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ComEd Income Eligible Multi-Family Retrofits Program Impact Evaluation Report

Energy Efficiency/Demand Response Plan: Program Year 2021 (CY2021) (1/1/2021-12/31/2021)

Prepared for:

ComEd

FINAL

April 25, 2022

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1. Introduction

This report presents the results of the impact evaluation of the CY2021 Multi-Family Retrofits – Income Eligible (IE) Program. It summarizes the total energy and demand impacts for the program broken out by relevant measure and program structure details. The appendices provide the impact analysis methodology and details of the total resource cost (TRC) analysis inputs. CY2021 covers January 1, 2021 through December 31, 2021.

2. Program Description

The Multi-Family Retrofits – Income Eligible Program offers direct installation of energy efficiency measures, replacement of inefficient equipment, and educational information to save money on energy bills. Eligible measures include light-emitting diode (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 vents, electrical repairs, and asbestos and mold remediation.

This program has two components:

- The Income Eligible Multi-Family Savings (IEMS) program component is administered by ComEd, Peoples Gas, and North Shore Gas and is implemented by Elevate Energy.
- The Multi-Family Retrofits – Illinois Home Weatherization Assistance Program (IHWAP) program component is administered by ComEd, Peoples Gas, North Shore Gas, and Nicor Gas and is implemented by Resource Innovations in partnership with IHWAP.

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

This report addresses only the ComEd savings. Gas savings the gas utilities can claim are in separate reports.

The IEMS program component had 483 participants and distributed 25,038 measures in CY2021. The IHWAP program component had 38 participants and distributed 5,638 measures in CY2021 (see Table 2-1).

Table 2-1. Number of Participants and Projects

Participation	IEMS	IHWAP	Total
Total Participants	483	38	**521**
Measures Installed	25,038	5,638	**30,676**
Total Projects	848	44	**892**

Source: ComEd tracking data and evaluation team analysis

The IEMS program component included the measures shown in Table 2-2 and Figure 2-1.

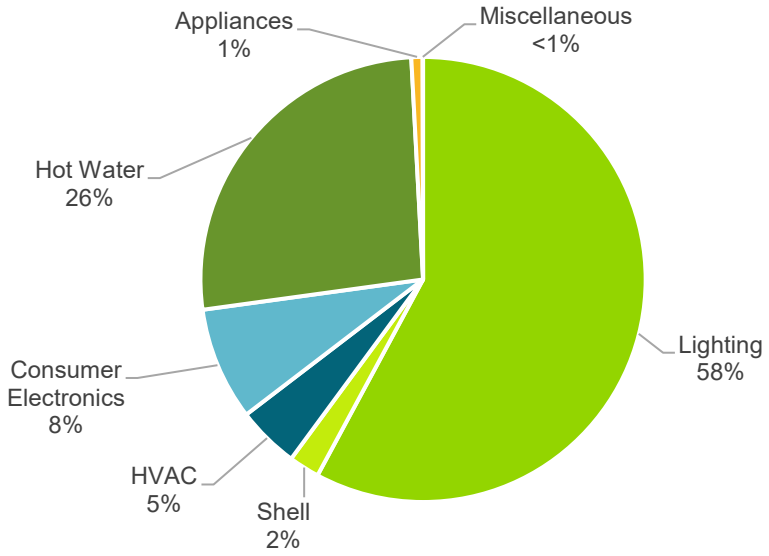
Table 2-2. IEMS Number of Measures by Type

End Use Type	Research Category	Quantity	Unit
Shell	CA Attic Insulation and Air Sealing	198	Projects
Lighting	LED CA Interior - Omnidirectional	1,628	Lamp
Lighting	LED CA Exterior - Fixture	606	Lamp
HVAC	IU PTHP	2	Projects
Lighting	Occupancy Sensor	3	Projects
Lighting	LED CA Interior 24/7 - Fixture	1,265	Lamp
Lighting	LED IU Interior - Omnidirectional	5,554	Lamp
Lighting	LED CA Interior High Rise - T12	372	Lamp
Lighting	LED CA Interior High Rise - T8	858	Lamp
Lighting	LED Exit Sign	477	Exit Sign
HVAC	IU Air Source Heat Pump	6	Projects
Lighting	LED CA Interior Mid Rise - T12	356	Lamp
Consumer Electronics	IU Advanced Power Strip	2,056	Each
Shell	CA Sidewall Insulation	37	Projects
Lighting	LED IU Interior - Decorative	2,395	Lamp
Appliances	IU Refrigerator	187	Each
Lighting	LED CA Interior Mid Rise - T8	357	Lamp
Shell	CA Floor Insulation	19	Projects
HVAC	IU Advanced Thermostat	337	Each
Hot Water	IU Kitchen Aerator	2,138	Each
Hot Water	IU Showerhead	1,494	Each
Lighting	LED CA Exterior - Omnidirectional	155	Lamp
Lighting	LED CA Exterior 24/7 - Fixture	99	Lamp
Lighting	LED CA Interior - Decorative	70	Lamp
HVAC	IU AC Cover and Gap Sealer	132	Each
Lighting	LED CA Interior - Directional	48	Lamp
Lighting	LED CA Garage - Fixture	24	Lamp
HVAC	IU Programmable Thermostat	262	Each
Appliances	IU Room Air Conditioner	17	Projects
Hot Water	IU Bathroom Aerator	1,281	Each
HVAC	IU Air Conditioner	9	Projects
Lighting	LED IU Interior - Directional	201	Lamp
Hot Water	CA On-Demand DHW Control	6	Projects
Hot Water	IU Shower Timer	1,671	Each
Lighting	LED IU Exterior - Omnidirectional	20	Lamp
Shell	CA Door Weatherstrip	158	Doors
Shell	CA Door Sweep	145	146
Shell	CA Wall Insulation	2	Projects
Miscellaneous	CA Advanced Power Strip	8	Each
HVAC	CA ECM Blower	1	Each
HVAC	IU Reprogram Thermostat	17	Each
HVAC	CA Steam Trap	143	Each
Hot Water	IU DHW Pipe Insulation	1	Projects
HVAC	CA Pipe Insulation	133	Projects
HVAC	CA Steam Boiler	66	Projects
HVAC	CA Averaging Controls	13	Projects
HVAC	CA Hydronic Boiler	2	Projects
HVAC	IU Furnace	8	Projects
Hot Water	IU DHW Heater	1	Projects
	Total	**25,038**	

Note: The table is sorted by verified gross savings. Acronyms in the table: in-unit (IU), common area (CA), domestic hot water (DHW), air conditioner (AC), packaged terminal heat pump (PTHP), and not applicable (NA).

Source: ComEd tracking data and evaluation team analysis

Figure 2-1. IEMS Share of Measures Installed by End Use Type



Source: ComEd tracking data and evaluation team analysis

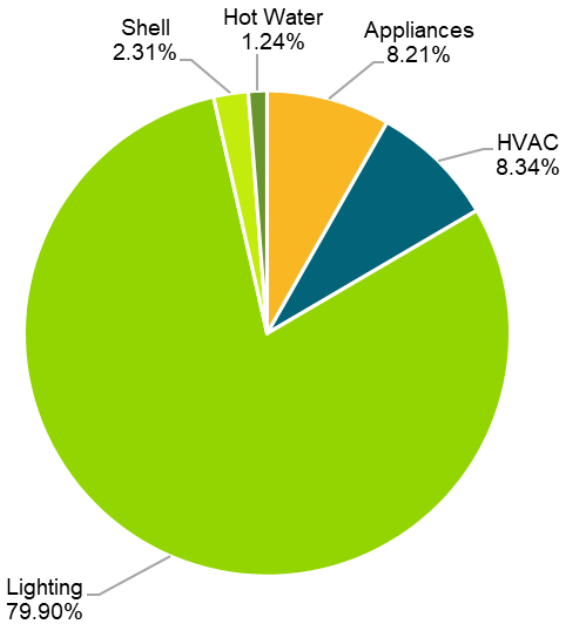
The IHWAP program component included the measures shown in Table 2-3 and Figure 2-2.

Table 2-3. IHWAP Number of Measures by Type

End Use Type	Research Category	Quantity	Unit
Appliances	Refrigerator	263	Each
HVAC	High Efficiency Bathroom Exhaust Fan	453	Each
HVAC	Custom - Heating Plant Improvements	3	Project
Appliances	Room Air Conditioner	200	Each
Lighting	LED Specialty Lamps - Indoor	3,791	Lamp
Lighting	LED Screw Based Omnidirectional Bulbs	700	Lamp
HVAC	Custom - Rooftop Units	3	Project
HVAC	Custom - HHW Pump	2	Project
Lighting	LED Specialty Lamps - Outdoor	14	Lamp
Shell	Attic Insulation	7	Each
HVAC	Advanced Thermostats	5	Project
HVAC	Residential Furnace Tune-Up	4	Each
Hot Water	Low Flow Faucet Aerator	58	Each
Hot Water	Low Flow Showerhead	9	Each
Shell	Air Sealing	123	Project
Hot Water	Custom - DHW Boiler	3	Project
	Total	**5,638**	

Note: The table is sorted by verified gross savings. Acronyms in the table: Domestic Hot Water (DHW)
Source: ComEd tracking data and evaluation team analysis

Figure 2-2. IHWAP Share of Measures Installed by End Use Type



Source: ComEd tracking data and evaluation team analysis

3. Program Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the IEMS program component achieved in CY2021. The gas savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim.[1]

Table 3-1. IEMS Total Annual Incremental Electric Savings

Savings Category	Units	Ex Ante Gross Savings	Program Gross Realization Rate	Verified Gross Savings	Program Net-to-Gross Ratio (NTG)	CY2019 Net Carryover Savings	CY2020 Net Carryover Savings	Verified Net Savings
Electric Energy Savings - Direct	kWh	4,350,903	1.00	4,369,191	1.00	N/A	N/A	4,369,191
Electric Energy Savings - Converted from Gas‡	kWh	19,292,499	1.00	19,383,645	1.00	N/A	N/A	19,383,645
Total Electric Energy Savings	kWh	23,643,402	1.00	23,752,835	1.00	N/A	N/A	23,752,835
Summer Peak§ Demand Savings	kW	570	0.83	475	1.00	N/A	N/A	475

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

‡ Gas savings are converted to kilowatt-hours (kWh) by multiplying therms by 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh). The evaluation team 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.”

§ The coincident summer peak period is defined as 1:00-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.

The “Verified Net Savings” in row one (Electric Energy Savings – Direct) includes primary kWh savings as a result of measure implementation, as well as secondary kWh savings from waste water treatment. It does not include carry over savings from CY2019 and CY2020 since that is not done for this program, nor electric heating penalties as all program lighting measures were installed in Natural Gas heated buildings.

