser	None	Watts_Base, Hours, ESF	TRM v7.0 Section 4.6.2
CA Advanced Power Strip	None	kW_wkday, kW_wkend, hrs_wkday, hrs_wkend, hrs_wkday-open, hrs_wkend-open, ISR, weeks/year	TRM v7.0 Section 4.8.7
IU Refrigerators	UEC_exist, UEC_base, UEC_ee	TSAF, LSAF, Hours	TRM v7.0 Section 5.1.6
IU Room AC	Capacity, CEER_ee, EER_exist	FLH, CEER_base, CF	TRM v7.0 Section 5.1.7
IU Advanced Power Strip	None	kWh, ISR, Hours, CF	TRM v7.0 Section 5.2.1

Measure	Custom Input Parameters	Deemed Input Parameters	Deemed* Input Data Source
IU Thermostat	None	% Fossil Heat, Gas Heating Consumption, Heating Reduction, HF, ISR, F_e, % AC, FLH, Capacity, SEER, Cooling Reduction, EER, CF	TRM v7.0 Section 5.3.11 and 5.3.16
IU Central AC	Capacity, SEER_EE, EER_EE, SEER_Exist, EER_Exist, SEER_Adj	FLH_Cool, SEER_Base, EER_Base, Derating Cool_Base, Derating Cool_Eff, CF	TRM v7.0 Section 5.3.3
IU ECM Blower Replacement	None	Cooling Capacity, kWh Savings Per Ton, kW Savings Per Ton	TRM v7.0 Section 5.3.5
IU Furnace	Heating Capacity, AFUE_Exist, AFUE_EE, Cooling Capacity	EFLH, AFUE_Base, Derating_Eff, Derating_Base, Heating kWh Savings, Cooling Capacity	TRM v7.0 Section 5.3.7
IU DHW Boiler	UEF_Exist, UEF_EE, Storage Capacity	UEF_Base, GPD, HF, Days/year, Specific Weight of Water, T_Out, T_In, Specific Heat of Water	TRM v7.0 Section 5.4.2
IU Aerator	None	%Electric_DHW, GPM_base, GPM_low, L_base, L_low, Household, DF, FPH, EPG_electric, ISR, Hours, %Fossil_DHW, EPG_gas, CF, Hours, E_Water Total	TRM v7.0 Section 5.4.4 and Errata
IU Showerhead	None	%Electric_DHW, GPM_base, GPM_low, L_Base, L_low, Household, SPCD, SPH, EPG_electric, ISR, %Fossil_DHW, EPG_gas, Hours, CF, E_Water Total	TRM v7.0 Section 5.4.5 and Errata
Air Sealing	N_sweep, LF_sealing, LF_wx	ΔTherms_sealing, ΔTherms_sweep, ΔTherms_wx, ADJ_RxAirsealing, ΔkWh_sealing, ΔkWh_sweep, ΔkWh_wx,	TRM v7.0 Section 5.6.1
Foundation Sidewall Insulation	R_new AG, L_wall Total, H_wall AG, R_old BG, R_new BG, H_wall Total	R_old AG, Framing Factor, HDD, Eff_heat, ADJ_heat, F_e, CDD, DUA, Eff_cool, ADJ_cool, FLH, CF	TRM v7.0 Section 5.6.2
Wall Insulation	R_old, R_wall, A_wall	Framing Factor, HDD, Eff_heat, ADJ_heat, F_e, ADJ_heat fan, CDD, DUA, Eff_cool, ADJ_cool, FLH, CF	TRM v7.0 Section 5.6.4
Attic Insulation	R_old, R_attic, A_attic, Eff_heat	Framing Factor, HDD, Eff_heat, ADJ_heat, F_e, ADJ_heat fan, CDD, DUA, Eff_cool, ADJ_cool, FLH, CF	TRM v7.0 Section 5.6.5

* TRM is the State of Illinois Technical Reference Manual version 7.0 from http://www.ilsag.info/technical-reference-manual.html. The NTG values can be found on the Ilinois SAG web site here: https://www.ilsag.info/ntg_2019.

2.5.2 Other Impact Findings and Recommendations

The evaluation team developed several recommendations based on findings from the CY2019 evaluation. The findings are separated by measure and are outlined in the following sections.

2.5.2.1 Electric Low Flow Faucet Aerators and Electric Low Flow Showerheads

Finding 1. The ex ante savings for these measures include secondary kWh savings for water supply and wastewater treatment. For measures installed in Cook County, the savings are calculated using the TRM v7.0 deemed Water Energy Factor for non-Cook County installs.

The evaluation team used the Cook County deemed Water Energy Factor while calculating the verified savings.

Recommendation 1. Guidehouse recommends using the Water Energy Factor corresponding to the County in which the measure is installed when calculating secondary kWh savings for these measures.

2.5.2.2 Gas Low Flow Faucet Aerators and Gas Low Flow Showerheads

Finding 2. The ex ante savings for these measures did not include secondary kWh savings for water supply and wastewater treatment. The evaluation team included the secondary kWh savings while calculating the verified energy savings for these measures.

Recommendation 2. Guidehouse recommends calculating secondary kWh savings for these measures since the secondary kWh savings are independent of the domestic hot water fuel.

2.5.2.3 ECM Blower Replacement, IU Central AC, Insulation, IU PTHP

Finding 3. The ex ante peak demand savings for these measures are calculated using the Summer System Peak (SSP) coincidence factor. The evaluation team calculated the verified peak demand savings using the PJM coincidence factor.

Recommendation 3. Guidehouse recommends using the PJM coincidence factor to calculate peak demand savings for this measure.

2.5.2.4 Common Area Pipe Insulation

Finding 4. The ex ante savings for these measures are calculated using the Heating Equivalent Full Load Hours (EFLH) corresponding to the Mid-Rise Multifamily building type. However, since the tracking data indicates that these measures are installed in High-Rise Multifamily buildings, the evaluation team calculated the verified savings using the corresponding EFLH values.

Recommendation 4. Guidehouse recommends using EFLH values corresponding to the building type in which the measures are installed when calculating savings for these measures as per Section 4.4.14 of the TRM v7.0.

2.5.2.5 Common Area Boiler

Finding 5. Incorrect baseline boiler efficiency values are used in the ex ante savings for 24 out of the 55 measures. The evaluation team calculated the verified savings using the updated baseline efficiency values for corresponding boiler types and capacities as deemed by the Section 4.4.10 of the TRM v7.0.

Recommendation 5. Guidehouse recommends using baseline boiler efficiency values of the corresponding boiler types and capacities as deemed by the Section 4.4.10 of the TRM v7.0.

Finding 6. Incorrect heating EFLH values are used in the ex ante savings for 8 out of the 55 measures. The evaluation team calculated the verified savings using heating EFLH values for the corresponding building types provided in the tracking data, as deemed by the Section 4.4.10 of the TRM v7.0.

Recommendation 6. Guidehouse recommends using heating EFLH values for the corresponding building types as deemed by the Section 4.4.10 of the TRM v7.0.

2.5.2.6 In Unit DHW Boiler

Finding 7. The ex ante savings for one measure were calculated using a custom tank temperature (T_out). However, Section 5.4.2 of the TRM v7.0 does not allow the use of custom tank temperature. The evaluation team calculated the verified savings using the TRM deemed tank temperature of 125°F.

Recommendation 7. Guidehouse recommends using the tank temperature value deemed in the Section 5.4.2 of the TRM v7.0.

2.5.2.7 In Unit Central AC

Finding 8. The ex ante savings for these measures assume quality installation is performed. The evaluation team calculated the verified savings with the assumption that "quality installation" is not performed or unknown since this information is not provided in the tracking data as per Section 5.3.3 of the TRM v7.0.

Recommendation 8. Guidehouse recommends using "quality installation is not performed" or "unknown" assumption when calculating savings for this measure if there is no documentation indicating that that quality installation was performed as per Section 5.3.3 of the TRM v7.0.

2.5.2.8 In Unit AC Cover

Finding 9. The ex ante savings for these measures are calculated using the Heating EFLH values corresponding to the Mid-Rise Multifamily building type. However, since the tracking data indicates that these measures are installed in High-Rise Multifamily buildings, the evaluation team calculated the verified savings using the corresponding EFLH values.

Recommendation 9. Guidehouse recommends using EFLH values corresponding to the building type in which the measures are installed when calculating savings for these measures as per Section 4.4.14 of the TRM v7.0.

2.5.2.9 Attic Insulation

Finding 10. The ex ante calculation claims both kWh and kW savings for Project ID 10005361, which has a Boiler heating system and Window cooling system. Section 5.6.5 of the TRM v7.0 does not deem any kWh and kW savings for projects installed at locations with window cooling systems.

Recommendation 10. Guidehouse recommends claiming kWh savings only for Gas Heat Attic Insulation measures with a Central cooling system and/or Furnace heating system and claiming kW savings only for measures with a Central cooling system as deemed in Section 5.6.5 of the TRM v7.0.

2.5.2.10 In Unit Packaged Terminal Heat Pumps

Finding 11. The ex ante savings for this measure for Project ID 10002672 are calculated using the heating EFLH and cooling EFLH values corresponding to the Multifamily – High Rise building type. The evaluation team calculated the verified savings using EFLH values corresponding to the Multifamily – High Rise – Residential building type based on the information provided in the tracking data.

Recommendation 11. Guidehouse recommends using EFLH values corresponding to the Multifamily – High Rise – Residential building type for IU PTHP measures installed in High Rise buildings as per Section 4.4.13 of the TRM v7.0.

2.5.2.11 In Unit Room AC

Finding 12. The ex ante kWh savings for this measure for Project ID 10003435 are calculated without converting the EER of the existing unit to CEER as deemed by Section 5.1.7 of the TRM v7.0.

Recommendation 12. Guidehouse recommends converting the EER value of the existing unit to CEER using (CEER = EER/1.01) when calculating energy savings for this measure as deemed by Section 5.1.7 of the TRM v7.0.

Finding 13. The ex ante kW savings for this measure for Project ID 10005616 are calculated without converting the baseline CEER to EER as deemed by Section 5.1.7 of the TRM v7.0.

Recommendation 13. Guidehouse recommends converting the baseline CEER value to EER using (EER = CEER*1.01) when calculating demand savings for this measure.

2.5.2.12 In Unit Furnace

Finding 14. The ex ante savings for these measures assume verified quality installation is performed. The evaluation team calculated the verified savings with the assumption that "quality installation is not performed" or "unknown" since this information is not provided in the tracking data as per Section 5.3.3 of the TRM v7.0.

Recommendation 14. Guidehouse recommends using the assumption that verified quality installation is not performed or unknown assumption when calculating savings for this measure if no supporting documentation is available.

Finding 15. For the project IDs 10002769, 10003117, and 10003258, the ex ante savings did not include heating penalty from the electronically commutated motor (ECM). The verified savings include this heating penalty calculated as per Section 5.3.5 of the TRM v7.0.

Recommendation 15. Guidehouse recommends including the heating penalty from ECM when calculating savings for this measure.

2.5.2.13 Basement Sidewall Insulation

Finding 16. The ex ante savings for this measure do not align with the input assumptions provided in the tracking data, shown in Table 2-14 below. The evaluation team wasn't able to resolve this issue with the additional information provided in Response 17 of the response memo produced by Elevate. Since this measure only accounts for 0.01% of the overall savings of the program the evaluation team will continue using the input assumptions provided with the 2019 tracking data to calculate the verified savings.

Recommendation 16. Guidehouse requests providing a detailed breakdown of the input assumptions and the algorithms used to calculate the ex ante savings in 2020.

Table 2-13 Tracking Data Inputs Assumptions for Basement Sidewall Insulation Measure

Parameter	Value
R Old AG	1
R Added Floor	13
L Wall Total	186.2
H Wall AG	4
R Old BG	7.42
R Added Basement Wall	13
H Wall Total	9
Framing Factor	0.25
HDD	3079
Eff Heat	0.72
ADJ Heat	0.6
Fe	0.0314
CDD	281
DUA	0.75
Eff Cool	13
ADJ Cool	0.8
FLH	506
CF	0.466

Source: ComEd tracking data and evaluation team analysis

2.5.2.14 LED Lighting

To account for the upcoming Energy Independence and Security Act (EISA) standards, Guidehouse calculated the CPAS numbers by applying a baseline shift to T12 replacement measures, LED Omnidirectional lamps and LED Specialty lamps. For Linear LEDs that replaced T12s, the baseline was shifted to a T8 after the remaining useful life of the T12 fixture calculated as 1/3 of the effective useful life and TRM v7.0 deemed baseline shifts were applied to LED Omnidirectional and LED specialty measure in 2021 and 2024 respectively.