Source: ComEd tracking data and evaluation team analysis

Table 3-2 summarizes the incremental energy and demand savings the IHWAP program component achieved in CY2021. The gas savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim.[2]

Table 3-2. IHWAP Total Annual Incremental Electric Savings

Savings Category	Units	Ex Ante Gross Savings	Program Gross Realization Rate	Verified Gross Savings	Program Net-to-Gross Ratio (NTG)	CY2019 Net Carryover Savings	CY2020 Net Carryover Savings	Verified Net Savings‡
Electric Energy Savings - Direct	kWh	350,799	0.99	348,535	1.00	N/A	N/A	348,535
Electric Energy Savings - Converted from Gas*	kWh	1,286,389	0.97	1,247,553	1.00	N/A	N/A	1,247,553
Total Electric Energy Savings	kWh	1,637,188	0.97	1,596,089	1.00	N/A	N/A	1,596,089
Summer Peak† Demand Savings	kW	72	0.98	70	1.00	N/A	N/A	70

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

* Gas savings are converted to kWh by multiplying therms by 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.”

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

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

† The coincident summer peak period is defined as 1:00-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.
‡ The "Verified Net Savings" in row one (Electric Energy Savings – Direct) includes primary kWh savings as a result of measure implementation, as well as secondary kWh savings from waste water treatment. It does not include carry over savings from CY2019 and CY2020 since that is not done for this program, nor electric heating penalties as all program lighting measures were installed in Natural Gas heated buildings.

Source: ComEd tracking data and evaluation team analysis

4. Cumulative Persisting Annual Savings

4.1 IEMS

Table 4-1 to Table 4-3 and Figure 4-1 show the measure-specific and total verified gross savings for the IEMS program component and the cumulative persisting annual savings (CPAS) for the measures installed in CY2021. The electric CPAS across all measures installed in 2021 is shown in Table 4-1. The CY2021 gas contribution to CPAS (converted to equivalent electricity) is shown in Table 4-2. The combined savings are shown in Table 4-3. 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 CY2021 contribution and the historic contribution. Figure 4-1 shows the savings across the effective useful life (EUL) of the measures.

Table 4-1. IEMS Cumulative Persisting Annual Savings – Electric

End Use Type	Research Category	EUL	CY2021 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Shell	CA Attic Insulation and Air Sealing	20.0	1,286,633	1.00	25,703,740				1,286,633	1,286,633	1,286,633	1,286,633	1,286,633	1,286,633
Lighting	LED CA Interior - Omnidirectional	3.4	381,809	1.00	1,283,390				381,809	381,809	381,809	137,964		
Lighting	LED CA Exterior - Fixture	11.6	371,367	1.00	4,315,205				371,367	371,367	371,367	371,367	371,367	371,367
HVAC	IU PTHP	8.0	302,793	1.00	1,074,668				302,793	302,793	302,793	33,258	33,258	33,258
Lighting	Occupancy Sensor	10.0	261,373	1.00	2,613,729				261,373	261,373	261,373	261,373	261,373	261,373
Lighting	LED CA Interior 24/7 - Fixture	5.7	244,264	1.00	1,393,244				244,264	244,264	244,264	244,264	244,264	171,926
Lighting	LED IU Interior - Omnidirectional	10.0	197,123	1.00	1,237,932				197,123	197,123	197,123	197,123	74,907	74,907
Lighting	LED CA Interior High Rise - T12	8.1	198,933	1.00	1,109,505				198,933	198,933	128,127	113,392	113,392	113,392
Lighting	LED CA Interior High Rise - T8	8.1	154,856	1.00	1,261,454				154,856	154,856	154,856	154,856	154,856	154,856
Lighting	LED Exit Sign	5.0	126,465	1.00	632,326				126,465	126,465	126,465	126,465	126,465	
HVAC	IU Air Source Heat Pump	16.0	122,972	1.00	1,967,560				122,972	122,972	122,972	122,972	122,972	122,972
Lighting	LED CA Interior Mid Rise - T12	9.6	94,876	1.00	622,686				94,876	94,876	76,772	54,079	54,079	54,079
Consumer Electronics	IU Advanced Power Strip	7.0	84,707	1.00	592,950				84,707	84,707	84,707	84,707	84,707	84,707
Shell	CA Sidewall Insulation	20.0	71,012	1.00	1,394,681				71,012	71,012	71,012	71,012	71,012	71,012
Lighting	LED IU Interior - Decorative	10.0	60,235	1.00	461,397				60,235	60,235	60,235	60,235	36,743	36,743
Appliances	IU Refrigerator	17.0	57,544	1.00	426,049				57,544	57,544	57,544	57,544	57,544	57,544
Lighting	LED CA Interior Mid Rise - T8	9.6	53,279	1.00	510,723				53,279	53,279	53,279	53,279	53,279	53,279
Shell	CA Floor Insulation	20.0	53,095	1.00	1,061,891				53,095	53,095	53,095	53,095	53,095	53,095
HVAC	IU Advanced Thermostat	11.0	49,769	1.00	547,456				49,769	49,769	49,769	49,769	49,769	49,769
Hot Water	IU Kitchen Aerator	10.0	28,548	1.00	285,483				28,548	28,548	28,548	28,548	28,548	28,548
Hot Water	IU Showerhead	10.0	26,389	1.00	263,886				26,389	26,389	26,389	26,389	26,389	26,389
Lighting	LED CA Exterior - Omnidirectional	4.6	22,393	1.00	95,085				22,393	22,393	22,393	22,393	5,513	
Lighting	LED CA Exterior 24/7 - Fixture	5.7	18,514	1.00	105,600				18,514	18,514	18,514	18,514	18,514	13,031
Lighting	LED CA Interior - Decorative	2.9	11,883	1.00	33,950				11,883	11,883	10,185			
HVAC	IU AC Cover and Gap Sealer	5.0	14,433	1.00	72,164				14,433	14,433	14,433	14,433	14,433	
Lighting	LED CA Interior - Directional	4.2	11,357	1.00	46,803				11,357	11,357	11,357	11,357	1,374	
Lighting	LED CA Garage - Fixture	14.7	10,306	1.00	151,508				10,306	10,306	10,306	10,306	10,306	10,306
HVAC	IU Programmable Thermostat	16.0	9,784	1.00	79,052				9,784	9,784	9,784	9,784	9,784	2,739
Appliances	IU Room Air Conditioner	12.0	9,193	1.00	110,321				9,193	9,193	9,193	9,193	9,193	9,193
Hot Water	IU Bathroom Aerator	10.0	6,480	1.00	64,804				6,480	6,480	6,480	6,480	6,480	6,480
HVAC	IU Air Conditioner	18.0	6,168	1.00	59,274				6,168	6,168	6,168	6,168	6,168	6,168
Lighting	LED IU Interior - Directional	10.0	6,141	1.00	46,675				6,141	6,141	6,141	6,141	3,685	3,685
Hot Water	CA On-Demand DHW Control	15.0	3,936	1.00	59,040				3,936	3,936	3,936	3,936	3,936	3,936
Hot Water	IU Shower Timer	2.0	3,380	1.00	6,761				3,380	3,380				
Lighting	LED IU Exterior - Omnidirectional	8.0	1,590	1.00	8,779				1,590	1,590	1,590	1,590	604	604
Shell	CA Door Weatherstrip	20.0	1,165	1.00	23,296				1,165	1,165	1,165	1,165	1,165	1,165
Shell	CA Door Sweep	20.0	1,094	1.00	21,874				1,094	1,094	1,094	1,094	1,094	1,094
Shell	CA Wall Insulation	20.0	945	1.00	16,958				945	945	945	945	945	945
Miscellaneous	CA Advanced Power Strip	7.0	869	1.00	6,080				869	869	869	869	869	869
HVAC	CA ECM Blower	16.5	644	1.00	10,626				644	644	644	644	644	644
HVAC	IU Reprogram Thermostat	2.0	633	1.00	1,267				633	633				
HVAC	CA Steam Trap	6.0	147	1.00	881				147	147	147	147	147	147
Hot Water	IU DHW Pipe Insulation	15.0	96	1.00	1,441				96	96	96	96	96	96
HVAC	CA Pipe Insulation	15.0	-	1.00	-				-	-	-	-	-	-
HVAC	CA Steam Boiler	25.0	-	1.00	-				-	-	-	-	-	-
HVAC	CA Averaging Controls	20.0	-	1.00	-				-	-	-	-	-	-
HVAC	CA Hydronic Boiler	25.0	-	1.00	-				-	-	-	-	-	-
HVAC	IU Furnace	20.0	-	1.00	-				-	-	-	-	-	-
Hot Water	IU DHW Heater	13.0	-	1.00	-				-	-	-	-	-	-
CY2021 Program Total Electric Contribution to CPAS			**4,369,191**		**49,782,195**				**4,369,191**	**4,369,191**	**4,274,570**	**3,713,578**	**3,399,601**	**3,166,951**
Historic Program Total Electric Contribution to CPAS‡						**3,824,064**	**7,350,293**	**9,116,861**	**8,471,998**	**8,253,471**	**7,810,269**	**6,445,382**	**5,290,778**	**4,478,116**
Program Total Electric CPAS						**3,824,064**	**7,350,293**	**9,116,861**	**12,841,189**	**12,622,662**	**12,084,839**	**10,158,960**	**8,690,378**	**7,645,067**
CY2021 Program Incremental Expiring Electric Savings§										**-**	**94,621**	**560,992**	**313,977**	**232,650**
Historic Program Incremental Expiring Electric Savings									**644,862**	**218,527**	**443,202**	**1,364,887**	**1,154,604**	**812,662**
Program Total Incremental Expiring Electric Savings									**644,862**	**218,527**	**537,824**	**1,925,879**	**1,468,581**	**1,045,312**

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Shell	CA Attic Insulation and Air Sealing	1,286,633	1,286,633	1,286,633	1,286,633	1,283,741	1,283,741	1,283,741	1,283,741	1,283,741	1,283,741	1,283,741	1,283,741
Lighting	LED CA Interior - Omnidirectional												
Lighting	LED CA Exterior - Fixture	371,367	371,367	371,367	371,367	371,367	230,173						
HVAC	IU PTHP	33,258	33,258										
Lighting	Occupancy Sensor	261,373	261,373	261,373	261,373								
Lighting	LED CA Interior 24/7 - Fixture												
Lighting	LED IU Interior - Omnidirectional	74,907	74,907	74,907	74,907								
Lighting	LED CA Interior High Rise - T12	113,392	113,392	16,552									
Lighting	LED CA Interior High Rise - T8	154,856	154,856	22,605									
Lighting	LED Exit Sign												
HVAC	IU Air Source Heat Pump	122,972	122,972	122,972	122,972	122,972	122,972	122,972	122,972	122,972	122,972		
Lighting	LED CA Interior Mid Rise - T12	54,079	54,079	54,079	31,685								
Consumer Electronics	IU Advanced Power Strip	84,707											
Shell	CA Sidewall Insulation	71,012	71,012	71,012	71,012	68,456	68,456	68,456	68,456	68,456	68,456	68,456	68,456
Lighting	LED IU Interior - Decorative	36,743	36,743	36,743	36,743								
Appliances	IU Refrigerator	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	
Lighting	LED CA Interior Mid Rise - T8	53,279	53,279	53,279	31,215								
Shell	CA Floor Insulation	53,095	53,095	53,095	53,095	53,095	53,095	53,095	53,095	53,095	53,095	53,095	53,095
HVAC	IU Advanced Thermostat	49,769	49,769	49,769	49,769	49,769							
Hot Water	IU Kitchen Aerator	28,548	28,548	28,548	28,548								
Hot Water	IU Showerhead	26,389	26,389	26,389	26,389								
Lighting	LED CA Exterior - Omnidirectional												
Lighting	LED CA Exterior 24/7 - Fixture												
Lighting	LED CA Interior - Decorative												
HVAC	IU AC Cover and Gap Sealer												
Lighting	LED CA Interior - Directional												
Lighting	LED CA Garage - Fixture	10,306	10,306	10,306	10,306	10,306	10,306	10,306	10,306	7,230			
HVAC	IU Programmable Thermostat	2,739	2,739	2,739	2,739	2,739	2,739	2,739	2,739	2,739	2,739		
Appliances	IU Room Air Conditioner	9,193	9,193	9,193	9,193	9,193	9,193						
Hot Water	IU Bathroom Aerator	6,480	6,480	6,480	6,480								
HVAC	IU Air Conditioner	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855
Lighting	LED IU Interior - Directional	3,685	3,685	3,685	3,685								
Hot Water	CA On-Demand DHW Control	3,936	3,936	3,936	3,936	3,936	3,936	3,936	3,936	3,936			
Hot Water	IU Shower Timer												
Lighting	LED IU Exterior - Omnidirectional	604	604										
Shell	CA Door Weatherstrip	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165	1,165
Shell	CA Door Sweep	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094	1,094
Shell	CA Wall Insulation	945	945	945	945	751	751	751	751	751	751	751	751
Miscellaneous	CA Advanced Power Strip	869											
HVAC	CA ECM Blower	644	644	644	644	644	644	644	644	644	644	322	
HVAC	IU Reprogram Thermostat												
HVAC	CA Steam Trap												
Hot Water	IU DHW Pipe Insulation	96	96	96	96	96	96	96	96	96			
HVAC	CA Pipe Insulation	-	-	-	-	-	-	-	-	-			
HVAC	CA Steam Boiler	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	CA Averaging Controls	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	CA Hydronic Boiler	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	IU Furnace	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	IU DHW Heater	-	-	-	-	-	-	-					
CY2021 Program Total Electric Contribution to CPAS		**2,927,333**	**2,841,757**	**2,578,804**	**2,495,189**	**1,988,523**	**1,797,561**	**1,558,194**	**1,558,194**	**1,555,119**	**1,543,857**	**1,417,823**	**1,410,157**
Historic Program Total Electric Contribution to CPAS‡		**4,087,064**	**3,527,745**	**3,334,650**	**3,017,699**	**2,663,388**	**2,580,468**	**1,887,300**	**1,341,824**	**1,233,463**	**1,201,987**	**1,196,684**	**1,176,059**
Program Total Electric CPAS		**7,014,397**	**6,369,502**	**5,913,454**	**5,512,888**	**4,651,911**	**4,378,028**	**3,445,495**	**2,900,018**	**2,788,582**	**2,745,844**	**2,614,507**	**2,586,216**
CY2021 Program Incremental Expiring Electric Savings§		**239,618**	**85,576**	**262,953**	**83,616**	**506,665**	**190,962**	**239,366**	**-**	**3,076**	**11,262**	**126,034**	**7,666**
Historic Program Incremental Expiring Electric Savings		**391,052**	**559,320**	**193,095**	**316,950**	**354,311**	**82,920**	**693,167**	**545,476**	**108,361**	**31,475**	**5,303**	**20,625**
Program Total Incremental Expiring Electric Savings		**630,670**	**644,895**	**456,047**	**400,566**	**860,977**	**273,883**	**932,534**	**545,476**	**111,437**	**42,737**	**131,337**	**28,291**

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Shell	CA Attic Insulation and Air Sealing	1,283,741	1,283,741										
Lighting	LED CA Interior - Omnidirectional												
Lighting	LED CA Exterior - Fixture												
HVAC	IU PTHP												
Lighting	Occupancy Sensor												
Lighting	LED CA Interior 24/7 - Fixture												
Lighting	LED IU Interior - Omnidirectional												
Lighting	LED CA Interior High Rise - T12												
Lighting	LED CA Interior High Rise - T8												
Lighting	LED Exit Sign												
HVAC	IU Air Source Heat Pump												
Lighting	LED CA Interior Mid Rise - T12												
Consumer Electronics	IU Advanced Power Strip												
Shell	CA Sidewall Insulation	68,456	68,456										
Lighting	LED IU Interior - Decorative												
Appliances	IU Refrigerator												
Lighting	LED CA Interior Mid Rise - T8												
Shell	CA Floor Insulation	53,095	53,095										
HVAC	IU Advanced Thermostat												
Hot Water	IU Kitchen Aerator												
Hot Water	IU Showerhead												
Lighting	LED CA Exterior - Omnidirectional												
Lighting	LED CA Exterior 24/7 - Fixture												
Lighting	LED CA Interior - Decorative												
HVAC	IU AC Cover and Gap Sealer												
Lighting	LED CA Interior - Directional												
Lighting	LED CA Garage - Fixture												
HVAC	IU Programmable Thermostat												
Appliances	IU Room Air Conditioner												
Hot Water	IU Bathroom Aerator												
HVAC	IU Air Conditioner												
Lighting	LED IU Interior - Directional												
Hot Water	CA On-Demand DHW Control												
Hot Water	IU Shower Timer												
Lighting	LED IU Exterior - Omnidirectional												
Shell	CA Door Weatherstrip	1,165	1,165										
Shell	CA Door Sweep	1,094	1,094										
Shell	CA Wall Insulation	751	751										
Miscellaneous	CA Advanced Power Strip												
HVAC	CA ECM Blower												
HVAC	IU Reprogram Thermostat												
HVAC	CA Steam Trap												
Hot Water	IU DHW Pipe Insulation												
HVAC	CA Pipe Insulation												
HVAC	CA Steam Boiler	-	-	-	-	-	-	-					
HVAC	CA Averaging Controls	-	-										
HVAC	CA Hydronic Boiler	-	-	-	-	-	-	-					
HVAC	IU Furnace	-	-										
Hot Water	IU DHW Heater												
CY2021 Program Total Electric Contribution to CPAS		**1,408,302**	**1,408,302**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Historic Program Total Electric Contribution to CPAS‡		**1,075,050**	**224,116**	**224,116**	**224,116**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total Electric CPAS		**2,483,352**	**1,632,418**	**224,116**	**224,116**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Electric Savings§		**1,855**	**-**	**1,408,302**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Electric Savings		**101,009**	**850,934**	**-**	**-**	**224,116**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total Incremental Expiring Electric Savings		**102,864**	**850,934**	**1,408,302**	**-**	**224,116**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Note: The green highlighted cell shows program total first-year electric savings. The gray cells are blank, indicating values irrelevant to the CY2021 contribution to CPAS.

Acronyms in the table: in-unit (IU), common area (CA), domestic hot water (DHW), air conditioner (AC), packaged terminal heat pump (PTHP), and not applicable (NA).

* A deemed value. Source: Illinois Stakeholder Advisory Guild (SAG) website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

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

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Table 4-2. IEMS Cumulative Persisting Annual Savings – Gas

End Use Type	Research Category	EUL	CY2021 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	Verified Net Therms Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Shell	CA Attic Insulation and Air Sealing	20.0	167,678	1.00	3,293,068				167,678	167,678	167,678	167,678	167,678	167,678
Lighting	LED CA Interior - Omnidirectional	3.4	-	1.00	-				-	-	-	-		
Lighting	LED CA Exterior - Fixture	11.6	-	1.00	-				-	-	-	-	-	-
HVAC	IU PTHP	8.0	-	1.00	-				-	-	-	-	-	-
Lighting	Occupancy Sensor	10.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED CA Interior 24/7 - Fixture	5.7	-	1.00	-				-	-	-	-	-	-
Lighting	LED IU Interior - Omnidirectional	10.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED CA Interior High Rise - T12	8.1	-	1.00	-				-	-	-	-	-	-
Lighting	LED CA Interior High Rise - T8	8.1	-	1.00	-				-	-	-	-	-	-
Lighting	LED Exit Sign	5.0	-	1.00	-				-	-	-	-	-	
HVAC	IU Air Source Heat Pump	16.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED CA Interior Mid Rise - T12	9.6	-	1.00	-				-	-	-	-	-	-
Consumer Electronics	IU Advanced Power Strip	7.0	-	1.00	-				-	-	-	-	-	-
Shell	CA Sidewall Insulation	20.0	39,395	1.00	764,720				39,395	39,395	39,395	39,395	39,395	39,395
Lighting	LED IU Interior - Decorative	10.0	-	1.00	-				-	-	-	-	-	-
Appliances	IU Refrigerator	17.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED CA Interior Mid Rise - T8	9.6	-	1.00	-				-	-	-	-	-	-
Shell	CA Floor Insulation	20.0	465	1.00	8,895				465	465	465	465	465	465
HVAC	IU Advanced Thermostat	11.0	22,128	1.00	243,408				22,128	22,128	22,128	22,128	22,128	22,128
Hot Water	IU Kitchen Aerator	10.0	14,797	1.00	147,970				14,797	14,797	14,797	14,797	14,797	14,797
Hot Water	IU Showerhead	10.0	14,830	1.00	148,304				14,830	14,830	14,830	14,830	14,830	14,830
Lighting	LED CA Exterior - Omnidirectional	4.6	-	1.00	-				-	-	-	-	-	
Lighting	LED CA Exterior 24/7 - Fixture	5.7	-	1.00	-				-	-	-	-	-	-
Lighting	LED CA Interior - Decorative	2.9	-	1.00	-				-	-	-			
HVAC	IU AC Cover and Gap Sealer	5.0	181	1.00	906				181	181	181	181	181	
Lighting	LED CA Interior - Directional	4.2	-	1.00	-				-	-	-	-	-	
Lighting	LED CA Garage - Fixture	14.7	-	1.00	-				-	-	-	-	-	-
HVAC	IU Programmable Thermostat	16.0	9,788	1.00	81,692				9,788	9,788	9,788	9,788	9,788	2,978
Appliances	IU Room Air Conditioner	12.0	-	1.00	-				-	-	-	-	-	-
Hot Water	IU Bathroom Aerator	10.0	1,697	1.00	16,973				1,697	1,697	1,697	1,697	1,697	1,697
HVAC	IU Air Conditioner	18.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED IU Interior - Directional	10.0	-	1.00	-				-	-	-	-	-	-
Hot Water	CA On-Demand DHW Control	15.0	9,834	1.00	147,515				9,834	9,834	9,834	9,834	9,834	9,834
Hot Water	IU Shower Timer	2.0	5,524	1.00	11,048				5,524	5,524				
Lighting	LED IU Exterior - Omnidirectional	8.0	-	1.00	-				-	-	-	-	-	-
Shell	CA Door Weatherstrip	20.0	1,045	1.00	20,898				1,045	1,045	1,045	1,045	1,045	1,045
Shell	CA Door Sweep	20.0	894	1.00	17,878				894	894	894	894	894	894
Shell	CA Wall Insulation	20.0	617	1.00	11,926				617	617	617	617	617	617
Miscellaneous	CA Advanced Power Strip	7.0	-	1.00	-				-	-	-	-	-	-
HVAC	CA ECM Blower	16.5	-	1.00	-				-	-	-	-	-	-
HVAC	IU Reprogram Thermostat	2.0	616	1.00	1,231				616	616				
HVAC	CA Steam Trap	6.0	4,336	1.00	26,018				4,336	4,336	4,336	4,336	4,336	4,336
Hot Water	IU DHW Pipe Insulation	15.0	-	1.00	-				-	-	-	-	-	-
HVAC	CA Pipe Insulation	15.0	200,544	1.00	3,008,163				200,544	200,544	200,544	200,544	200,544	200,544
HVAC	CA Steam Boiler	25.0	123,697	1.00	3,092,436				123,697	123,697	123,697	123,697	123,697	123,697
HVAC	CA Averaging Controls	20.0	34,828	1.00	696,559				34,828	34,828	34,828	34,828	34,828	34,828
HVAC	CA Hydronic Boiler	25.0	6,377	1.00	159,423				6,377	6,377	6,377	6,377	6,377	6,377
HVAC	IU Furnace	20.0	1,986	1.00	39,727				1,986	1,986	1,986	1,986	1,986	1,986
Hot Water	IU DHW Heater	13.0	74	1.00	958				74	74	74	74	74	74
CY2021 Program Total Gas Contribution to CPAS (Therms)			**661,332**		**11,939,718**				**661,332**	**661,332**	**655,192**	**655,192**	**655,192**	**648,201**
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)‡						-	-	-	**19,383,645**	**19,383,645**	**19,203,690**	**19,203,690**	**19,203,690**	**18,998,773**
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§						**12,834,959**	**26,702,999**	**35,584,389**	**35,444,304**	**35,341,211**	**35,190,611**	**32,455,955**	**26,959,627**	**26,959,627**
Program Total Gas CPAS (kWh Equivalent)						**12,834,959**	**26,702,999**	**35,584,389**	**54,827,948**	**54,724,856**	**54,394,301**	**51,659,645**	**46,163,317**	**45,958,400**
CY2021 Program Incremental Expiring Gas Savings (Therms)										**-**	**6,140**	**-**	**-**	**6,991**
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent)‖										**-**	**179,955**	**-**	**-**	**204,917**
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)									**140,085**	**103,092**	**150,601**	**2,734,655**	**5,496,328**	**-**
Program Total Incremental Expiring Gas Savings (kWh Equivalent)									**140,085**	**103,092**	**330,555**	**2,734,655**	**5,496,328**	**204,917**