Finding 17. For the Common Area LED Sconce measures, the ex ante savings are calculated using an In-Service Rate (ISR) of 100%. However, an ISR of 100% is only applicable if the application form included a sign off that equipment is not placed into storage. Since the LED Sconce measures are not listed in the application form, the ex post savings are calculated using an ISR of 82.5% as per Section 4.5.4 of the TRM v7.0.

Recommendation 17. Guidehouse recommends including the LED Sconce measures in the application form. Guidehouse also recommends using an ISR of 82.5% for measures that are not included in the application form as per Section 4.5.4 of the TRM v7.0.

Finding 18. The verified savings for all lighting measures installed in electrically heated buildings as per the tracking data include a kWh heating penalty calculated as per the TRM v7.0.

Recommendation 18. Guidehouse recommends accounting for the heating penalty while calculating the ex ante energy savings.

Finding 19. For all Common Area LED lighting measures, the ex ante savings for High Rise Multifamily buildings are calculated using the deemed input assumptions for Mid-Rise Multifamily buildings.

Recommendation 19. Guidehouse recommends using the building type specific annual operating hours, WHFe, WHFd and coincidence factor values when calculating savings for these measures as per Section 4.5.4 of the TRM v7.0.

Finding 20. For all Common Area LED lighting measures, the ex ante calculations are broken down into 24/7 Common Area and non-24/7 Common Area measures. The 24/7 Common Area measures use 8,766 annual operating hours and 1.0 as the coincidence factor, while the non-24/7 measure use the TRM deemed values of 5,216 and 0.82 for annual operating hours and coincidence factor respectively. However, these TRM deemed values are a blended mix of both 24/7 and non-24/7 spaces. By using the TRM values for just the non-24/7 lighting measures, the ex ante calculations overestimate the energy and demand savings. Guidehouse calculated the verified energy and demand savings using 3,252 as the annual operating hours and 0.9 as the coincidence factor for all non-24/7 CA lighting measures.

Recommendation 20. If the Common Area LED lighting measures are to be broken down as such, Guidehouse recommends using 3,242 as the annual operating hours and 0.9 as the coincidence factor for all non-24/7 lighting measures.

Finding 21. For all LED Exit Sign measures installed in High Rise Multifamily buildings, the ex ante savings are calculated using WHFe and WHFd values valid for a Mid-Rise Multifamily building type.

Recommendation 21. Guidehouse recommends using the building type specific WHFe and WHFd values when calculating savings for these measures as per Section 4.5.5 of the TRM v7.0.

Finding 22. For all LED Exit Sign measures, the ex ante savings are calculated using a Watts Base value calculated as the average of the Incandescent and CFL (single sided) baseline type from the Section 4.5.5 of the TRM v7.0.

Recommendation 22. Guidehouse recommends tracking the actual baseline type for these measures.

Finding 23. For all Occupancy Sensor measures installed in High Rise Multifamily buildings, the ex ante savings are calculated using the inputs assumptions deemed for Mid-Rise Multifamily buildings.

Recommendation 23. Guidehouse recommends using the building type specific annual operating hours, WHFe, WHFd and coincidence factor values when calculating savings for these measures as per Section 4.5.5 of the TRM v7.0.

Finding 24. For the following Common Area Lighting T12 and T8 measures, the ex ante savings are calculated using incorrect efficient fixture wattages as shown in Table 2-15 below.

Recommendation 24. Guidehouse recommends updating the efficient fixture wattages for these measures to use the TRM v7.0.

Table 2-14 Ex Ante vs Verified Watts Efficient for Common Area T12 and T8 lighting Measure

Lamp Type and Length	Ex Ante Wattage	Ex Ante Wattage Source	Ex Post Wattage	Ex Post Wattage Source
1L 2ft	8.09	Unknown	8.9	TRM v7.0 Vol 2 Page 434
2L 2ft	15.8	Assumed equivalent to a 1L 4ft	17.8 (8.9*2)	TRM v7.0 Vol 2 Page 434
1L 4ft	18.7	TRM v6.0 Page 370	15.8	TRM v7.0 Vol 2 Page 434
2L 2ft	19.4 (9.7*2)	TRM v6.0 Page 370	17.8 (8.9*2)	TRM v7.0 Vol 2 Page 434

Source: ComEd tracking data and evaluation team analysis

Finding 25. For the following Common Area Lighting T8 measures, the ex ante savings are calculated using incorrect baseline fixture wattages as shown in Table 2-16 below.

Recommendation 25. Guidehouse recommends updating the baseline fixture wattages for these measures to use the TRM v7.0.

Table 2-15 Ex Ante vs Verified Watts Baseline for Common Area T8 lighting Measure

Lamp Type and Length	Ex Ante Wattage	Ex Ante Wattage Source	Ex Post Wattage	Ex Post Wattage Source
1L 2ft T8	14.8	Unknown	14.96	TRM v7.0 Vol 2 Page 417
2L 2ft T8	28.2	Assumed equivalent to a 1L 4ft T8	29.92 (14.96*2)	TRM v7.0 Vol 2 Page 417
1L 3ft T8	20.24	Assumes RWT8 1L 3ft	22	TRM v7.0 Vol 2 Page 417
2L 2ft T8U	229	Unknown	56.32 (28.16*2)	TRM v7.0 Vol 2 Page 417

Source: ComEd tracking data and evaluation team analysis

Finding 26. For the following Common Area Lighting T12 measures, the ex ante savings are calculated using incorrect baseline fixture wattages as shown in Table 2-17 below.

Recommendation 26. Guidehouse recommends updating the baseline fixture wattages for these measures to use the TRM v7.0.

Table 2-16 Ex Ante vs Verified Watts Baseline for Common Area T12 lighting Measure

Lamp Type and Length	Ex Ante Wattage	Ex Ante Wattage Source	Ex Post Wattage	Ex Post Wattage Source
4L 4ft T12	154	Unknown	158 AVG (144,172)	TRM v7.0 Vol 2 Page 416
2L 2ft T12	28.2	Assumed to be same as 2L 2ft T8	44.09	Calculated assuming the same ratio between T8 and T12 Wattage as that for 1L 4ft lamps
1L 3ft T12	20.24	Assumed to be same as 1L 3ft T8	32.42	Calculated assuming the same ratio between T8 and T12 Wattage as that for 1L 4ft lamps
1L 2ft T12	14.8	Assumed to be same as 1L 2ft T8	22.05	Calculated assuming the same ratio between T8 and T12 Wattage as that for 1L 4ft lamps
2L 4ft T12 Shoplight	77 AVG(67,87)	TRM v7.0 Vol 2 Page 416	58	TRM v7.0 Vol 2 Page 434 (Since the efficient fixture is a LED Troffer)

Source: ComEd tracking data and evaluation team analysis

2.6 Appendix 1. Impact Analysis Methodology

Guidehouse determined verified gross savings for each program measure by:

1. Reviewing the savings algorithm inputs in the measure workbook for agreement with the TRM v7.0 and TRM Errata v7.0, where applicable.

2. Validating that the savings algorithm was applied correctly.
3. Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in Guidehouse's calculations if the workbook did not agree with the TRM.
4. Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

Guidehouse calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a net-to-gross (NTG) ratio. In CY2019, NTG estimates used to calculate the net verified savings were based on past evaluation research and defined by a consensus process through Illinois Stakeholder Advisory Group (SAG).

Guidehouse used the following documents to verify per-unit savings for each program measure:

- Final CY2019 tracking data: "MFIE_CY2019_EOY_Data_Rev2_02182020.xlsx"
- Illinois Technical Reference Manual (TRM v7.0) for deemed input parameters or secondary evaluation research to verify any custom inputs used in the ex ante calculations.
- Implementer Savings Calculations: "2019 Elevate IEMS PHES Measure Variable Documentation_ComEd.xlsx"
- Implementer Savings Calculations: "Refrigerator Calculation Documentation 021820.pdf"

2.7 Appendix 2. Total Resource Cost Detail

Table 2-18. shows the Total Resource Cost (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) are not included in this table and will be provided to the evaluation team later.

Table 2-17. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Verified Gross Electric Energy Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Verified Gross Gas Savings (Therms)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Verified Net Electric Energy Savings (kWh)	Verified Net Peak Demand Reduction (kW)	Verified Net Gas Savings (Therms)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Lighting	CA Lighting - CFL‡	Lamp	3,453	5.9	NO	508,520	71.76	0	0	-9,501	1.00	1.00	1.00	508,520	71.76	0	0	-9,501
Lighting	CA Lighting - Outdoor	Lamp	725	11.6	NO	482,413	0.00	0	0	0	1.00	1.00	1.00	482,413	0.00	0	0	0
Lighting	CA Lighting - Incandescent‡	Lamp	1,539	8.5	NO	414,166	76.78	0	0	-8,233	1.00	1.00	1.00	414,166	76.78	0	0	-8,233
Lighting	CA Lighting - T8 24/7	Lamp	1,782	5.7	NO	393,621	61.68	0	0	-6,226	1.00	1.00	1.00	393,621	61.68	0	0	-6,226
Lighting	CA Lighting - Specialty‡	Lamp	1,453	7.2	NO	311,978	50.86	0	0	-6,327	1.00	1.00	1.00	311,978	50.86	0	0	-6,327
HVAC	IU PTHP	Each	181	8.0	YES	280,004	9.36	0	0	0	1.00	1.00	1.00	280,004	9.36	0	0	0
Appliances	IU Refrigerator	Each	698	17.0	YES	210,737	31.76	0	0	0	1.00	1.00	1.00	210,737	31.76	0	0	0
Lighting	CA Lighting - T8	Lamp	2,348	15.0	NO	239,033	81.99	0	0	-4,725	1.00	1.00	1.00	239,033	81.99	0	0	-4,725
Lighting	IU Lighting Incandescent‡	Lamp	5,903	10.0	NO	196,511	25.26	0	0	-4,136	1.00	1.00	1.00	196,511	25.26	0	0	-4,136
Lighting	CA Lighting - T12 24/7‡	Lamp	518	5.7	NO	236,023	35.74	0	0	-4,208	1.00	1.00	1.00	236,023	35.74	0	0	-4,208
Lighting	CA Lighting - Exit Sign	Lamp	777	5.0	NO	137,535	21.03	0	0	-2,855	1.00	1.00	1.00	137,535	21.03	0	0	-2,855
Lighting	CA Lighting - T12‡	Lamp	650	15.0	NO	125,305	47.77	0	0	-2,157	1.00	1.00	1.00	125,305	47.77	0	0	-2,157
Shell	Insulation‡	Square Feet	573,803	20.0	NO	96,880	39.49	51,817	0	0	1.00	1.00	1.00	96,880	39.49	51,817	0	0
Lighting	IU Lighting Specialty‡	Lamp	1,857	10.0	NO	43,287	7.53	0	0	-752	1.00	1.00	1.00	43,287	7.53	0	0	-752
Consumer Electronics	Advanced Power Strip	Each	464	7.0	NO	34,552	3.37	0	0	0	1.00	1.00	1.00	34,552	3.37	0	0	0
Hot Water	IU Electric Aerator	Each	125	10.0	NO	19,065	5.11	0	0	0	1.00	1.00	1.00	19,065	5.11	0	0	0
Shell	Air Sealing	Linear Feet	168,186	20.0	NO	9,559	0.00	61,991	0	0	1.00	1.00	1.00	9,559	0.00	61,991	0	0
HVAC	IU Thermostat	Each	170	9.5	NO	9,320	1.60	4,174	0	0	1.00	1.00	1.00	9,320	1.60	4,174	0	0
HVAC	IU ECM Blower Replacement	Each	16	15.0	NO	7,488	0.32	0	0	0	1.00	1.00	1.00	7,488	0.32	0	0	0
Hot Water	IU Gas Showerhead	Each	1,054	10.0	NO	0	0.00	7,134	0	0	1.00	1.00	1.00	0	0.00	7,134	0	0
Hot Water	IU Electric Showerhead	Each	25	10.0	NO	5,678	0.76	0	0	0	1.00	1.00	1.00	5,678	0.76	0	0	0
Hot Water	IU Gas Aerator	Each	1,410	10.0	NO	0	0.00	4,822	0	0	1.00	1.00	1.00	0	0.00	4,822	0	0
HVAC	IU Central AC	Each	6	18.0	YES	2,975	2.34	0	0	0	1.00	1.00	1.00	2,975	2.34	0	0	0
Lighting	CA Lighting - Occ Sensor	Each	13	8.0	NO	2,757	1.62	0	0	-58	1.00	1.00	1.00	2,757	1.62	0	0	-58
Refrigeration	Vending Miser	Each	1	5.0	NO	1,613	0.00	0	0	0	1.00	1.00	1.00	1,613	0.00	0	0	0
Appliances	IU Room AC	Each	14	12.0	YES	398	0.56	0	0	0	1.00	1.00	1.00	398	0.56	0	0	0
HVAC	CA Boiler	kBtu/hr	89,102	20.0	NO	0	0.00	52,790	0	0	1.00	1.00	1.00	0	0.00	52,790	0	0
HVAC	CA Pipe Insulation	Linear Feet	41,609	15.0	NO	0	0.00	73,402	0	0	1.00	1.00	1.00	0	0.00	73,402	0	0
HVAC	Pipe Steam Averaging Controls	Projects	287	20.0	NO	0	0.00	19,640	0	0	1.00	1.00	1.00	0	0.00	19,640	0	0
HVAC	IU Furnace	Each	16	20.0	YES	0	0.00	1,257	0	0	1.00	1.00	1.00	0	0.00	1,257	0	0
HVAC	Steam Trap	Each	5,532	6.0	NO	0	0.00	186,720	0	0	1.00	1.00	1.00	0	0.00	186,720	0	0
HVAC	IU AC Cover and Gap Sealer	Each	776	5.0	NO	0	0.00	2,323	0	0	1.00	1.00	1.00	0	0.00	2,323	0	0
Hot Water	IU DHW Boiler	Each	8	13.0	YES	0	0.00	101	0	0	1.00	1.00	1.00	0	0.00	101	0	0
Hot Water	CA DHW Boiler	Apt Units	281	15.0	YES	0	0.00	3,264	0	0	1.00	1.00	1.00	0	0.00	3,264	0	0
HVAC	CA Boiler Reset Controls	kBtu/hr	4,020	20.0	NO	0	0.00	2,700	0	0	1.00	1.00	1.00	0	0.00	2,700	0	0
HVAC	CA Boiler Tune Up	kBtu/hr	5,997	3.0	NO	0	0.00	1,017	0	0	1.00	1.00	1.00	0	0.00	1,017	0	0
	Total			9.3		3,769,418	577	473,150	0	-49,178	1.00	1.00	1.00	3,769,418	577	473,150	0	-49,178