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Shell	CA Attic Insulation and Air Sealing	167,678	167,678	167,678	167,678	165,964	165,964	165,964	159,771	159,771	159,771	159,771	159,771
Lighting	LED CA Interior - Omnidirectional												
Lighting	LED CA Exterior - Fixture	-	-	-	-	-	-						
HVAC	IU PTHP	-	-										
Lighting	Occupancy Sensor	-	-	-	-								
Lighting	LED CA Interior 24/7 - Fixture												
Lighting	LED IU Interior - Omnidirectional	-	-	-	-								
Lighting	LED CA Interior High Rise - T12	-	-	-									
Lighting	LED CA Interior High Rise - T8	-	-	-									
Lighting	LED Exit Sign												
HVAC	IU Air Source Heat Pump	-	-	-	-	-	-	-	-	-	-		
Lighting	LED CA Interior Mid Rise - T12	-	-	-	-								
Consumer Electronics	IU Advanced Power Strip	-											
Shell	CA Sidewall Insulation	39,395	39,395	39,395	39,395	37,077	37,077	37,077	37,077	37,077	37,077	37,077	37,077
Lighting	LED IU Interior - Decorative	-	-	-	-								
Appliances	IU Refrigerator	-	-	-	-	-	-	-	-	-	-	-	
Lighting	LED CA Interior Mid Rise - T8	-	-	-	-								
Shell	CA Floor Insulation	465	465	465	465	465	465	465	408	408	408	408	408
HVAC	IU Advanced Thermostat	22,128	22,128	22,128	22,128	22,128							
Hot Water	IU Kitchen Aerator	14,797	14,797	14,797	14,797								
Hot Water	IU Showerhead	14,830	14,830	14,830	14,830								
Lighting	LED CA Exterior - Omnidirectional												
Lighting	LED CA Exterior 24/7 - Fixture												
Lighting	LED CA Interior - Decorative												
HVAC	IU AC Cover and Gap Sealer												
Lighting	LED CA Interior - Directional												
Lighting	LED CA Garage - Fixture	-	-	-	-	-	-	-	-	-			
HVAC	IU Programmable Thermostat	2,978	2,978	2,978	2,978	2,978	2,978	2,978	2,978	2,978	2,978		
Appliances	IU Room Air Conditioner	-	-	-	-	-	-						
Hot Water	IU Bathroom Aerator	1,697	1,697	1,697	1,697								
HVAC	IU Air Conditioner	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED IU Interior - Directional	-	-	-	-								
Hot Water	CA On-Demand DHW Control	9,834	9,834	9,834	9,834	9,834	9,834	9,834	9,834	9,834			
Hot Water	IU Shower Timer												
Lighting	LED IU Exterior - Omnidirectional	-	-										
Shell	CA Door Weatherstrip	1,045	1,045	1,045	1,045	1,045	1,045	1,045	1,045	1,045	1,045	1,045	1,045
Shell	CA Door Sweep	894	894	894	894	894	894	894	894	894	894	894	894
Shell	CA Wall Insulation	617	617	617	617	594	594	594	567	567	567	567	567
Miscellaneous	CA Advanced Power Strip	-											
HVAC	CA ECM Blower	-	-	-	-	-	-	-	-	-	-	-	
HVAC	IU Reprogram Thermostat												
HVAC	CA Steam Trap												
Hot Water	IU DHW Pipe Insulation	-	-	-	-	-	-	-	-	-			
HVAC	CA Pipe Insulation	200,544	200,544	200,544	200,544	200,544	200,544	200,544	200,544	200,544			
HVAC	CA Steam Boiler	123,697	123,697	123,697	123,697	123,697	123,697	123,697	123,697	123,697	123,697	123,697	123,697
HVAC	CA Averaging Controls	34,828	34,828	34,828	34,828	34,828	34,828	34,828	34,828	34,828	34,828	34,828	34,828
HVAC	CA Hydronic Boiler	6,377	6,377	6,377	6,377	6,377	6,377	6,377	6,377	6,377	6,377	6,377	6,377
HVAC	IU Furnace	1,986	1,986	1,986	1,986	1,986	1,986	1,986	1,986	1,986	1,986	1,986	1,986
Hot Water	IU DHW Heater	74	74	74	74	74	74	74					
CY2021 Program Total Gas Contribution to CPAS (Therms)		**643,865**	**643,865**	**643,865**	**643,865**	**608,486**	**586,358**	**586,358**	**580,007**	**580,007**	**369,628**	**366,650**	**366,650**
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		**18,871,673**	**18,871,673**	**18,871,673**	**18,871,673**	**17,834,722**	**17,186,150**	**17,186,150**	**16,999,994**	**16,999,994**	**10,833,798**	**10,746,525**	**10,746,525**
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§		**26,588,434**	**24,999,828**	**24,576,012**	**24,133,379**	**24,124,135**	**24,091,026**	**20,127,513**	**17,901,036**	**15,133,498**	**15,133,498**	**15,133,498**	**12,853,371**
Program Total Gas CPAS (kWh Equivalent)		**45,460,106**	**43,871,501**	**43,447,685**	**43,005,052**	**41,958,857**	**41,277,176**	**37,313,663**	**34,901,029**	**32,133,492**	**25,967,296**	**25,880,024**	**23,599,896**
CY2021 Program Incremental Expiring Gas Savings (Therms)		**4,336**	**-**	**-**	**-**	**35,379**	**22,128**	**-**	**6,351**	**-**	**210,379**	**2,978**	**-**
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent)‖		**127,100**	**-**	**-**	**-**	**1,036,950**	**648,573**	**-**	**186,156**	**-**	**6,166,196**	**87,272**	**-**
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)		**371,194**	**1,588,605**	**423,816**	**442,633**	**9,244**	**33,109**	**3,963,513**	**2,226,477**	**2,767,537**	**-**	**-**	**2,280,128**
Program Total Incremental Expiring Gas Savings (kWh Equivalent)		**498,294**	**1,588,605**	**423,816**	**442,633**	**1,046,194**	**681,681**	**3,963,513**	**2,412,633**	**2,767,537**	**6,166,196**	**87,272**	**2,280,128**

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Shell	CA Attic Insulation and Air Sealing	159,771	159,771										
Lighting	LED CA Interior - Omnidirectional												
Lighting	LED CA Exterior - Fixture												
HVAC	IU PTHP												
Lighting	Occupancy Sensor												
Lighting	LED CA Interior 24/7 - Fixture												
Lighting	LED IU Interior - Omnidirectional												
Lighting	LED CA Interior High Rise - T12												
Lighting	LED CA Interior High Rise - T8												
Lighting	LED Exit Sign												
HVAC	IU Air Source Heat Pump												
Lighting	LED CA Interior Mid Rise - T12												
Consumer Electronics	IU Advanced Power Strip												
Shell	CA Sidewall Insulation	37,077	37,077										
Lighting	LED IU Interior - Decorative												
Appliances	IU Refrigerator												
Lighting	LED CA Interior Mid Rise - T8												
Shell	CA Floor Insulation	408	408										
HVAC	IU Advanced Thermostat												
Hot Water	IU Kitchen Aerator												
Hot Water	IU Showerhead												
Lighting	LED CA Exterior - Omnidirectional												
Lighting	LED CA Exterior 24/7 - Fixture												
Lighting	LED CA Interior - Decorative												
HVAC	IU AC Cover and Gap Sealer												
Lighting	LED CA Interior - Directional												
Lighting	LED CA Garage - Fixture												
HVAC	IU Programmable Thermostat												
Appliances	IU Room Air Conditioner												
Hot Water	IU Bathroom Aerator												
HVAC	IU Air Conditioner												
Lighting	LED IU Interior - Directional												
Hot Water	CA On-Demand DHW Control												
Hot Water	IU Shower Timer												
Lighting	LED IU Exterior - Omnidirectional												
Shell	CA Door Weatherstrip	1,045	1,045										
Shell	CA Door Sweep	894	894										
Shell	CA Wall Insulation	567	567										
Miscellaneous	CA Advanced Power Strip												
HVAC	CA ECM Blower												
HVAC	IU Reprogram Thermostat												
HVAC	CA Steam Trap												
Hot Water	IU DHW Pipe Insulation												
HVAC	CA Pipe Insulation												
HVAC	CA Steam Boiler	123,697	123,697	123,697	123,697	123,697	123,697	123,697					
HVAC	CA Averaging Controls	34,828	34,828										
HVAC	CA Hydronic Boiler	6,377	6,377	6,377	6,377	6,377	6,377	6,377					
HVAC	IU Furnace	1,986	1,986										
Hot Water	IU DHW Heater												
CY2021 Program Total Gas Contribution to CPAS (Therms)		**366,650**	**366,650**	**130,074**	**130,074**	**130,074**	**130,074**	**130,074**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		**10,746,525**	**10,746,525**	**3,812,479**	**3,812,479**	**3,812,479**	**3,812,479**	**3,812,479**	**-**	**-**	**-**	**-**	**-**
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§		**7,398,852**	**4,823,512**	**4,823,512**	**4,823,512**	**2,780,974**	**2,780,974**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total Gas CPAS (kWh Equivalent)		**18,145,377**	**15,570,038**	**8,635,991**	**8,635,991**	**6,593,453**	**6,593,453**	**3,812,479**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Gas Savings (Therms)		**-**	**-**	**236,576**	**-**	**-**	**-**	**-**	**130,074**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent)‖		**-**	**-**	**6,934,047**	**-**	**-**	**-**	**-**	**3,812,479**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)		**5,454,519**	**2,575,339**	**-**	**-**	**2,042,538**	**-**	**2,780,974**	**-**	**-**	**-**	**-**	**-**
Program Total Incremental Expiring Gas Savings (kWh Equivalent)		**5,454,519**	**2,575,339**	**6,934,047**	**-**	**2,042,538**	**-**	**2,780,974**	**3,812,479**	**-**	**-**	**-**	**-**

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 CY2021.

Acronyms in the table: in-unit (IU), common area (CA), domestic hot water (DHW), air conditioner (AC), packaged terminal heat pump (PTHP), and not applicable (NA).

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

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

‡ kWh equivalent savings are calculated by multiplying therm savings by 29.31.

§ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Table 4-3. IEMS Cumulative Persisting Annual Savings – Total

End Use Type	Research Category	EUL	CY2021 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
Shell	CA Attic Insulation and Air Sealing	20.0	6,201,274	1.00	122,223,564				6,201,274	6,201,274	6,201,274	6,201,274	6,201,274	6,201,274
Lighting	LED CA Interior - Omnidirectional	3.4	381,809	1.00	1,283,390				381,809	381,809	381,809	137,964		
Lighting	LED CA Exterior - Fixture	11.6	371,367	1.00	4,315,205				371,367	371,367	371,367	371,367	371,367	371,367
HVAC	IU PTHP	8.0	302,793	1.00	1,074,668				302,793	302,793	302,793	33,258	33,258	33,258
Lighting	Occupancy Sensor	10.0	261,373	1.00	2,613,729				261,373	261,373	261,373	261,373	261,373	261,373
Lighting	LED CA Interior 24/7 - Fixture	5.7	244,264	1.00	1,393,244				244,264	244,264	244,264	244,264	244,264	171,926
Lighting	LED IU Interior - Omnidirectional	10.0	197,123	1.00	1,237,932				197,123	197,123	197,123	197,123	74,907	74,907
Lighting	LED CA Interior High Rise - T12	8.1	198,933	1.00	1,109,505				198,933	198,933	128,127	113,392	113,392	113,392
Lighting	LED CA Interior High Rise - T8	8.1	154,856	1.00	1,261,454				154,856	154,856	154,856	154,856	154,856	154,856
Lighting	LED Exit Sign	5.0	126,465	1.00	632,326				126,465	126,465	126,465	126,465	126,465	
HVAC	IU Air Source Heat Pump	16.0	122,972	1.00	1,967,560				122,972	122,972	122,972	122,972	122,972	122,972
Lighting	LED CA Interior Mid Rise - T12	9.6	94,876	1.00	622,686				94,876	94,876	76,772	54,079	54,079	54,079
Consumer Electronics	IU Advanced Power Strip	7.0	84,707	1.00	592,950				84,707	84,707	84,707	84,707	84,707	84,707
Shell	CA Sidewall Insulation	20.0	1,225,669	1.00	23,808,622				1,225,669	1,225,669	1,225,669	1,225,669	1,225,669	1,225,669
Lighting	LED IU Interior - Decorative	10.0	60,235	1.00	461,397				60,235	60,235	60,235	60,235	36,743	36,743
Appliances	IU Refrigerator	17.0	57,544	1.00	426,049				57,544	57,544	57,544	57,544	57,544	57,544
Lighting	LED CA Interior Mid Rise - T8	9.6	53,279	1.00	510,723				53,279	53,279	53,279	53,279	53,279	53,279
Shell	CA Floor Insulation	20.0	66,711	1.00	1,322,595				66,711	66,711	66,711	66,711	66,711	66,711
HVAC	IU Advanced Thermostat	11.0	698,341	1.00	7,681,756				698,341	698,341	698,341	698,341	698,341	698,341
Hot Water	IU Kitchen Aerator	10.0	462,248	1.00	4,622,476				462,248	462,248	462,248	462,248	462,248	462,248
Hot Water	IU Showerhead	10.0	461,067	1.00	4,610,674				461,067	461,067	461,067	461,067	461,067	461,067
Lighting	LED CA Exterior - Omnidirectional	4.6	22,393	1.00	95,085				22,393	22,393	22,393	22,393	5,513	
Lighting	LED CA Exterior 24/7 - Fixture	5.7	18,514	1.00	105,600				18,514	18,514	18,514	18,514	18,514	13,031
Lighting	LED CA Interior - Decorative	2.9	11,883	1.00	33,950				11,883	11,883	10,185			
HVAC	IU AC Cover and Gap Sealer	5.0	19,741	1.00	98,706				19,741	19,741	19,741	19,741	19,741	
Lighting	LED CA Interior - Directional	4.2	11,357	1.00	46,803				11,357	11,357	11,357	11,357	1,374	
Lighting	LED CA Garage - Fixture	14.7	10,306	1.00	151,508				10,306	10,306	10,306	10,306	10,306	10,306
HVAC	IU Programmable Thermostat	16.0	296,665	1.00	2,473,449				296,665	296,665	296,665	296,665	296,665	90,012
Appliances	IU Room Air Conditioner	12.0	9,193	1.00	110,321				9,193	9,193	9,193	9,193	9,193	9,193
Hot Water	IU Bathroom Aerator	10.0	56,228	1.00	562,282				56,228	56,228	56,228	56,228	56,228	56,228
HVAC	IU Air Conditioner	18.0	6,168	1.00	59,274				6,168	6,168	6,168	6,168	6,168	6,168
Lighting	LED IU Interior - Directional	10.0	6,141	1.00	46,675				6,141	6,141	6,141	6,141	3,685	3,685
Hot Water	CA On-Demand DHW Control	15.0	292,181	1.00	4,382,715				292,181	292,181	292,181	292,181	292,181	292,181
Hot Water	IU Shower Timer	2.0	165,293	1.00	330,585				165,293	165,293				
Lighting	LED IU Exterior - Omnidirectional	8.0	1,590	1.00	8,779				1,590	1,590	1,590	1,590	604	604
Shell	CA Door Weatherstrip	20.0	31,791	1.00	635,828				31,791	31,791	31,791	31,791	31,791	31,791
Shell	CA Door Sweep	20.0	27,295	1.00	545,890				27,295	27,295	27,295	27,295	27,295	27,295
Shell	CA Wall Insulation	20.0	19,041	1.00	366,514				19,041	19,041	19,041	19,041	19,041	19,041
Miscellaneous	CA Advanced Power Strip	7.0	869	1.00	6,080				869	869	869	869	869	869
HVAC	CA ECM Blower	16.5	644	1.00	10,626				644	644	644	644	644	644
HVAC	IU Reprogram Thermostat	2.0	18,676	1.00	37,352				18,676	18,676				
HVAC	CA Steam Trap	6.0	127,247	1.00	763,482				127,247	127,247	127,247	127,247	127,247	127,247
Hot Water	IU DHW Pipe Insulation	15.0	96	1.00	1,441				96	96	96	96	96	96
HVAC	CA Pipe Insulation	15.0	5,877,951	1.00	88,169,265				5,877,951	5,877,951	5,877,951	5,877,951	5,877,951	5,877,951
HVAC	CA Steam Boiler	25.0	3,625,572	1.00	90,639,297				3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572
HVAC	CA Averaging Controls	20.0	1,020,808	1.00	20,416,155				1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808
HVAC	CA Hydronic Boiler	25.0	186,907	1.00	4,672,675				186,907	186,907	186,907	186,907	186,907	186,907
HVAC	IU Furnace	20.0	58,220	1.00	1,164,401				58,220	58,220	58,220	58,220	58,220	58,220
Hot Water	IU DHW Heater	13.0	2,160	1.00	28,074				2,160	2,160	2,160	2,160	2,160	2,160
CY2021 Program Total Contribution to CPAS			**23,752,835**		**399,735,319**				**23,752,835**	**23,752,835**	**23,478,260**	**22,917,268**	**22,603,291**	**22,165,724**
Historic Program Total Contribution to CPAS‡						**16,659,024**	**34,053,292**	**44,701,249**	**43,916,302**	**43,594,683**	**43,000,880**	**38,901,337**	**32,250,405**	**31,437,743**
Program Total CPAS						**16,659,024**	**34,053,292**	**44,701,249**	**67,669,138**	**67,347,518**	**66,479,139**	**61,818,605**	**54,853,695**	**53,603,467**
CY2021 Program Incremental Expiring Savings§										**-**	**274,576**	**560,992**	**313,977**	**437,567**
Historic Program Incremental Expiring Savings									**784,947**	**321,619**	**593,803**	**4,099,542**	**6,650,933**	**812,662**
Program Total Incremental Expiring Savings									**784,947**	**321,619**	**868,379**	**4,660,534**	**6,964,910**	**1,250,229**