Note: To avoid double counting, the verified gross kWh and net kWh used in the TRC analysis excludes secondary energy savings from water reduction measures. Table 2-18 represents the kWh savings from Table 2-6 minus those shown in Table 2-11)

The electric heating penalties are included in the verified gross and net savings columns

* 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 EUL for this measure varies over time. See the CPAS tables (Table 2-3 to Table 2-5).

Source: ComEd tracking data and evaluation team analysis

3. Multi-Family Retrofits IHWAP

3.1 Program Description

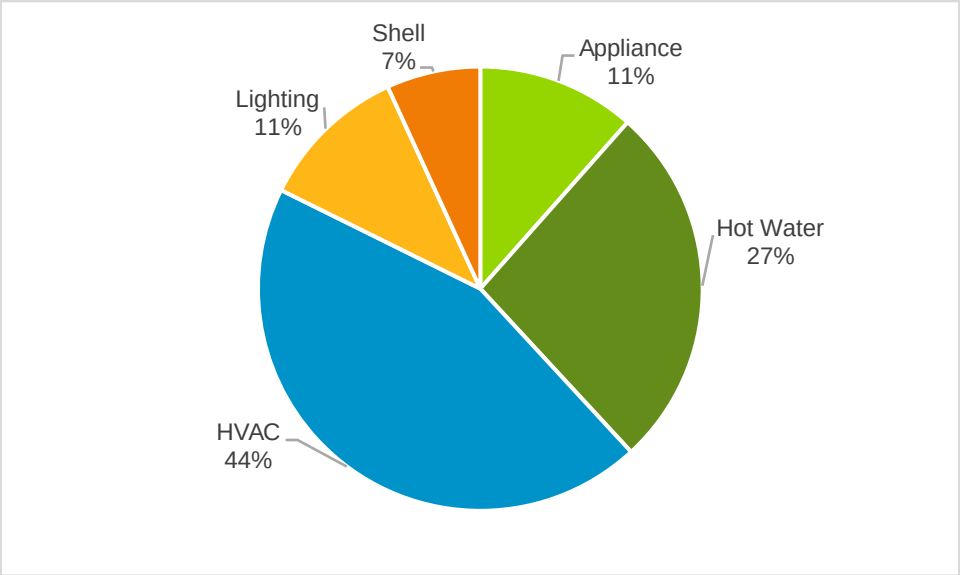
The program had 247 participants in CY2019 and distributed a total of 1,770 measures as shown in the following table and graph.

Table 3-1. CY2019 Volumetric Findings Detail

Participation	Total
Participants*	247
Total Measures†	1,770
Installed Projects‡	2,234

* Participants comprise of distinct ComEd Account Numbers
† Measure quantities for certain measures with units of kBtu/hr and Sq. Ft. have been adjusted to number of projects implemented to provide a more representative count
‡ Number of Unique Project IDs in the tracking data
Source: ComEd tracking data and evaluation team analysis

Figure 3-1. Number of Measures Installed by Type



Source: ComEd tracking data and evaluation team analysis

3.2 Program Savings Detail

Table 3-2 summarizes the incremental energy and demand savings the IHWAP portion of the Multi-Family Retrofits Program achieved in CY2019. The 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]

Table 3-2. CY2019 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Non-Coincident Demand Savings (kW)	Summer Peak* Demand Savings (kW)
Electricity			
Ex Ante Gross Savings	673,045	NR	263
Program Gross Realization Rate	0.97	NA	1.01
Verified Gross Savings	653,216	732	266
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	653,216	732	266
Converted from Gas†			
Ex Ante Gross Savings	5,323,029	NA	NA
Program Gross Realization Rate	1.06	NA	NA
Verified Gross Savings	5,663,168	NA	NA
Program Net-to-Gross Ratio (NTG)	1.00	NA	NA
Verified Net Savings	5,663,168	NA	NA
Total Electric Plus Gas			
Ex Ante Gross Savings	5,997,890	NR	263
Program Gross Realization Rate	1.05	NA	1.01
Verified Gross Savings	6,316,384	732	266
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	6,316,384	732	266

NR = Not reported (refers a piece of data that was not reported, i.e., non-coincident demand savings)
NA = Not applicable (refers a piece of data cannot be produced or does not apply)
* The coincident summer peak period is defined as 1:00-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.
† Gas savings converted to kWh by multiplying therms * 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh). The evaluation will determine which gas savings will be 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

3.3 Cumulative Persisting Annual Savings

Table 3-3 to Table 3-5 and Figure 3-2 show the measure-specific and total verified gross savings for the IHWAP portion of the Multi-family Retrofits Program and the cumulative persisting annual savings (CPAS)

[2] The evaluation will determine which gas savings will be counted toward goal while producing the portfolio-wide Summary Report.

for the measures installed in CY2019. The electric CPAS across all measures installed in 2019 is 653,216 kWh (Table 3-3). The CY2019 gas contribution to CPAS (converted to equivalent electricity) is 5,663,168 kWh (Table 3-4). Adding the gas and electric contributions produces 6,316,384 kWh of total CY2019 contribution to CPAS (Table 3-5). The “historic” rows in each table are the CPAS contribution back to CY2018. The “Program Total Electric CPAS” and the “Program Total Gas CPAS” are the sum of the CY2019 contribution and the historic contribution.

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

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
HVAC	Custom - Boiler	25.0		1.00										
HVAC	Gas High Efficiency Furnace (Early Replacement	20.0	87,285	1.00	1,745,700		87,285	87,285	87,285	87,285	87,285	87,285	87,285	87,285
Shell	Custom - Air Sealing	20.0		1.00										
Hot Water	Custom - DHW Heater	13.0		1.00										
Shell	Attic Insulation	20.0	27,433	1.00	496,902		27,433	27,433	27,433	27,433	27,433	27,433	27,433	27,433
HVAC	Advanced Thermostat	11.0	27,277	1.00	300,052		27,277	27,277	27,277	27,277	27,277	27,277	27,277	27,277
HVAC	Central Air Conditioner (Early Replacement)	18.0	124,793	1.00	1,104,144		124,793	124,793	124,793	124,793	124,793	124,793	29,616	29,616
Hot Water	Gas Water Heater (Early Replacement)	13.0		1.00										
HVAC	Custom - Pumps	12.0	103,350	1.00	1,240,195		103,350	103,350	103,350	103,350	103,350	103,350	103,350	103,350
BAS	Custom - BAS	16.0		1.00										
HVAC	Duct Insulation and Sealing	20.0	3,463	1.00	69,845		3,463	3,463	3,463	3,463	3,463	3,463	3,463	3,463
Appliances	Refrigerator (Early Replacement)	17.0	96,103	1.00	514,362		96,103	96,103	96,103	96,103	9,996	9,996	9,996	9,996
Lighting	LED Specialty	10.0	66,025	1.00	374,417		66,025	66,025	66,025	66,025	66,025	8,859	8,859	8,859
Shell	Custom - Roof Replacement	10.0	6,049	1.00	60,490		6,049	6,049	6,049	6,049	6,049	6,049	6,049	6,049
Lighting	LED Standard	10.0	42,974	1.00	152,330		42,974	42,974	8,298	8,298	8,298	8,298	8,298	8,298
Hot Water	Domestic Hot Water Pipe Insulation	15.0		1.00										
Lighting	Custom - Area Lighting	5.7	27,759	1.00	166,554		27,759	27,759	27,759	27,759	27,759	27,759		
Shell	Basement Sidewall Insulation	20.0	1,384	1.00	33,103		1,384	1,384	1,384	1,384	1,384	1,384	1,384	1,384
HVAC	Bathroom Exhaust Fan	19.0	15,270	1.00	290,129		15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270
Hot Water	Low Flow Faucet Aerator	10.0	664	1.00	6,641		664	664	664	664	664	664	664	664
HVAC	Custom - Rooftop Exhaust Fan	19.0	11,345	1.00	215,561		11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345
Shell	Air Sealing	20.0	894	1.00	18,493		894	894	894	894	894	894	894	894
HVAC	Custom - Rooftop Unit	10.0	6,018	1.00	60,180		6,018	6,018	6,018	6,018	6,018	6,018	6,018	6,018
HVAC	Room Air Conditioner	12.0	4,968	1.00	36,781		4,968	4,968	4,968	4,968	2,114	2,114	2,114	2,114
Hot Water	Low Flow Showerhead	10.0	100	1.00	999		100	100	100	100	100	100	100	100
Appliances	Freezer	22.0	62	1.00	1,373		62	62	62	62	62	62	62	62
CY2019 Program Total Electric Contribution to CPAS			653,216		6,888,251		653,216	653,216	618,540	618,540	529,578	472,412	349,476	349,476
Historic Program Total Electric Contribution to CPAS‡						628,175	628,175	628,175	530,904	414,905	393,805	365,365	364,890	364,890
Program Total Electric CPAS						628,175	1,281,391	1,281,391	1,149,444	1,033,445	923,383	837,778	714,366	714,366
CY2019 Program Incremental Expiring Electric Savings§								-	34,676	-	88,962	57,166	122,937	-
Historic Program Incremental Expiring Electric Savings‡§							-	-	97,271	115,999	21,100	28,440	475	-
Program Total Incremental Expiring Electric Savings§							-	-	131,948	115,999	110,062	85,605	123,411	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041
HVAC	Custom - Boiler															
HVAC	Gas High Efficiency Furnace (Early Replacemen	87,285	87,285	87,285	87,285	87,285	87,285	87,285	87,285	87,285	87,285	87,285	87,285			
Shell	Custom - Air Sealing															
Hot Water	Custom - DHW Heater															
Shell	Attic Insulation	27,433	27,433	22,257	22,257	22,257	22,257	22,257	22,257	22,257	22,257	22,257	22,257			
HVAC	Advanced Thermostat	27,277	27,277	27,277												
HVAC	Central Air Conditioner (Early Replacement)	29,616	29,616	29,616	29,616	29,616	29,616	29,616	29,616	29,616	29,616					
Hot Water	Gas Water Heater (Early Replacement)															
HVAC	Custom - Pumps	103,350	103,350	103,350	103,350											
BAS	Custom - BAS															
HVAC	Duct Insulation and Sealing	3,463	3,463	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522	3,522			
Appliances	Refrigerator (Early Replacement)	9,996	9,996	9,996	9,996	9,996	9,996	9,996	9,996	9,996						
Lighting	LED Specialty	8,859	8,859													
Shell	Custom - Roof Replacement	6,049	6,049													
Lighting	LED Standard	8,298	8,298													
Hot Water	Domestic Hot Water Pipe Insulation															
Lighting	Custom - Area Lighting															
Shell	Basement Sidewall Insulation	1,384	1,384	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926	1,926			
HVAC	Bathroom Exhaust Fan	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270				
Hot Water	Low Flow Faucet Aerator	664	664													
HVAC	Custom - Rooftop Exhaust Fan	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345				
Shell	Air Sealing	894	894	956	956	956	956	956	956	956	956	956	956			
HVAC	Custom - Rooftop Unit	6,018	6,018													
HVAC	Room Air Conditioner	2,114	2,114	2,114	2,114											
Hot Water	Low Flow Showerhead	100	100													
Appliances	Freezer	62	62	62	62	62	62	62	62	62	62	62	62	62	62	
CY2019 Program Total Electric Contribution to CPAS		349,476	349,476	314,976	287,698	182,235	182,235	182,235	182,235	182,235	172,239	142,623	116,008	62	62	-
Historic Program Total Electric Contribution to CPAS‡		360,784	287,351	287,351	271,987	271,987	271,987	53,531	53,531	53,531	45,474	14,471	14,471	14,471	14,471	14,471
Program Total Electric CPAS		710,260	636,827	602,327	559,685	454,222	454,222	235,766	235,766	235,766	217,713	157,095	130,479	14,533	14,533	14,471
CY2019 Program Incremental Expiring Electric Savings§		-	-	34,500	27,277	105,463	-	-	-	-	9,996	29,616	26,615	115,946	-	62
Historic Program Incremental Expiring Electric Savings‡§		4,106	73,433	-	15,364	-	-	218,456	-	-	8,057	31,003	-	-	-	-
Program Total Incremental Expiring Electric Savings§		4,106	73,433	34,500	42,642	105,463	-	218,456	-	-	18,053	60,618	26,615	115,946	-	62