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Shell	CA Attic Insulation and Air Sealing	6,201,274	6,201,274	6,201,274	6,201,274	6,148,160	6,148,160	6,148,160	5,966,620	5,966,620	5,966,620	5,966,620	5,966,620
Lighting	LED CA Interior - Omnidirectional												
Lighting	LED CA Exterior - Fixture	371,367	371,367	371,367	371,367	371,367	230,173						
HVAC	IU PTHP	33,258	33,258										
Lighting	Occupancy Sensor	261,373	261,373	261,373	261,373								
Lighting	LED CA Interior 24/7 - Fixture												
Lighting	LED IU Interior - Omnidirectional	74,907	74,907	74,907	74,907								
Lighting	LED CA Interior High Rise - T12	113,392	113,392	16,552									
Lighting	LED CA Interior High Rise - T8	154,856	154,856	22,605									
Lighting	LED Exit Sign												
HVAC	IU Air Source Heat Pump	122,972	122,972	122,972	122,972	122,972	122,972	122,972	122,972	122,972	122,972		
Lighting	LED CA Interior Mid Rise - T12	54,079	54,079	54,079	31,685								
Consumer Electronics	IU Advanced Power Strip	84,707											
Shell	CA Sidewall Insulation	1,225,669	1,225,669	1,225,669	1,225,669	1,155,193	1,155,193	1,155,193	1,155,193	1,155,193	1,155,193	1,155,193	1,155,193
Lighting	LED IU Interior - Decorative	36,743	36,743	36,743	36,743								
Appliances	IU Refrigerator	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	7,344	
Lighting	LED CA Interior Mid Rise - T8	53,279	53,279	53,279	31,215								
Shell	CA Floor Insulation	66,711	66,711	66,711	66,711	66,711	66,711	66,711	65,050	65,050	65,050	65,050	65,050
HVAC	IU Advanced Thermostat	698,341	698,341	698,341	698,341	698,341							
Hot Water	IU Kitchen Aerator	462,248	462,248	462,248	462,248								
Hot Water	IU Showerhead	461,067	461,067	461,067	461,067								
Lighting	LED CA Exterior - Omnidirectional												
Lighting	LED CA Exterior 24/7 - Fixture												
Lighting	LED CA Interior - Decorative												
HVAC	IU AC Cover and Gap Sealer												
Lighting	LED CA Interior - Directional												
Lighting	LED CA Garage - Fixture	10,306	10,306	10,306	10,306	10,306	10,306	10,306	10,306	7,230			
HVAC	IU Programmable Thermostat	90,012	90,012	90,012	90,012	90,012	90,012	90,012	90,012	90,012	90,012		
Appliances	IU Room Air Conditioner	9,193	9,193	9,193	9,193	9,193	9,193						
Hot Water	IU Bathroom Aerator	56,228	56,228	56,228	56,228								
HVAC	IU Air Conditioner	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855	1,855
Lighting	LED IU Interior - Directional	3,685	3,685	3,685	3,685								
Hot Water	CA On-Demand DHW Control	292,181	292,181	292,181	292,181	292,181	292,181	292,181	292,181	292,181			
Hot Water	IU Shower Timer												
Lighting	LED IU Exterior - Omnidirectional	604	604										
Shell	CA Door Weatherstrip	31,791	31,791	31,791	31,791	31,791	31,791	31,791	31,791	31,791	31,791	31,791	31,791
Shell	CA Door Sweep	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295	27,295
Shell	CA Wall Insulation	19,041	19,041	19,041	19,041	18,167	18,167	18,167	17,371	17,371	17,371	17,371	17,371
Miscellaneous	CA Advanced Power Strip	869											
HVAC	CA ECM Blower	644	644	644	644	644	644	644	644	644	644	322	
HVAC	IU Reprogram Thermostat												
HVAC	CA Steam Trap												
Hot Water	IU DHW Pipe Insulation	96	96	96	96	96	96	96	96	96			
HVAC	CA Pipe Insulation	5,877,951	5,877,951	5,877,951	5,877,951	5,877,951	5,877,951	5,877,951	5,877,951	5,877,951			
HVAC	CA Steam Boiler	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572
HVAC	CA Averaging Controls	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808	1,020,808
HVAC	CA Hydronic Boiler	186,907	186,907	186,907	186,907	186,907	186,907	186,907	186,907	186,907	186,907	186,907	186,907
HVAC	IU Furnace	58,220	58,220	58,220	58,220	58,220	58,220	58,220	58,220	58,220	58,220	58,220	58,220
Hot Water	IU DHW Heater	2,160	2,160	2,160	2,160	2,160	2,160	2,160					
CY2021 Program Total Contribution to CPAS		**21,799,005**	**21,713,430**	**21,450,477**	**21,366,861**	**19,823,245**	**18,983,710**	**18,744,344**	**18,558,188**	**18,555,112**	**12,377,654**	**12,164,348**	**12,156,682**
Historic Program Total Contribution to CPAS‡		**30,675,498**	**28,527,573**	**27,910,662**	**27,151,078**	**26,787,523**	**26,671,494**	**22,014,813**	**19,242,859**	**16,366,961**	**16,335,486**	**16,330,182**	**14,029,429**
Program Total CPAS		**52,474,503**	**50,241,003**	**49,361,139**	**48,517,940**	**46,610,768**	**45,655,204**	**40,759,157**	**37,801,047**	**34,922,073**	**28,713,140**	**28,494,531**	**26,186,112**
CY2021 Program Incremental Expiring Savings§		**366,718**	**85,576**	**262,953**	**83,616**	**1,543,616**	**839,535**	**239,366**	**186,156**	**3,076**	**6,177,458**	**213,306**	**7,666**
Historic Program Incremental Expiring Savings		**762,245**	**2,147,925**	**616,911**	**759,583**	**363,556**	**116,029**	**4,656,681**	**2,771,954**	**2,875,898**	**31,475**	**5,303**	**2,300,753**
Program Total Incremental Expiring Savings		**1,128,964**	**2,233,501**	**879,864**	**843,199**	**1,907,171**	**955,564**	**4,896,047**	**2,958,110**	**2,878,974**	**6,208,933**	**218,609**	**2,308,419**

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Shell	CA Attic Insulation and Air Sealing	5,966,620	5,966,620										
Lighting	LED CA Interior - Omnidirectional												
Lighting	LED CA Exterior - Fixture												
HVAC	IU PTHP												
Lighting	Occupancy Sensor												
Lighting	LED CA Interior 24/7 - Fixture												
Lighting	LED IU Interior - Omnidirectional												
Lighting	LED CA Interior High Rise - T12												
Lighting	LED CA Interior High Rise - T8												
Lighting	LED Exit Sign												
HVAC	IU Air Source Heat Pump												
Lighting	LED CA Interior Mid Rise - T12												
Consumer Electronics	IU Advanced Power Strip												
Shell	CA Sidewall Insulation	1,155,193	1,155,193										
Lighting	LED IU Interior - Decorative												
Appliances	IU Refrigerator												
Lighting	LED CA Interior Mid Rise - T8												
Shell	CA Floor Insulation	65,050	65,050										
HVAC	IU Advanced Thermostat												
Hot Water	IU Kitchen Aerator												
Hot Water	IU Showerhead												
Lighting	LED CA Exterior - Omnidirectional												
Lighting	LED CA Exterior 24/7 - Fixture												
Lighting	LED CA Interior - Decorative												
HVAC	IU AC Cover and Gap Sealer												
Lighting	LED CA Interior - Directional												
Lighting	LED CA Garage - Fixture												
HVAC	IU Programmable Thermostat												
Appliances	IU Room Air Conditioner												
Hot Water	IU Bathroom Aerator												
HVAC	IU Air Conditioner												
Lighting	LED IU Interior - Directional												
Hot Water	CA On-Demand DHW Control												
Hot Water	IU Shower Timer												
Lighting	LED IU Exterior - Omnidirectional												
Shell	CA Door Weatherstrip	31,791	31,791										
Shell	CA Door Sweep	27,295	27,295										
Shell	CA Wall Insulation	17,371	17,371										
Miscellaneous	CA Advanced Power Strip												
HVAC	CA ECM Blower												
HVAC	IU Reprogram Thermostat												
HVAC	CA Steam Trap												
Hot Water	IU DHW Pipe Insulation												
HVAC	CA Pipe Insulation												
HVAC	CA Steam Boiler	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572	3,625,572					
HVAC	CA Averaging Controls	1,020,808	1,020,808										
HVAC	CA Hydronic Boiler	186,907	186,907	186,907	186,907	186,907	186,907	186,907					
HVAC	IU Furnace	58,220	58,220										
Hot Water	IU DHW Heater												
CY2021 Program Total Contribution to CPAS		**12,154,827**	**12,154,827**	**3,812,479**	**3,812,479**	**3,812,479**	**3,812,479**	**3,812,479**	**-**	**-**	**-**	**-**	**-**
Historic Program Total Contribution to CPAS‡		**8,473,902**	**5,047,629**	**5,047,629**	**5,047,629**	**2,780,974**	**2,780,974**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total CPAS		**20,628,729**	**17,202,456**	**8,860,108**	**8,860,108**	**6,593,453**	**6,593,453**	**3,812,479**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Savings§		**1,855**	**-**	**8,342,348**	**-**	**-**	**-**	**-**	**3,812,479**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Savings		**5,555,527**	**3,426,273**	**-**	**-**	**2,266,654**	**-**	**2,780,974**	**-**	**-**	**-**	**-**	**-**
Program Total Incremental Expiring Savings		**5,557,383**	**3,426,273**	**8,342,348**	**-**	**2,266,654**	**-**	**2,780,974**	**3,812,479**	**-**	**-**	**-**	**-**

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 CY2021.

Acronyms in the table: in-unit (IU), common area (CA), domestic hot water (DHW), air conditioner (AC), packaged terminal heat pump (PTHP), and not applicable (NA).

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

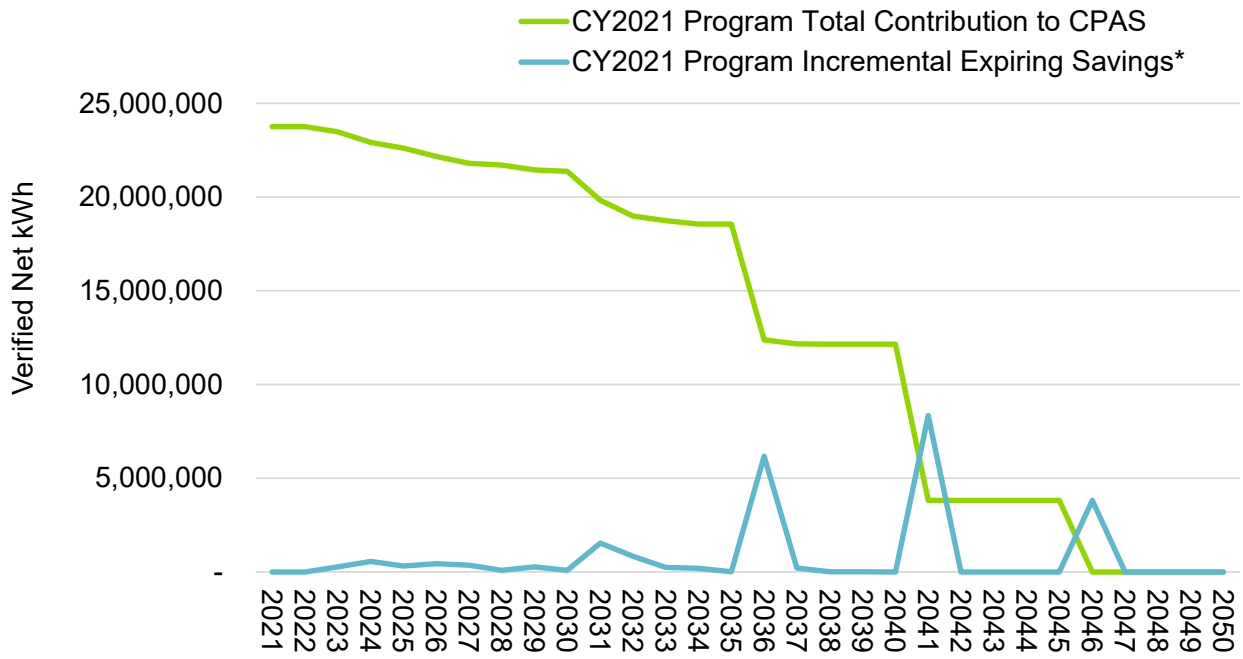
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Figure 4-1. IEMS Cumulative Persisting Annual Savings



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

Source: Evaluation team analysis

4.2 IHWAP

Table 4-4 to Table 4-6 and Figure 4-1 show the measure-specific and total verified gross savings for the IHWAP program component and the CPAS for the measures installed in CY2021. The electric CPAS across all measures installed in 2021 is shown in Table 4-4. The CY2021 gas contribution to CPAS (converted to equivalent electricity) is shown in Table 4-5. The combined savings are shown in Table 4-6. 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 CY2021 contribution and the historic contribution. Figure 4-2 shows the savings across the EUL of the measures.