Note: The green highlighted cell shows program total first year electric savings. The gray cells are blank, indicating values irrelevant to the CY2019 contribution to CPAS.

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

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

‡ Historical savings go back to CY2018

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

Source: Evaluation team analysis

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

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	Verified Net Therms Savings								
						2018	2019	2020	2021	2022	2023	2024	2025	2026
HVAC	Custom - Boiler	25.0	101,458	1.00	2,536,450		101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458
HVAC	Gas High Efficiency Furnace (Early Replacement)	20.0	37,644	1.00	311,288		37,644	37,644	37,644	37,644	37,644	37,644	6,102	6,102
Shell	Custom - Air Sealing	20.0	15,796	1.00	315,920		15,796	15,796	15,796	15,796	15,796	15,796	15,796	15,796
Hot Water	Custom - DHW Heater	13.0	10,630	1.00	138,191		10,630	10,630	10,630	10,630	10,630	10,630	10,630	10,630
Shell	Attic Insulation	20.0	8,421	1.00	159,404		8,421	8,421	8,421	8,421	8,421	8,421	8,421	8,421
HVAC	Advanced Thermostat	11.0	7,360	1.00	80,955		7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360
HVAC	Central Air Conditioner (Early Replacement)	15.0		1.00										
Hot Water	Gas Water Heater (Early Replacement)	13.0	4,201	1.00	42,623		4,201	4,201	4,201	4,201	2,869	2,869	2,869	2,869
HVAC	Custom - Pumps	12.0		1.00	-									
BAS	Custom - BAS	16.0	2,222	1.00	35,560		2,222	2,222	2,222	2,222	2,222	2,222	2,222	2,222
HVAC	Duct Insulation and Sealing	20.0	1,598	1.00	31,950		1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598
Appliances	Refrigerator (Early Replacement)	17.0		1.00	-									
Lighting	LED Specialty	10.0		1.00	-									
Shell	Custom - Roof Replacement	10.0	1,369	1.00	13,689		1,369	1,369	1,369	1,369	1,369	1,369	1,369	1,369
Lighting	LED Standard	10.0		1.00										
Hot Water	Domestic Hot Water Pipe Insulation	15.0	1,020	1.00	15,300		1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020
Lighting	Custom - Area Lighting	5.7		1.00										
Shell	Basement Sidewall Insulation	20.0	663	1.00	16,156		663	663	663	663	663	663	663	663
HVAC	Bathroom Exhaust Fan	19.0		1.00										
Hot Water	Low Flow Faucet Aerator	10.0	496	1.00	4,958		496	496	496	496	496	496	496	496
HVAC	Custom - Rooftop Exhaust Fan	19.0		1.00										
Shell	Air Sealing	20.0	195	1.00	4,416		195	195	195	195	195	195	195	195
HVAC	Custom - Rooftop Unit	10.0		1.00										
HVAC	Room Air Conditioner	12.0		1.00										
Hot Water	Low Flow Showerhead	10.0	145	1.00	1,447		145	145	145	145	145	145	145	145
Appliances	Freezer	22.0		1.00										
CY2019 Program Total Gas Contribution to CPAS (Therms)			193,216		3,708,305		193,216	193,216	193,216	193,216	191,885	191,885	160,343	160,343
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡					9,703,896		5,663,168	5,663,168	5,663,168	5,663,168	5,624,135	5,624,135	4,699,651	4,699,651
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§						124,465	124,465	124,465	124,465	124,465	124,465	124,465	124,465	124,465
Program Total Gas CPAS (kWh Equivalent)‡						124,465	5,787,633	5,787,633	5,787,633	5,787,633	5,748,600	5,748,600	4,824,116	4,824,116
CY2019 Program Incremental Expiring Gas Savings (Therms)‖								-	-	-	1,332	-	31,542	-
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖								-	-	-	39,033	-	924,485	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§‖							-	-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖							-	-	-	-	39,033	-	924,485	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
HVAC	Custom - Boiler	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	101,458	
HVAC	Gas High Efficiency Furnace (Early Replacement)	6,102	6,102	6,102	6,102	6,102	6,102	6,102	6,102	6,102	6,102	6,102	6,102						
Shell	Custom - Air Sealing	15,796	15,796	15,796	15,796	15,796	15,796	15,796	15,796	15,796	15,796	15,796	15,796						
Hot Water	Custom - DHW Heater	10,630	10,630	10,630	10,630	10,630													
Shell	Attic Insulation	8,421	8,421	7,520	7,520	7,520	7,520	7,520	7,520	7,520	7,520	7,520	7,520						
HVAC	Advanced Thermostat	7,360	7,360	7,360															
HVAC	Central Air Conditioner (Early Replacement)																		
Hot Water	Gas Water Heater (Early Replacement)	2,869	2,869	2,869	2,869	2,869													
HVAC	Custom - Pumps																		
BAS	Custom - BAS	2,222	2,222	2,222	2,222	2,222	2,222	2,222	2,222										
HVAC	Duct Insulation and Sealing	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598	1,598						
Appliances	Refrigerator (Early Replacement)																		
Lighting	LED Specialty																		
Shell	Custom - Roof Replacement	1,369	1,369																
Lighting	LED Standard																		
Hot Water	Domestic Hot Water Pipe Insulation	1,020	1,020	1,020	1,020	1,020	1,020	1,020											
Lighting	Custom - Area Lighting																		
Shell	Basement Sidewall Insulation	663	663	952	952	952	952	952	952	952	952	952	952						
HVAC	Bathroom Exhaust Fan																		
Hot Water	Low Flow Faucet Aerator	496	496																
HVAC	Custom - Rooftop Exhaust Fan																		
Shell	Air Sealing	195	195	246	246	246	246	246	246	246	246	246	246						
HVAC	Custom - Rooftop Unit																		
HVAC	Room Air Conditioner																		
Hot Water	Low Flow Showerhead	145	145																
Appliances	Freezer																		
CY2019 Program Total Gas Contribution to CPAS (Therms)		160,343	160,343	157,773	150,413	150,413	136,914	136,914	135,894	133,672	133,672	133,672	133,672	101,458	101,458	101,458	101,458	101,458	-
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		4,699,651	4,699,651	4,624,323	4,408,615	4,408,615	4,012,957	4,012,957	3,983,062	3,917,921	3,917,921	3,917,921	3,917,921	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	-
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§		123,989	123,989	123,989	123,989	123,989	123,989	63,043	63,043	63,043	63,043	63,043	63,043	63,043	-	-	-	-	-
Program Total Gas CPAS (kWh Equivalent)‡		4,823,640	4,823,640	4,748,312	4,532,603	4,532,603	4,136,946	4,076,000	4,046,105	3,980,964	3,980,964	3,980,964	3,980,964	3,036,777	2,973,734	2,973,734	2,973,734	2,973,734	-
CY2019 Program Incremental Expiring Gas Savings (Therms)||		-	-	2,570	7,360	-	13,499	-	1,020	2,222	-	-	-	32,214	-	-	-	-	101,458
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡||		-	-	75,327	215,709	-	395,657	-	29,895	65,141	-	-	-	944,187	-	-	-	-	2,973,734
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§||		476	-	-	-	-	-	60,946	-	-	-	-	-	-	63,043	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡||		476	-	75,327	215,709	-	395,657	60,946	29,895	65,141	-	-	-	944,187	63,043	-	-	-	2,973,734

Note: The green highlighted cell shows program total first year gas savings in kWh equivalents. The gray cells are blank, indicating no values or do not contribute to calculating CPAS in CY2019.
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
† 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.
|| Expiring savings are equal to CPAS Yn-1 - CPAS Y_n.
Source: Evaluation team analysis

Table 3-5. Cumulative Persisting Annual Savings (CPAS) – Total

End Use Type	Research Category	EUL	CY2019 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
HVAC	Custom - Boiler	25.0	2,973,734	1.00	74,343,350		2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734
HVAC	Gas High Efficiency Furnace (Early Replacement)	20.0	1,190,616	1.00	10,869,541		1,190,616	1,190,616	1,190,616	1,190,616	1,190,616	1,190,616	266,132	266,132
Shell	Custom - Air Sealing	20.0	462,981	1.00	9,259,615		462,981	462,981	462,981	462,981	462,981	462,981	462,981	462,981
Hot Water	Custom - DHW Heater	13.0	311,568	1.00	4,050,379		311,568	311,568	311,568	311,568	311,568	311,568	311,568	311,568
Shell	Attic Insulation	20.0	274,243	1.00	5,169,021		274,243	274,243	274,243	274,243	274,243	274,243	274,243	274,243
HVAC	Advanced Thermostat	11.0	242,986	1.00	2,672,849		242,986	242,986	242,986	242,986	242,986	242,986	242,986	242,986
HVAC	Central Air Conditioner (Early Replacement)	15.0	124,793	1.00	1,104,144		124,793	124,793	124,793	124,793	124,793	124,793	29,616	29,616
Hot Water	Gas Water Heater (Early Replacement)	13.0	123,122	1.00	1,249,294		123,122	123,122	123,122	123,122	84,089	84,089	84,089	84,089
HVAC	Custom - Pumps	12.0	103,350	1.00	1,240,195		103,350	103,350	103,350	103,350	103,350	103,350	103,350	103,350
BAS	Custom - BAS	16.0	65,141	1.00	1,042,261		65,141	65,141	65,141	65,141	65,141	65,141	65,141	65,141
HVAC	Duct Insulation and Sealing	20.0	50,286	1.00	1,006,305		50,286	50,286	50,286	50,286	50,286	50,286	50,286	50,286
Appliances	Refrigerator (Early Replacement)	17.0	96,103	1.00	514,362		96,103	96,103	96,103	96,103	9,996	9,996	9,996	9,996
Lighting	LED Specialty	10.0	66,025	1.00	374,417		66,025	66,025	66,025	66,025	66,025	8,859	8,859	8,859
Shell	Custom - Roof Replacement	10.0	46,170	1.00	461,703		46,170	46,170	46,170	46,170	46,170	46,170	46,170	46,170
Lighting	LED Standard	10.0	42,974	1.00	152,330		42,974	42,974	8,298	8,298	8,298	8,298	8,298	8,298
Hot Water	Domestic Hot Water Pipe Insulation	15.0	29,895	1.00	448,432		29,895	29,895	29,895	29,895	29,895	29,895	29,895	29,895
Lighting	Custom - Area Lighting	5.7	27,759	1.00	166,554		27,759	27,759	27,759	27,759	27,759	27,759	-	-
Shell	Basement Sidewall Insulation	20.0	20,827	1.00	506,625		20,827	20,827	20,827	20,827	20,827	20,827	20,827	20,827
HVAC	Bathroom Exhaust Fan	19.0	15,270	1.00	290,129		15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270
Hot Water	Low Flow Faucet Aerator	10.0	15,196	1.00	151,962		15,196	15,196	15,196	15,196	15,196	15,196	15,196	15,196
HVAC	Custom - Rooftop Exhaust Fan	19.0	11,345	1.00	215,561		11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345
Shell	Air Sealing	20.0	6,611	1.00	147,912		6,611	6,611	6,611	6,611	6,611	6,611	6,611	6,611
HVAC	Custom - Rooftop Unit	10.0	6,018	1.00	60,180		6,018	6,018	6,018	6,018	6,018	6,018	6,018	6,018
HVAC	Room Air Conditioner	12.0	4,968	1.00	36,781		4,968	4,968	4,968	4,968	2,114	2,114	2,114	2,114
Hot Water	Low Flow Showerhead	10.0	4,340	1.00	43,401		4,340	4,340	4,340	4,340	4,340	4,340	4,340	4,340
Appliances	Freezer	22.0	62	1.00	1,373		62	62	62	62	62	62	62	62
CY2019 Program Total Contribution to CPAS			6,316,384		115,578,678		6,316,384	6,316,384	6,281,708	6,281,708	6,153,713	6,096,548	5,049,127	5,049,127
Historic Program Total Contribution to CPAS‡						752,640	752,640	752,640	655,369	539,370	518,270	489,830	489,355	489,355
Program Total CPAS						752,640	7,069,024	7,069,024	6,937,077	6,821,078	6,671,983	6,586,378	5,538,482	5,538,482
CY2019 Program Incremental Expiring Savings§								-	34,676	-	127,995	57,166	1,047,421	-
Historic Program Incremental Expiring Savings‡§							-	-	97,271	115,999	21,100	28,440	475	-
Program Total Incremental Expiring Savings§§							-	-	131,948	115,999	149,095	85,605	1,047,896	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
HVAC	Custom - Boiler	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	2,973,734	-
HVAC	Gas High Efficiency Furnace (Early Replacement)	266,132	266,132	266,132	266,132	266,132	266,132	266,132	266,132	266,132	266,132	266,132	266,132	-	-	-	-	-	-
Shell	Custom - Air Sealing	462,981	462,981	462,981	462,981	462,981	462,981	462,981	462,981	462,981	462,981	462,981	462,981	-	-	-	-	-	-
Hot Water	Custom - DHW Heater	311,568	311,568	311,568	311,568	311,568	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell	Attic Insulation	274,243	274,243	242,659	242,659	242,659	242,659	242,659	242,659	242,659	242,659	242,659	242,659	-	-	-	-	-	-
HVAC	Advanced Thermostat	242,986	242,986	242,986	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Central Air Conditioner (Early Replacement)	29,616	29,616	29,616	29,616	29,616	29,616	29,616	29,616	29,616	29,616	-	-	-	-	-	-	-	-
Hot Water	Gas Water Heater (Early Replacement)	84,089	84,089	84,089	84,089	84,089	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Custom - Pumps	103,350	103,350	103,350	103,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BAS	Custom - BAS	65,141	65,141	65,141	65,141	65,141	65,141	65,141	65,141	-	-	-	-	-	-	-	-	-	-
HVAC	Duct Insulation and Sealing	50,286	50,286	50,345	50,345	50,345	50,345	50,345	50,345	50,345	50,345	50,345	50,345	-	-	-	-	-	-
Appliances	Refrigerator (Early Replacement)	9,996	9,996	9,996	9,996	9,996	9,996	9,996	9,996	9,996	-	-	-	-	-	-	-	-	-
Lighting	LED Specialty	8,859	8,859	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell	Custom - Roof Replacement	46,170	46,170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED Standard	8,298	8,298	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Domestic Hot Water Pipe Insulation	29,895	29,895	29,895	29,895	29,895	29,895	29,895	-	-	-	-	-	-	-	-	-	-	-
Lighting	Custom - Area Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shell	Basement Sidewall Insulation	20,827	20,827	29,836	29,836	29,836	29,836	29,836	29,836	29,836	29,836	29,836	29,836	-	-	-	-	-	-
HVAC	Bathroom Exhaust Fan	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	15,270	-	-	-	-	-	-	-
Hot Water	Low Flow Faucet Aerator	15,196	15,196	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Custom - Rooftop Exhaust Fan	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	11,345	-	-	-	-	-	-	-
Shell	Air Sealing	6,611	6,611	8,180	8,180	8,180	8,180	8,180	8,180	8,180	8,180	8,180	8,180	-	-	-	-	-	-
HVAC	Custom - Rooftop Unit	6,018	6,018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Room Air Conditioner	2,114	2,114	2,114	2,114	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Low Flow Showerhead	4,340	4,340	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Appliances	Freezer	62	62	62	62	62	62	62	62	62	62	62	62	62	62	-	-	-	-
CY2019 Program Total Contribution to CPAS		5,049,127	5,049,127	4,939,299	4,696,313	4,590,850	4,195,193	4,195,193	4,165,297	4,100,156	4,090,160	4,060,544	4,033,929	2,973,796	2,973,796	2,973,734	2,973,734	2,973,734	-
Historic Program Total Contribution to CPAS‡		484,773	411,340	411,340	395,976	395,976	395,976	116,574	116,574	116,574	108,517	77,514	77,514	77,514	14,471	14,471	14,471	-	-
Program Total CPAS		5,533,900	5,460,467	5,350,639	5,092,289	4,986,826	4,591,168	4,311,767	4,281,871	4,216,730	4,198,677	4,138,058	4,111,443	3,051,310	2,988,267	2,988,205	2,988,205	2,973,734	-
CY2019 Program Incremental Expiring Savings§		-	-	109,828	242,986	105,463	395,657	-	29,895	65,141	9,996	29,616	26,615	1,060,132	-	62	-	-	2,973,734
Historic Program Incremental Expiring Savings‡§		4,582	73,433	-	15,364	-	-	279,402	-	-	8,057	31,003	-	-	63,043	-	-	14,471	-
Program Total Incremental Expiring Savings§§		4,582	73,433	109,828	258,351	105,463	395,657	279,402	29,895	65,141	18,053	60,618	26,615	1,060,132	63,043	62	-	14,471	2,973,734

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 do not contribute to calculating CPAS in CY2019.

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

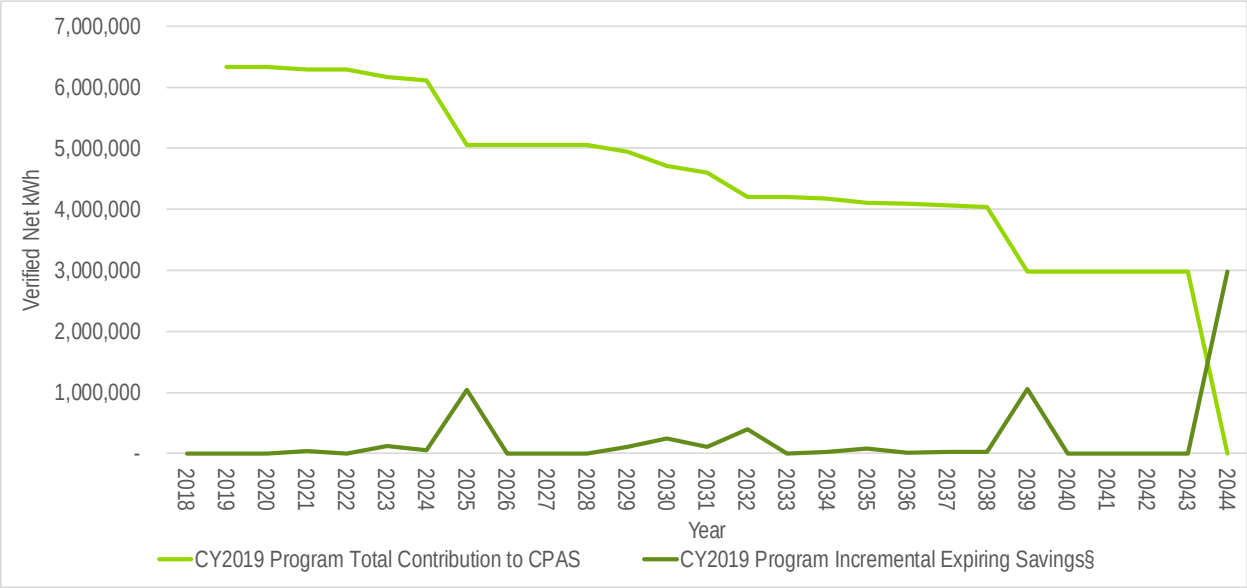
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Figure 3-2. Cumulative Persisting Annual Savings

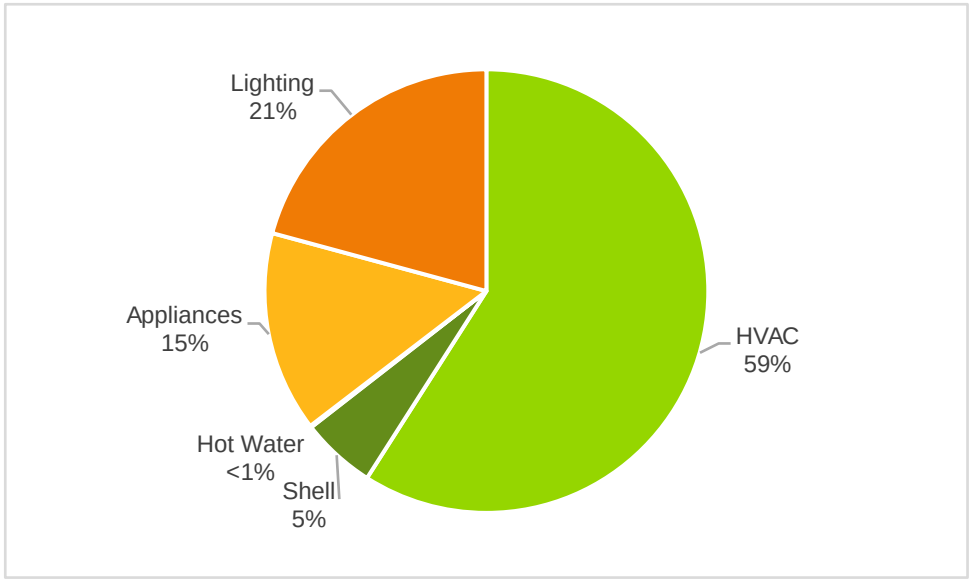


* Expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n.
Source: Evaluation team analysis

3.4 Program Savings by Measure

The program includes 26 measures as shown in the following tables. The gas high efficiency furnace and attic insulation measures contributed the most savings (see Figure 3-3).