Table 4-4. IHWAP Cumulative Persisting Annual Savings – Electric

End Use Type	Research Category	EUL	CY2021 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Appliances	Refrigerator	17.0	109,697	1.00	786,344				109,697	109,697	109,697	109,697	109,697	109,697
HVAC	High Efficiency Bathroom Exhaust Fan	19.0	76,297	1.00	1,449,641				76,297	76,297	76,297	76,297	76,297	76,297
HVAC	Custom - Heating Plant Improvements	23.4	46,356	1.00	994,274				46,356	46,356	46,356	46,356	46,356	46,356
Appliances	Room Air Conditioner	12.0	35,016	1.00	420,194				35,016	35,016	35,016	35,016	35,016	35,016
Lighting	LED Specialty Lamps - Indoor	10.0	31,294	1.00	277,263				31,294	31,294	31,294	31,294	31,294	31,294
Lighting	LED Screw Based Omnidirectional Bulbs	10.0	25,053	1.00	234,745				25,053	25,053	25,053	25,053	25,053	25,053
HVAC	Custom - Rooftop Units	15.0	10,692	1.00	118,891				10,692	10,692	10,692	10,692	10,692	6,543
HVAC	Custom - HHW Pump	15.0	10,641	1.00	159,609				10,641	10,641	10,641	10,641	10,641	10,641
Lighting	LED Specialty Lamps - Outdoor	10.0	2,393	1.00	21,199				2,393	2,393	2,393	2,393	2,393	2,393
Shell	Attic Insulation	20.0	441	1.00	8,822				441	441	441	441	441	441
HVAC	Advanced Thermostats	11.0	307	1.00	3,372				307	307	307	307	307	307
HVAC	Residential Furnace Tune-Up	3.0	173	1.00	520				173	173	173			
Hot Water	Low Flow Faucet Aerator	10.0	130	1.00	1,299				130	130	130	130	130	130
Hot Water	Low Flow Showerhead	10.0	28	1.00	284				28	28	28	28	28	28
Shell	Air Sealing	20.0	18	1.00	364				18	18	18	18	18	18
Hot Water	Custom - DHW Boiler	15.0	-	1.00	-				-	-	-	-	-	-
CY2021 Program Total Electric Contribution to CPAS			**348,535**		**4,476,822**				**348,535**	**348,535**	**348,535**	**348,362**	**348,362**	**344,214**
Historic Program Total Electric Contribution to CPAS‡						**628,175**	**1,281,093**	**1,489,997**	**1,358,049**	**1,235,804**	**1,120,495**	**1,033,502**	**858,459**	**840,130**
Program Total Electric CPAS						**628,175**	**1,281,093**	**1,489,997**	**1,706,585**	**1,584,339**	**1,469,030**	**1,381,864**	**1,206,821**	**1,184,344**
CY2021 Program Incremental Expiring Electric Savings§										**-**	**-**	**173**	**-**	**4,149**
Historic Program Incremental Expiring Electric Savings									**131,948**	**122,246**	**115,309**	**86,993**	**175,043**	**18,329**
Program Total Incremental Expiring Electric Savings									**131,948**	**122,246**	**115,309**	**87,166**	**175,043**	**22,477**

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	Refrigerator	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	
HVAC	High Efficiency Bathroom Exhaust Fan	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297
HVAC	Custom - Heating Plant Improvements	46,356	46,356	46,356	46,356	46,356	46,356	46,356	46,356	46,356	29,894	29,894	29,894
Appliances	Room Air Conditioner	35,016	35,016	35,016	35,016	35,016	35,016						
Lighting	LED Specialty Lamps - Indoor	31,294	19,402	19,402	19,402								
Lighting	LED Screw Based Omnidirectional Bulbs	25,053	19,792	19,792	19,792								
HVAC	Custom - Rooftop Units	6,543	6,543	6,543	6,543	6,543	6,543	6,543	6,543	6,543			
HVAC	Custom - HHW Pump	10,641	10,641	10,641	10,641	10,641	10,641	10,641	10,641	10,641			
Lighting	LED Specialty Lamps - Outdoor	2,393	1,483	1,483	1,483								
Shell	Attic Insulation	441	441	441	441	441	441	441	441	441	441	441	441
HVAC	Advanced Thermostats	307	307	307	307	307							
HVAC	Residential Furnace Tune-Up												
Hot Water	Low Flow Faucet Aerator	130	130	130	130								
Hot Water	Low Flow Showerhead	28	28	28	28								
Shell	Air Sealing	18	18	18	18	18	18	18	18	18	18	18	18
Hot Water	Custom - DHW Boiler	-	-	-	-	-	-	-	-	-			
CY2021 Program Total Electric Contribution to CPAS		**246,167**	**228,105**	**228,105**	**228,105**	**187,270**	**186,963**	**151,947**	**151,947**	**151,947**	**118,301**	**118,301**	**106,650**
Historic Program Total Electric Contribution to CPAS‡		**822,784**	**749,352**	**714,851**	**654,019**	**544,987**	**541,200**	**322,744**	**322,744**	**241,518**	**223,465**	**162,847**	**135,498**
Program Total Electric CPAS		**1,068,952**	**977,457**	**942,957**	**882,124**	**732,257**	**728,163**	**474,691**	**474,691**	**393,465**	**341,766**	**281,147**	**242,147**
CY2021 Program Incremental Expiring Electric Savings§		**98,046**	**18,062**	**-**	**-**	**40,836**	**307**	**35,016**	**-**	**-**	**33,646**	**-**	**11,651**
Historic Program Incremental Expiring Electric Savings		**17,346**	**73,433**	**34,500**	**60,832**	**109,032**	**3,787**	**218,456**	**-**	**81,226**	**18,053**	**60,618**	**27,349**
Program Total Incremental Expiring Electric Savings		**115,392**	**91,495**	**34,500**	**60,832**	**149,867**	**4,094**	**253,472**	**-**	**81,226**	**51,699**	**60,618**	**39,000**

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Appliances	Refrigerator												
HVAC	High Efficiency Bathroom Exhaust Fan	76,297											
HVAC	Custom - Heating Plant Improvements	29,894	29,894	29,894	29,894	29,894	29,894	29,894					
Appliances	Room Air Conditioner												
Lighting	LED Specialty Lamps - Indoor												
Lighting	LED Screw Based Omnidirectional Bulbs												
HVAC	Custom - Rooftop Units												
HVAC	Custom - HHW Pump												
Lighting	LED Specialty Lamps - Outdoor												
Shell	Attic Insulation	441	441										
HVAC	Advanced Thermostats												
HVAC	Residential Furnace Tune-Up												
Hot Water	Low Flow Faucet Aerator												
Hot Water	Low Flow Showerhead												
Shell	Air Sealing	18	18										
Hot Water	Custom - DHW Boiler												
CY2021 Program Total Electric Contribution to CPAS		**106,650**	**30,353**	**29,894**	**29,894**	**29,894**	**29,894**	**29,894**	**-**	**-**	**-**	**-**	**-**
Historic Program Total Electric Contribution to CPAS‡		**17,635**	**14,533**	**14,471**	**14,471**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total Electric CPAS		**124,284**	**44,886**	**44,365**	**44,365**	**29,894**	**29,894**	**29,894**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Electric Savings§		**-**	**76,297**	**459**	**-**	**-**	**-**	**-**	**29,894**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Electric Savings		**117,863**	**3,101**	**62**	**-**	**14,471**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total Incremental Expiring Electric Savings		**117,863**	**79,398**	**522**	**-**	**14,471**	**-**	**-**	**29,894**	**-**	**-**	**-**	**-**

Note: The green highlighted cell shows program total first-year electric savings. The gray cells are blank, indicating values irrelevant to the CY2021 contribution to CPAS.

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

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

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Table 4-5. IHWAP Cumulative Persisting Annual Savings – Gas

End Use Type	Research Category	EUL	CY2021 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	Verified Net Therms Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Appliances	Refrigerator	17.0	-	1.00	-				-	-	-	-	-	-
HVAC	High Efficiency Bathroom Exhaust Fan	19.0	-	1.00	-				-	-	-	-	-	-
HVAC	Custom - Heating Plant Improvements	23.4	24,690	1.00	581,991				24,690	24,690	24,690	24,690	24,690	24,690
Appliances	Room Air Conditioner	12.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED Specialty Lamps - Indoor	10.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED Screw Based Omnidirectional Bulbs	10.0	-	1.00	-				-	-	-	-	-	-
HVAC	Custom - Rooftop Units	15.0	-	1.00	-				-	-	-	-	-	-
HVAC	Custom - HHW Pump	15.0	-	1.00	-				-	-	-	-	-	-
Lighting	LED Specialty Lamps - Outdoor	10.0	-	1.00	-				-	-	-	-	-	-
Shell	Attic Insulation	20.0	5,617	1.00	112,338				5,617	5,617	5,617	5,617	5,617	5,617
HVAC	Advanced Thermostats	11.0	-	1.00	-				-	-	-	-	-	-
HVAC	Residential Furnace Tune-Up	3.0	-	1.00	-				-	-	-			
Hot Water	Low Flow Faucet Aerator	10.0	113	1.00	1,131				113	113	113	113	113	113
Hot Water	Low Flow Showerhead	10.0	33	1.00	330				33	33	33	33	33	33
Shell	Air Sealing	20.0	8,409	1.00	168,182				8,409	8,409	8,409	8,409	8,409	8,409
Hot Water	Custom - DHW Boiler	15.0	3,702	1.00	55,530				3,702	3,702	3,702	3,702	3,702	3,702
CY2021 Program Total Gas Contribution to CPAS (Therms)			**42,564**		**919,502**				**42,564**	**42,564**	**42,564**	**42,564**	**42,564**	**42,564**
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)‡						**-**	**-**	**-**	**1,247,553**	**1,247,553**	**1,247,553**	**1,247,553**	**1,247,553**	**1,247,553**
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§						**124,465**	**5,787,633**	**6,432,068**	**6,432,068**	**6,432,068**	**6,393,035**	**6,245,803**	**5,321,318**	**5,321,318**
Program Total Gas CPAS (kWh Equivalent)						**124,465**	**5,787,633**	**6,432,068**	**7,679,621**	**7,679,621**	**7,640,588**	**7,493,356**	**6,568,872**	**6,568,872**
CY2021 Program Incremental Expiring Gas Savings (Therms)										**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent)‖										**-**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)									**-**	**-**	**39,033**	**147,232**	**924,485**	**-**
Program Total Incremental Expiring Gas Savings (kWh Equivalent)									**-**	**-**	**39,033**	**147,232**	**924,485**	**-**