Figure 3-3. Verified Net Savings by End Use – Electric



Source: ComEd tracking data and evaluation team analysis

Table 3-6. CY2019 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)
HVAC	Custom - Boiler	0	NA	0	1.00	0	25.0
HVAC	Gas High Efficiency Furnace (Early Replacement)	87,285	1.00	87,285	1.00	87,285	20.0
Shell	Custom - Air Sealing	0	NA	0	1.00	0	20.0
Hot Water	Custom - DHW Heater	0	NA	0	1.00	0	13.0
Shell	Attic Insulation	27,433	1.00	27,433	1.00	27,433	20.0
HVAC	Advanced Thermostat	27,277	1.00	27,277	1.00	27,277	11.0
HVAC	Central Air Conditioner (Early Replacement)	124,793	1.00	124,793	1.00	124,793	18.0
Hot Water	Gas Water Heater (Early Replacement)	0	NA	0	1.00	0	13.0
HVAC	Custom - Pumps	119,047	0.87	103,350	1.00	103,350	12.0
BAS	Custom - BAS	0	NA	0	1.00	0	16.0
HVAC	Duct Insulation and Sealing	3,463	1.00	3,463	1.00	3,463	20.0
Appliances	Refrigerator (Early Replacement)	96,103	1.00	96,103	1.00	96,103	17.0
Lighting	LED Specialty	66,025	1.00	66,025	1.00	66,025	10.0
Shell	Custom - Roof Replacement	6,049	1.00	6,049	1.00	6,049	10.0
Lighting	LED Standard	42,974	1.00	42,974	1.00	42,974	10.0
Hot Water	Domestic Hot Water Pipe Insulation	0	NA	0	1.00	0	15.0
Lighting	Custom - Area Lighting	29,724	0.93	27,759	1.00	27,759	5.7
Shell	Basement Sidewall Insulation	1,384	1.00	1,384	1.00	1,384	20.0
HVAC	Bathroom Exhaust Fan	15,270	1.00	15,270	1.00	15,270	19.0
Hot Water	Low Flow Faucet Aerator	0	NA	664	1.00	664	10.0
HVAC	Custom - Rooftop Exhaust Fan	19,473	0.58	11,345	1.00	11,345	19.0
Shell	Air Sealing	894	1.00	894	1.00	894	20.0
HVAC	Custom - Rooftop Unit	821	7.33	6,018	1.00	6,018	10.0
HVAC	Room Air Conditioner	4,968	1.00	4,968	1.00	4,968	12.0
Hot Water	Low Flow Showerhead	0	NA	100	1.00	100	10.0
Appliances	Freezer	62	1.00	62	1.00	62	22.0
	Total	**673,045**	**0.97**	**653,216**	**NA**	**653,216**	**15.0**

NA = Not applicable

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

Note: The savings in this table includes secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd.

Source: ComEd tracking data and evaluation team analysis

Table 3-7. CY2019 Non-Coincident Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Non-Coincident Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Non-Coincident Demand Reduction (kW)	NTG*	Verified Net Non-Coincident Demand Reduction (kW)
HVAC	Custom - Boiler	NR	NA	0	1.00	0
HVAC	Gas High Efficiency Furnace (Early Replacement)	NR	NA	39	1.00	39
Shell	Custom - Air Sealing	NR	NA	0	1.00	0
Hot Water	Custom - DHW Heater	NR	NA	0	1.00	0
Shell	Attic Insulation	NR	NA	34	1.00	34
HVAC	Advanced Thermostat	NR	NA	57	1.00	57
HVAC	Central Air Conditioner (Early Replacement)	NR	NA	373	1.00	373
Hot Water	Gas Water Heater (Early Replacement)	NR	NA	0	1.00	0
HVAC	Custom - Pumps	NR	NA	0	1.00	0
BAS	Custom - BAS	NR	NA	0	1.00	0
HVAC	Duct Insulation and Sealing	NR	NA	3	1.00	3
Appliances	Refrigerator (Early Replacement)	NR	NA	14	1.00	14
Lighting	LED Specialty	NR	NA	85	1.00	85
Shell	Custom - Roof Replacement	NR	NA	0	1.00	0
Lighting	LED Standard	NR	NA	40	1.00	40
Hot Water	Domestic Hot Water Pipe Insulation	NR	NA	23	1.00	23
Lighting	Custom - Area Lighting	NR	NA	34	1.00	34
Shell	Basement Sidewall Insulation	NR	NA	1	1.00	1
HVAC	Bathroom Exhaust Fan	NR	NA	4	1.00	4
Hot Water	Low Flow Faucet Aerator	NR	NA	0	1.00	0
HVAC	Custom - Rooftop Exhaust Fan	NR	NA	0	1.00	0
Shell	Air Sealing	NR	NA	1	1.00	1
HVAC	Custom - Rooftop Unit	NR	NA	0	1.00	0
HVAC	Room Air Conditioner	NR	NA	23	1.00	23
Hot Water	Low Flow Showerhead	NR	NA	0	1.00	0
Appliances	Freezer	NR	NA	0	1.00	0
	Total	NR	NA	732	NA	732

NR = Not reported
NA = Not applicable
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
Source: ComEd tracking data and evaluation team analysis

Table 3-8. CY2019 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)
HVAC	Custom - Boiler	0	NA	0	1.00	0
HVAC	Gas High Efficiency Furnace (Early Replacement)	18	1.00	18	1.00	18
Hot Water	Custom - Air Sealing	0	NA	0	1.00	0
Shell	Custom - DHW Heater	0	NA	0	1.00	0
Shell	Attic Insulation	16	1.00	16	1.00	16
HVAC	Advanced Thermostat	13	1.00	13	1.00	13
HVAC	Central Air Conditioner (Early Replacement)	174	1.00	174	1.00	174
Hot Water	Gas Water Heater (Early Replacement)	0	NA	0	1.00	0
HVAC	Custom - Pumps	0	NA	0	1.00	0
BAS	Custom - BAS	0	NA	0	1.00	0
HVAC	Duct Insulation and Sealing	2	1.00	2	1.00	2
Appliances	Refrigerator (Early Replacement)	14	1.00	14	1.00	14
Lighting	LED Specialty	10	1.00	10	1.00	10
Shell	Custom - Roof Replacement	0	NA	0	1.00	0
Lighting	LED Standard	5	1.00	5	1.00	5
Hot Water	Domestic Hot Water Pipe Insulation	0	NA	0	1.00	0
Lighting	Custom - Area Lighting	0	8.21	4	1.00	4
Shell	Basement Sidewall Insulation	1	1.00	1	1.00	1
HVAC	Bathroom Exhaust Fan	2	1.00	2	1.00	2
Hot Water	Low Flow Faucet Aerator	0	NA	0	1.00	0
HVAC	Custom - Rooftop Exhaust Fan	0	NA	0	1.00	0
Shell	Air Sealing	1	1.00	1	1.00	1
HVAC	Custom - Rooftop Unit	0	NA	0	1.00	0
HVAC	Room Air Conditioner	7	1.00	7	1.00	7
Hot Water	Low Flow Showerhead	0	NA	0	1.00	0
Appliances	Freezer	0	1.00	0	1.00	0
	Total	263	1.01	266	NA	266

NA = Not applicable
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
Source: ComEd tracking data and evaluation team analysis

Table 3-9. CY2019 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)
HVAC	Custom - Boiler	82,357	1.23	101,458	1.00	101,458	25.0
HVAC	Gas High Efficiency Furnace (Early Replacement)	37,644	1.00	37,644	1.00	37,644	20.0
Shell	Custom - Air Sealing	17,310	0.91	15,796	1.00	15,796	20.0
Hot Water	Custom - DHW Heater	13,880	0.77	10,630	1.00	10,630	13.0
Shell	Attic Insulation	8,421	1.00	8,421	1.00	8,421	20.0
HVAC	Advanced Thermostat	7,360	1.00	7,360	1.00	7,360	11.0
HVAC	Central Air Conditioner (Early Replacement)	0	NA	0	1.00	0	15.0
Hot Water	Gas Water Heater (Early Replacement)	4,201	1.00	4,201	1.00	4,201	13.0
HVAC	Custom - Pumps	0	NA	0	1.00	0	12.0
BAS	Custom - BAS	2,338	0.95	2,222	1.00	2,222	16.0
HVAC	Duct Insulation and Sealing	1,598	1.00	1,598	1.00	1,598	20.0
Appliances	Refrigerator (Early Replacement)	0	NA	0	1.00	0	17.0
Lighting	LED Specialty	0	NA	0	1.00	0	10.0
Shell	Custom - Roof Replacement	4,047	0.34	1,369	1.00	1,369	10.0
Lighting	LED Standard	0	NA	0	1.00	0	10.0
Hot Water	Domestic Hot Water Pipe Insulation	1,020	1.00	1,020	1.00	1,020	15.0
Lighting	Custom - Area Lighting	0	NA	0	1.00	0	5.7
Shell	Basement Sidewall Insulation	663	1.00	663	1.00	663	20.0
HVAC	Bathroom Exhaust Fan	0	NA	0	1.00	0	19.0
Hot Water	Low Flow Faucet Aerator	496	1.00	496	1.00	496	10.0
HVAC	Custom - Rooftop Exhaust Fan	0	NA	0	1.00	0	19.0
Shell	Air Sealing	195	1.00	195	1.00	195	20.0
HVAC	Custom - Rooftop Unit	0	NA	0	1.00	0	10.0
HVAC	Room Air Conditioner	0	NA	0	1.00	0	12.0
Hot Water	Low Flow Showerhead	145	1.00	145	1.00	145	10.0
Appliances	Freezer	0	NA	0	1.00	0	22.0
	Total †	**181,673**	**1.06**	**193,216**	**NA**	**91,758**	**21.6**

NA = Not applicable

* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

† Gas savings converted to kWh by multiplying therms * 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh).

Source: ComEd tracking data and evaluation team analysis

Table 3-10. CY2019 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)
HVAC	Custom - Boiler	2,413,869	1.23	2,973,734	1.00	2,973,734
HVAC	Gas High Efficiency Furnace (Early Replacement)	1,190,619	1.00	1,190,616	1.00	1,190,616
Hot Water	Custom - Air Sealing	507,370	0.91	462,981	1.00	462,981
Shell	Custom - DHW Heater	406,835	0.77	311,568	1.00	311,568
Shell	Attic Insulation	274,243	1.00	274,243	1.00	274,243
HVAC	Advanced Thermostat	242,986	1.00	242,986	1.00	242,986
HVAC	Central Air Conditioner (Early Replacement)	124,793	1.00	124,793	1.00	124,793
Hot Water	Gas Water Heater (Early Replacement)	123,123	1.00	123,122	1.00	123,122
HVAC	Custom - Pumps	119,047	0.87	103,350	1.00	103,350
BAS	Custom - BAS	68,523	0.95	65,141	1.00	65,141
HVAC	Duct Insulation and Sealing	50,286	1.00	50,286	1.00	50,286
Appliances	Refrigerator (Early Replacement)	96,103	1.00	96,103	1.00	96,103
Lighting	LED Specialty	66,025	1.00	66,025	1.00	66,025
Shell	Custom - Roof Replacement	124,669	0.37	46,170	1.00	46,170
Lighting	LED Standard	42,974	1.00	42,974	1.00	42,974
Hot Water	Domestic Hot Water Pipe Insulation	29,896	1.00	29,895	1.00	29,895
Lighting	Custom - Area Lighting	29,724	0.93	27,759	1.00	27,759
Shell	Basement Sidewall Insulation	20,827	1.00	20,827	1.00	20,827
HVAC	Bathroom Exhaust Fan	15,270	1.00	15,270	1.00	15,270
Hot Water	Low Flow Faucet Aerator	14,533	1.05	15,196	1.00	15,196
HVAC	Custom - Rooftop Exhaust Fan	19,473	0.58	11,345	1.00	11,345
Shell	Air Sealing	6,611	1.00	6,611	1.00	6,611
HVAC	Custom - Rooftop Unit	821	7.33	6,018	1.00	6,018
HVAC	Room Air Conditioner	4,968	1.00	4,968	1.00	4,968
Hot Water	Low Flow Showerhead	4,240	1.02	4,340	1.00	4,340
Appliances	Freezer	62	1.00	62	1.00	62
	Total †	**5,997,890**	**1.05**	**6,316,384**	**NA**	**6,316,384**

NA = Not applicable
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
† The total includes the electric equivalent of the total therms.
Source: ComEd tracking data and evaluation team analysis

The multi-family retrofits program includes measures that save water. That reduction in water produces secondary kWh savings from water supply and wastewater treatment. Table 3-11 shows the secondary measure level savings. The savings in this table are included within the electricity savings in the previous tables in this section.

Table 3-11. Secondary Energy Savings from Water Reduction by Measure – Electric

End Use Type	Research Category	Ex Ante Annual Water Savings (gallons)	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate (RR_{water})	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
HVAC	Custom - Boiler	0	0	NA	0	1.00	0.0
HVAC	Gas High Efficiency Furnace (Early Replacement)	0	0	NA	0	1.00	0.0
Shell	Attic Insulation	0	0	NA	0	1.00	0.0
Hot Water	Custom - Air Sealing	0	0	NA	0	1.00	0.0
Shell	Custom - DHW Heater	0	0	NA	0	1.00	0.0
HVAC	Advanced Thermostat	0	0	NA	0	1.00	0.0
HVAC	Central Air Conditioner (Early Replacement)	0	0	NA	0	1.00	0.0
Hot Water	Gas Water Heater (Early Replacement)	0	0	NA	0	1.00	0.0
HVAC	Custom - Pumps	0	0	NA	0	1.00	0.0
BAS	Custom - BAS	0	0	NA	0	1.00	0.0
HVAC	Duct Insulation and Sealing	0	0	NA	0	1.00	0.0
Appliances	Refrigerator (Early Replacement)	0	0	NA	0	1.00	0.0
Lighting	LED Specialty	0	0	NA	0	1.00	0.0
Shell	Custom - Roof Replacement	0	0	NA	0	1.00	0.0
Lighting	LED Standard	0	0	NA	0	1.00	0.0
Hot Water	Domestic Hot Water Pipe Insulation	0	0	NA	0	1.00	0.0
Lighting	Custom - Area Lighting	0	0	NA	0	1.00	0.0
Shell	Basement Sidewall Insulation	0	0	NA	0	1.00	0.0
HVAC	Bathroom Exhaust Fan	0	0	NA	0	1.00	0.0
Hot Water	Low Flow Faucet Aerator	163,445	819	0.81	664	1.00	664.1
HVAC	Custom - Rooftop Exhaust Fan	0	0	NA	0	1.00	0.0
Shell	Air Sealing	0	0	NA	0	1.00	0.0
HVAC	Custom - Rooftop Unit	0	0	NA	0	1.00	0.0
HVAC	Room Air Conditioner	0	0	NA	0	1.00	0.0
Hot Water	Low Flow Showerhead	29,350	147	0.68	100	1.00	99.9
Appliances	Freezer	0	0	NA	0	1.00	0.0
	Total	192,795	966	0.79	764	NA	0.0

NA = Not applicable
Note: The savings in this table reflects only secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd, not those claimed by gas utilities.
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
Source: ComEd tracking data and evaluation team analysis

3.5 Impact Analysis Findings and Recommendations

3.5.1 Impact Parameter Estimates

The lifetime energy and demand savings are estimated by multiplying the verified savings by the effective useful life for each measure.

Table 3-12. Savings Parameters

Measure	Custom Input Parameters	Deemed Input Parameters	Deemed* Input Data Source
Room Air Conditioner	Btu.hr, CEER_ee, CEER_base	FLH_roomAC, EER_exist, CF	TRM v7.0 – Section 5.1.07
Refrigerator	None	UEC_exist, UEC_base, UEC_ee, TAF, LSAF, Hours	TRM v7.0 – Section 5.1.06
Attic Insulation	R_old, R_attic, A_attic, Eff_cool, Eff_heat	Framing Factor_attic, CDD, DUA, HDD, ADJ_WallAtticCool, F_e, CF, FLH_cooling, ADJ_WallAtticHeat	TRM v7.0 – Section 5.6.05
Air Sealing	CFM50_existing, CFM50_new	N_heat, HDD, Eff_heat	TRM v7.0 – Section 5.6.01
Hot Water Pipe Insulation	R_new, C, L	R_exist, Eff_DHW, ΔT	TRM v7.0 – Section 5.4.01
Central Air Conditioning	SEER_ee, EER_ee, SEER_exist, EER_exist	FLH_cool, SEER_base, EER_base, CF	TRM v7.0 – Section 5.3.03
Low Flow Faucet Aerator	None	%Electric_DHW, GPM_base, GPM_low, L_base, L_low, Household, DF, FPH, EPG_electric, ISR, Hours, CF %Fossil_DHW, EPG_gas	TRM v7.0 – Section 5.4.04
LED Lighting	Watts_ee, Watts_base	ISR, Leakage, Hours, WHF_e, WHF_d, CF	TRM v7.0 – Section 5.5.06, Section 5.5.08
Freezer	None	kWh_base, kWh_ESTAR, Hours, CF	TRM v7.0 – Section 5.1.05
Gas Water Heater	UEF_base, UEF_efficient, UEF_existing	GPD, Household, yWater, T_out, T_in	TRM v7.0 – Section 5.4.02
Low Flow Showerhead	None	%Electric_DHW, GPM_base, GPM_low, L_base, L_low, Household, SPCD, SPH EPG_electric, ISR, Hours, CF %Fossil_DHW, EPG_gas, GPH	TRM v7.0 – Section 5.4.05
Advanced Thermostat	Capacity, SEER, EER	%ElectricHeat, Elec_Heating_Consumption, Heating_Reduction, HF, EFF_ISR, Fe, %AC, FLH, Cooling_Reduction, ISR, Hours, CF, %FossilHeat	TRM v7.0 – Section 5.3.16
Duct Insulation and Sealing	DEafter, DEbefore, CapacityCool, nCool, nEquipment, InputCapacityHeat	FLHcool, TRFcool, FLHheat, TRFheat, COP, nSystem	TRM v7.0 – Section 5.3.04
Furnace Blower Motor	AFUE, Capacity_cooling	kWSavingsPerTon, kWhSavingsPerTon, HeatingkWhSavings	TRM v7.0 – 5.3.05
Gas High Efficiency Furnace	CAPInput, AFUE(eff), AFUE(exist), AFUE(base)	EFLH	TRM v7.0 – Section 5.3.07
Bathroom Exhaust Fan	None	CFM, Eff_baseline, Eff_efficient, Hours, CF	TRM v6.0 – Section 5.3.9
Basement Sidewall Insulation	R_old_AG, R_added, L_basement_wall_total, H_basement_wall_AG, nCool, R_old_BG, nHeat	Framing_factor, CDD, DUA, ADJ_BasementCool, HDD, ADJ_BasementHeat, Fe, FLH_cooling, CF	TRM v7.0 – Section 5.6.02

* TRM is the State of Illinois Technical Reference Manual version 7.0 from http://www.ilsag.info/technical-reference-manual.html. The NTG values can be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.

3.5.2 Other Impact Findings and Recommendations

The evaluation team developed several recommendations based on findings from the CY2019 evaluation, as follows:

3.5.2.1 Custom – Air Sealing

Finding 1. For the Custom – Air Sealing measure installed as part of the North Lake Farms project, the ex ante savings for window weather-stripping were calculated using the linear feet for window caulking measure. Guidehouse calculated verified savings using the linear feet for the weather-stripping installed on window bottoms instead.

Recommendation 1. Guidehouse recommends calculating the energy and demand savings for the window weather-stripping measure using the using the linear feet of weather-stripping installed on window bottoms.

Finding 2. For the Custom – Air Sealing measure installed as part of the North Lake Farms project, the ex ante savings for air sealing gaskets were calculated using 0.70 therms per gasket. Guidehouse calculated verified savings using 0.47 therms per gasket as per TRM v7.0 Section 5.6.1.

Recommendation 2. Guidehouse recommends updating the per unit savings from installation of a gasket on an electrical outlet to 0.47 therms as per TRM v7.0 Section 5.6.1.

3.5.2.2 Custom – DHW Heater

Finding 3. For the Custom – DHW Boiler projects (MEA-2019.08.07-92789 and MEA-2019.09.20-99548), the ex ante savings were calculated using the quantity information that doesn't align with the values provided in the tracking data. Additionally, an annual hour value of 8,760 was used for the ex ante calculations instead of the TRM v7.0 deemed value of 8766.

Recommendation 3. Guidehouse recommends updating the number of units for this measure based on tracking data and using the TRM deemed annual hours.

Finding 4. For the Custom – DHW Boiler projects (MEA-2019.08.07-92789), Guidehouse used a scaling factor calculated as the ratio of normalized usage (using utility bill analysis) at the facility to the baseline usage as predicted by the custom calculations to ensure calibration. The savings calculated using the custom approach were multiplied by the scaling factor.

Recommendation 4. Guidehouse recommends the implementer calibrate the savings calculation to match the predicted baseline consumption with the actual usage at the facility.

Finding 5. For the Custom – DHW Boiler projects (MEA-2019.09.20-99548), Guidehouse updated the efficiency of the baseline boiler and the volume of the tank as per the engineering report. The normalized usage at the facility calculated using utility bill analysis does not align with the baseline usage calculated using the custom approach and is low as compared to the size of the building.

Recommendation 5. Guidehouse recommends updating the baseline efficiency and volume of the tank as per the engineering report. Guidehouse would also like to request gas utility bills (for all meters, if multiple) for this site to ensure calibration between the baseline and normalized usage.

3.5.2.3 Custom – Common Area Lighting

Finding 6. For the Custom – Common Area Lighting (MEA-2019.08.07-92787), the ex ante savings were calculated using the in service rate (ISR), waste heat factor for energy and demand (WHFe and WHFd) and coincidence factor (CF) values deemed for in-unit installs in the Section 5.3.8 of the TRM v7.0. Guidehouse used the ISR, WHFe and WHFd values deemed for common area installs from Section 4.5.4. Guidehouse also used 8,766 hours of operation and a CF of 1.00 representative of the continuous operation of these lights at the facility.

Recommendation 6. Guidehouse recommends using the TRM v7.0 Section 4.5.4 when calculating savings for lighting measures installed in the common area of multi-family buildings.

3.5.2.4 Custom – Pumps and Exhaust Fans

Finding 7. For the Custom – Pumps (MEA-2019.08.01-88948 and MEA-2019.09.20-99551), the ex ante savings were calculated using incorrect hours (138) for the temperature bin (0 °F – 5 °F). Guidehouse calculated the verified savings using 84 hours for the temperature bin (0 °F – 5 °F).

Recommendation 7. Guidehouse recommends updating the hours for the temperature bin (0 °F – 5 °F) to 84 hours.

Finding 8. For the Custom – Pumps and Exhaust Fans (MEA-2019.08.01-88948, MEA-2019.09.20-99551 and MEA-2019.10.21-103977), the ex ante calculations are using custom inputs for pump and fan motor efficiencies. Based on the review of the specification sheets provided by the IC, Guidehouse updated the verified savings calculations to use the most appropriate efficiency values as shown in the tables below.

Recommendation 8. Guidehouse recommends providing specification sheets or nameplate information for the baseline and efficient pump and fan motors to support the custom efficiency values going forward.

Table 3-13 MEA-2019.08.01-88948 Baseline Motor Efficiency Comparison

Baseline Motor HP	Ex Ante Efficiency	Ex Post Efficiency	Baseline Motor Model Numbe	Ex Post Source
3	80%	86.5%	Dayton 3KW34G	Specification Sheet
7.5	80%	88.5%	Baldor M3311T	Specification Sheet
1	80%	77.0%	Marathon M302	Specification Sheet
1/12	80%	44.0%	Series #100 H89	TRM v7.0 Page 285

Source: Evaluation team analysis

Table 3-14 MEA-2019.08.01-88948 Proposed Motor Efficiency Comparison

Proposed Motor HP	Ex Ante Efficiency	Ex Post Efficiency	Ex Post Source
1/3	95%	70.0%	TRM v7.0 Page 285 (NEMA Premium Efficiency Motor)
7.5	95%	91.0%	TRM v7.0 Page 285 (NEMA Premium Efficiency Motor)

Source: Evaluation team analysis

Table 3-15 MEA-2019.09.20-99551 Baseline Motor Efficiency Comparison

Baseline Motor HP	Ex Ante Efficiency	Ex Post Efficiency	Baseline Motor Model Numbe	Ex Post Source
7.5	91%	91.0%	Marathon PVH	Engineering Report
7.5	80%	88.5%	Baldor M3311T	Specification Sheet

Source: Evaluation team analysis

Table 3-16 MEA-2019.09.20-99551 Proposed Motor Efficiency Comparison

Proposed Motor HP	Ex Ante Efficiency	Ex Post Efficiency	Ex Post Source
7.5	95%	91.0%	TRM v7.0 Page 285 (NEMA Premium Efficiency Motor)

Source: Evaluation team analysis

3.5.2.5 Custom – BAS Controls

Finding 9. For the Custom – BAS Controls (MEA-2019.08.07-92790), the ex ante savings are calculated using the deemed approach from TRM v7.0 Section 4.4.21 and custom (1540 hours) heating effective full load hours (EFLH) . In the absence of any documentation supporting the use of custom EFLH values, Guidehouse calculated the verified savings using the TRM deemed heating EFLH values corresponding to the MF – High Rise – Residential building type.

Recommendation 9. Guidehouse recommends using TRM deemed heating EFLH values corresponding to the appropriate building type for this measure.

3.5.2.6 Custom - Boiler

Finding 10. For the Custom – Boiler (MEA-2019.08.07-92788), the ex ante savings are calculated using incorrect hours for the temperature bin (-10 °F to 39 °F) and incorrect combustion efficiency for the efficient boiler. Guidehouse updated the hours for the temperature bin (-10 °F to 39 °F) and updated the combustion efficiency for the boiler using specification sheets. Guidehouse also used a scaling factor, calculated as the ratio of normalized usage (using utility bill analysis) at the facility to the baseline usage as predicted by the custom calculations to ensure calibration. The savings calculated using the custom approach were multiplied by the scaling factor.

Recommendation 10. Guidehouse recommends updating the hours for the temperature bin (-10 °F to 39 °F) and updating the combustion efficiency for the boiler to match the specification sheets. Guidehouse also recommends the implementer calibrate the savings calculation to match the predicted baseline consumption with the actual usage at the facility.

Finding 11. For the Custom – Boiler (MEA-2019.09.20-99547), the baseline boiler consumption is calculated using incorrect hours for the temperature bins (0 °F to 5 °F and 20 °F to 39 °F) and incorrect % Run Hours for the Medium firing rate. While the classification of the firing rate in the analysis for the efficient boiler consumption does not correspond to the specified outside air temperature (OAT) range. Both the baseline and efficient boiler consumption is calculated using the % Run Hours rather than the % Run Time per Hour.

Recommendation 11. Guidehouse recommends using the % Run Time per Hours instead of the % Run Hours when calculating consumption for the boilers. Guidehouse also recommends

updating the hours for the temperature bins (0 °F to 5 °F and 20 °F to 39 °F), updating the % Run Hours for the medium firing rate of the baseline boiler and updating the classification of the firing rate for the efficient boiler based on OAT range.

Finding 12. For the Custom – DHW Boiler (MEA-2019.09.20-99547), the normalized usage at the facility, calculated using utility bill analysis does not align with the baseline usage calculated using the custom approach and is low as compared to the size of the building.

Recommendation 12. Guidehouse recommends collecting gas utility bills that reflect the actual gas consumption at the site for all meters going forward..

3.5.2.7 Custom – Rooftop Unit

Finding 13. For the Custom – Rooftop Unit (MEA-2019.07.02-86440), the ex ante kWh savings correspond to the cost savings from the measure. Guidehouse updated the verified savings to match the kWh savings as provided in the engineering report for this project.

Recommendation 13. Guidehouse recommends ensuring the ex ante kWh savings in the tracking data are indeed kWh savings and not cost savings for the measure.

3.5.2.8 Custom – Roof Replacement

Finding 14. For the Custom – Roof Replacement (MEA-2019.04.03-70944), the annual normalized usage at the facility calculated using utility bill analysis aligns with the baseline annual usage calculated using the custom approach. However, the utility billing analysis indicates that a portion of the annual therms usage at the facility is independent of the OAT (possible DHW consumption). While the ex ante calculations assume the entire annual therms usage at the facility corresponds to space heating usage. Guidehouse calculated savings for this measure for just the space heating portion of the annual therms usage as indicated by the utility bill analysis using a monthly scaling factor.

Table 3-17. Adjusted baseline therms based on Billing Data Analysis

Month	Total Therms Ex Ante Baseline	Total Therms Normalized (Utility Bill Analysis)
January	6,688	3,448
February	5,106	3,119
March	4,198	2,777
April	1,677	2,345
May	270	1,976
June	0	1,713
July	0	1,641
August	0	1,665
September	0	1,786
October	1,057	2,223
November	3,405	2,672
December	6,050	3,371
Annual	28,451	28,736

Source: ComEd tracking data and evaluation team analysis

Recommendation 14. Guidehouse recommends calibrating the building simulation models to ensure that the models use the relevant usage history depending on whether the measure impacts domestic hot water or space heating consumption.

3.5.2.9 Low Flow Aerator and Showerhead Secondary Water Savings

Finding 15. The evaluation team found that measures the ex ante energy savings did not incorporate energy savings from water. We included secondary electric savings from water supply regardless of if installed in a home with an electric or gas domestic hot water system in our estimation of verified electric savings.

Recommendation 15. Guidehouse recommends that the implementer continue tracking gallons of water saved from these measures. ComEd informed that the implementer will only be reporting gallons of water saved in CY2019. It is our understanding that ComEd and implementer will work together to incorporate necessary calculations and include secondary kWh savings from water in ex ante savings going forward. Table 3-12 shows the secondary kWh savings for these measures.

3.5.2.10 Shell End Use Furnace Efficiency

Finding 16. The evaluation team calculated verified savings for measures in the Shell End Use using the existing heating system efficiency value and derating it by 15%, as deemed by the TRM v7.0. This deration was performed under the assumption that the existing heating system value provided had not been previously derated.

Recommendation 16. Guidehouse recommends using a derated furnace efficiency value when evaluating savings.

3.6 Appendix 1. Impact Analysis Methodology

Guidehouse determined verified gross savings for each program measure by:

- Reviewing the savings algorithm inputs in the measure workbook for agreement with the TRM v7.0.
- Validating that the savings algorithm was applied correctly.
- Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in Guidehouse's calculations if the workbook did not agree with the TRM.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

Guidehouse calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a net-to-gross ratio (NTG). In CY2019, the NTG estimates used to calculate the net verified savings were deemed as one, based on a consensus process through the Illinois Stakeholder Advisory Group (SAG)

Guidehouse used the following documents to verify the per-unit savings for each program measure:

- Final CY2019 tracking data: "IHWAP-MF_CY2019_EOY_Data_Rev2_01242020"
- Illinois Technical Reference Manual (TRM v7.0) for deemed input parameters or secondary evaluation research to verify any custom inputs used in the ex ante calculations
- Implementer Savings Calculations: "2019 HEWI Income Eligible Retrofits_Resource Innovations Savings Calculator"

3.7 Appendix 2. Total Resource Cost Detail

Table 3-15 shows the Total Resource Cost (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) are not included in this table and will be provided to the evaluation team later.

Table 3-18. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Verified Gross Electric Energy Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Verified Gross Gas Savings (Therms)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Verified Net Electric Energy Savings (kWh)	Verified Net Peak Demand Reduction (kW)	Verified Net Gas Savings (Therms)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
HVAC	Custom - Boiler	Each	2	25.0	No	0	0.00	101,458	0	0	1.00	1.00	1.00	0	0	101,458	0	0
HVAC	Gas High Efficiency Furnace (Early Replacement) ‡	Each	206	20.0	Yes	87,285	18.25	37,644	0	-836	1.00	1.00	1.00	87,285	18	37,644	0	-836
Shell	Custom - Air Sealing	Projects	160	13.0	No	0	0.00	15,796	0	0	1.00	1.00	1.00	0	0.00	15,796	0	0
Hot Water	Custom - DHW Heater	Each	2	20.0	No	0	0.00	10,630	0	0	1.00	1.00	1.00	0	0.00	10,630	0	0
Shell	Attic Insulation ‡	Sq Ft.	91,692	20.0	No	27,433	15.90	8,421	0	0	1.00	1.00	1.00	27,433	15.90	8,421	0	0
HVAC	Advanced Thermostat	Each	223	11.0	No	27,277	13.30	7,360	0	0	1.00	1.00	1.00	27,277	13.30	7,360	0	0
HVAC	Central Air Conditioner (Early Replacement) ‡	Each	171	15.0	Yes	124,793	173.91	0	0	0	1.00	1.00	1.00	124,793	173.91	0	0	0
Hot Water	Gas Water Heater (Early Replacement) ‡	Each	117	13.0	Yes	0	0.00	4,201	0	0	1.00	1.00	1.00	0	0.00	4,201	0	0
HVAC	Custom - Pumps	Each	2	12.0	No	103,350	0.00	0	0	0	1.00	1.00	1.00	103,350	0.00	0	0	0
BAS	Custom - BAS	Each	1	16.0	No	0	0.00	2,222	0	0	1.00	1.00	1.00	0	0.00	2,222	0	0
HVAC	Duct Insulation and Sealing ‡	Projects	12	20.0	No	3,463	1.56	1,598	0	0	1.00	1.00	1.00	3,463	1.56	1,598	0	0
Appliances	Refrigerator (Early Replacement) ‡	Each	226	17.0	Yes	96,103	14.49	0	0	0	1.00	1.00	1.00	96,103	14.49	0	0	0
Lighting	LED Specialty ‡	Each	1,640	10.0	No	66,025	9.56	0	0	-1,423	1.00	1.00	1.00	66,025	9.56	0	0	-1,422
Shell	Custom - Roof Replacement	Each	1	10.0	No	6,049	0.00	1,369	0	0	1.00	1.00	1.00	6,049	0.00	1,369	0	0
Lighting	LED Standard ‡	Each	1,673	10.0	No	42,974	5.19	0	0	-977	1.00	1.00	1.00	42,974	5.19	0	0	-977
Hot Water	Domestic Hot Water Pipe Insulation	Sq Ft.	2,330	15.0	No	0	0.00	1,020	0	0	1.00	1.00	1.00	0	0.00	1,020	0	0
Lighting	Custom - Area Lighting	Each	96	5.7	No	27,759	3.67	0	0	0	1.00	1.00	1.00	27,759	3.67	0	0	0
Shell	Basement Sidewall Insulation ‡	Sq Ft.	4,272	20.0	Yes	1,384	0.60	663	0	0	1.00	1.00	1.00	1,384	0.60	663	0	0
HVAC	Bathroom Exhaust Fan	Each	170	19.0	No	15,270	1.77	0	0	0	1.00	1.00	1.00	15,270	1.77	0	0	0
Hot Water	Low Flow Faucet Aerator	Each	328	10.0	No	0	0.00	496	0	0	1.00	1.00	1.00	0	0.00	496	0	0
HVAC	Custom - Rooftop Exhaust Fan	Each	183	19.0	No	11,345	0.00	0	0	0	1.00	1.00	1.00	11,345	0.00	0	0	0
Shell	Air Sealing ‡	Projects	12	20.0	No	894	0.61	195	0	0	1.00	1.00	1.00	894	0.61	195	0	0
HVAC	Custom - Rooftop Unit	Each	95	10.0	No	6,018	0.00	0	0	0	1.00	1.00	1.00	6,018	0.00		0	0
HVAC	Room Air Conditioner ‡	Each	108	12.0	Yes	4,968	7.03	0	0	0	1.00	1.00	1.00	4,968	7.03	0	0	0
Hot Water	Low Flow Showerhead	Each	80	10.0	No	0	0.00	145	0	0	1.00	1.00	1.00	0	0.00	145	0	0
Appliances	Freezer	Each	2	22.0	No	62	0.01	0	0	0	1.00	1.00	1.00	62	0.01	0	0	0
	Total		103,804	20.9	NA	652,452	266	193,216	0	-3,236	NA	NA	NA	652,452	266	193,216	0	-3,234

Note: To avoid double counting, the verified gross kWh and net kWh used in the TRC analysis excludes secondary energy savings from water reduction measures.Table 3-15 represents the kWh savings from Table 3-6 minus those shown in Table 3-11)

* 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 EUL for this measure varies over time. See the CPAS tables (Table 3-3 to Table 3-5).

Source: ComEd tracking data and evaluation team analysis

4. Appendix 1. Total Program Savings Detail

Table 4-1 summarizes the incremental energy and demand savings the Multi-Family Retrofits Program achieved in CY2019. The 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.[3]

Table 4-1. CY2019 Total Program Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Non-Coincident Demand Savings (kW)	Summer Peak* Demand Savings (kW)
Electricity			
Ex Ante Gross Savings	4,913,756	NR	865
Program Gross Realization Rate	0.90	NA	0.97
Verified Gross Savings	4,435,178	1,880	843
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	4,435,178	1,880	843
Converted from Gas†			
Ex Ante Gross Savings	19,119,042	NA	NA
Program Gross Realization Rate	1.02	NA	NA
Verified Gross Savings	19,531,208	NA	NA
Program Net-to-Gross Ratio (NTG)	1.00	NA	NA
Verified Net Savings	19,531,208	NA	NA
Total Electric Plus Gas			
Ex Ante Gross Savings	24,034,614	NR	865
Program Gross Realization Rate	1.00	NA	0.97
Verified Gross Savings	23,966,386	1,880	843
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	23,966,386	1,880	843

[3] The evaluation will determine which gas savings will be counted toward goal while producing the portfolio-wide Summary Report.