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	Refrigerator	-	-	-	-	-	-	-	-	-	-	-	
HVAC	High Efficiency Bathroom Exhaust Fan	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Custom - Heating Plant Improvements	24,690	24,690	24,690	24,690	24,690	24,690	24,690	24,690	24,690	24,690	24,690	24,690
Appliances	Room Air Conditioner	-	-	-	-	-	-						
Lighting	LED Specialty Lamps - Indoor	-	-	-	-								
Lighting	LED Screw Based Omnidirectional Bulbs	-	-	-	-								
HVAC	Custom - Rooftop Units	-	-	-	-	-	-	-	-	-			
HVAC	Custom - HHW Pump	-	-	-	-	-	-	-	-	-			
Lighting	LED Specialty Lamps - Outdoor	-	-	-	-								
Shell	Attic Insulation	5,617	5,617	5,617	5,617	5,617	5,617	5,617	5,617	5,617	5,617	5,617	5,617
HVAC	Advanced Thermostats	-	-	-	-	-							
HVAC	Residential Furnace Tune-Up												
Hot Water	Low Flow Faucet Aerator	113	113	113	113								
Hot Water	Low Flow Showerhead	33	33	33	33								
Shell	Air Sealing	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409
Hot Water	Custom - DHW Boiler	3,702	3,702	3,702	3,702	3,702	3,702	3,702	3,702	3,702			
CY2021 Program Total Gas Contribution to CPAS (Therms		**42,564**	**42,564**	**42,564**	**42,564**	**42,418**	**42,418**	**42,418**	**42,418**	**42,418**	**38,716**	**38,716**	**38,716**
CY2021 Program Total Gas Contribution to CPAS (kWh Eq		**1,247,553**	**1,247,553**	**1,247,553**	**1,247,553**	**1,243,270**	**1,243,270**	**1,243,270**	**1,243,270**	**1,243,270**	**1,134,765**	**1,134,765**	**1,134,765**
Historic Program Total Gas Contribution to CPAS (kWh E		**5,181,880**	**5,161,835**	**5,086,508**	**4,849,724**	**4,849,724**	**4,454,067**	**4,393,121**	**4,363,225**	**4,111,068**	**4,111,068**	**4,111,068**	**4,111,068**
Program Total Gas CPAS (kWh Equivalent)		**6,429,433**	**6,409,389**	**6,334,061**	**6,097,277**	**6,092,994**	**5,697,336**	**5,636,391**	**5,606,495**	**5,354,338**	**5,245,832**	**5,245,832**	**5,245,832**
CY2021 Program Incremental Expiring Gas Savings (Ther		**-**	**-**	**-**	**-**	**146**	**-**	**-**	**-**	**-**	**3,702**	**-**	**-**
CY2021 Program Incremental Expiring Gas Savings (kWh		**-**	**-**	**-**	**-**	**4,283**	**-**	**-**	**-**	**-**	**108,505**	**-**	**-**
Historic Program Incremental Expiring Gas Savings (kWh		**139,438**	**20,045**	**75,327**	**236,784**	**-**	**395,657**	**60,946**	**29,895**	**252,158**	**-**	**-**	**-**
Program Total Incremental Expiring Gas Savings (kWh E		**139,438**	**20,045**	**75,327**	**236,784**	**4,283**	**395,657**	**60,946**	**29,895**	**252,158**	**108,505**	**-**	**-**

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Appliances	Refrigerator												
HVAC	High Efficiency Bathroom Exhaust Fan	-											
HVAC	Custom - Heating Plant Improvements	24,690	24,690	24,690	15,876	15,876	15,876	15,876					
Appliances	Room Air Conditioner												
Lighting	LED Specialty Lamps - Indoor												
Lighting	LED Screw Based Omnidirectional Bulbs												
HVAC	Custom - Rooftop Units												
HVAC	Custom - HHW Pump												
Lighting	LED Specialty Lamps - Outdoor												
Shell	Attic Insulation	5,617	5,617										
HVAC	Advanced Thermostats												
HVAC	Residential Furnace Tune-Up												
Hot Water	Low Flow Faucet Aerator												
Hot Water	Low Flow Showerhead												
Shell	Air Sealing	8,409	8,409										
Hot Water	Custom - DHW Boiler												
CY2021 Program Total Gas Contribution to CPAS (Therm		**38,716**	**38,716**	**24,690**	**15,876**	**15,876**	**15,876**	**15,876**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Total Gas Contribution to CPAS (kWh Ec		**1,134,765**	**1,134,765**	**723,663**	**465,312**	**465,312**	**465,312**	**465,312**	**-**	**-**	**-**	**-**	**-**
Historic Program Total Gas Contribution to CPAS (kWh E		**3,166,881**	**3,091,329**	**3,059,743**	**3,059,743**	**3,059,743**	**86,009**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total Gas CPAS (kWh Equivalent)		**4,301,646**	**4,226,094**	**3,783,405**	**3,525,054**	**3,525,054**	**551,320**	**465,312**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Gas Savings (Ther		**-**	**-**	**14,026**	**8,814**	**-**	**-**	**-**	**15,876**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Gas Savings (kWh		**-**	**-**	**411,102**	**258,351**	**-**	**-**	**-**	**465,312**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Gas Savings (kWh		**944,187**	**75,552**	**31,587**	**-**	**-**	**2,973,734**	**86,009**	**-**	**-**	**-**	**-**	**-**
Program Total Incremental Expiring Gas Savings (kWh E		**944,187**	**75,552**	**442,689**	**258,351**	**-**	**2,973,734**	**86,009**	**465,312**	**-**	**-**	**-**	**-**

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 CY2021.

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

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

‡ kWh equivalent savings are calculated by multiplying therm savings by 29.31.

§ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Table 4-6. IHWAP Cumulative Persisting Annual Savings – Total

End Use Type	Research Category	EUL	CY2021 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
Appliances	Refrigerator	17.0	109,697	1.00	786,344				109,697	109,697	109,697	109,697	109,697	109,697
HVAC	High Efficiency Bathroom Exhaust Fan	19.0	76,297	1.00	1,449,641				76,297	76,297	76,297	76,297	76,297	76,297
HVAC	Custom - Heating Plant Improvements	23.4	770,019	1.00	18,052,437				770,019	770,019	770,019	770,019	770,019	770,019
Appliances	Room Air Conditioner	12.0	35,016	1.00	420,194				35,016	35,016	35,016	35,016	35,016	35,016
Lighting	LED Specialty Lamps - Indoor	10.0	31,294	1.00	277,263				31,294	31,294	31,294	31,294	31,294	31,294
Lighting	LED Screw Based Omnidirectional Bulbs	10.0	25,053	1.00	234,745				25,053	25,053	25,053	25,053	25,053	25,053
HVAC	Custom - Rooftop Units	15.0	10,692	1.00	118,891				10,692	10,692	10,692	10,692	10,692	6,543
HVAC	Custom - HHW Pump	15.0	10,641	1.00	159,609				10,641	10,641	10,641	10,641	10,641	10,641
Lighting	LED Specialty Lamps - Outdoor	10.0	2,393	1.00	21,199				2,393	2,393	2,393	2,393	2,393	2,393
Hot Water	Low Flow Faucet Aerator	10.0	3,445	1.00	34,451				3,445	3,445	3,445	3,445	3,445	3,445
Shell	Attic Insulation	20.0	165,073	1.00	3,301,458				165,073	165,073	165,073	165,073	165,073	165,073
HVAC	Advanced Thermostats	11.0	307	1.00	3,372				307	307	307	307	307	307
HVAC	Residential Furnace Tune-Up	3.0	173	1.00	520				173	173	173			
Hot Water	Low Flow Showerhead	10.0	997	1.00	9,966				997	997	997	997	997	997
Shell	Air Sealing	20.0	246,489	1.00	4,929,772				246,489	246,489	246,489	246,489	246,489	246,489
Hot Water	Custom - DHW Boiler	15.0	108,505	1.00	1,627,576				108,505	108,505	108,505	108,505	108,505	108,505
CY2021 Program Total Contribution to CPAS			**1,596,089**		**31,427,438**				**1,596,089**	**1,596,089**	**1,596,089**	**1,595,915**	**1,595,915**	**1,591,767**
Historic Program Total Contribution to CPAS‡						**752,640**	**7,068,726**	**7,922,065**	**7,790,117**	**7,667,872**	**7,513,530**	**7,279,305**	**6,179,777**	**6,161,448**
Program Total CPAS						**752,640**	**7,068,726**	**7,922,065**	**9,386,206**	**9,263,960**	**9,109,618**	**8,875,220**	**7,775,693**	**7,753,215**
CY2021 Program Incremental Expiring Savings§										-	-	**173**	-	**4,149**
Historic Program Incremental Expiring Savings									**131,948**	**122,246**	**154,342**	**234,225**	**1,099,528**	**18,329**
Program Total Incremental Expiring Savings									**131,948**	**122,246**	**154,342**	**234,398**	**1,099,528**	**22,477**

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Appliances	Refrigerator	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	11,651	
HVAC	High Efficiency Bathroom Exhaust Fan	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297	76,297
HVAC	Custom - Heating Plant Improvements	770,019	770,019	770,019	770,019	770,019	770,019	770,019	770,019	770,019	753,556	753,556	753,556
Appliances	Room Air Conditioner	35,016	35,016	35,016	35,016	35,016	35,016						
Lighting	LED Specialty Lamps - Indoor	31,294	19,402	19,402	19,402								
Lighting	LED Screw Based Omnidirectional Bulbs	25,053	19,792	19,792	19,792								
HVAC	Custom - Rooftop Units	6,543	6,543	6,543	6,543	6,543	6,543	6,543	6,543	6,543			
HVAC	Custom - HHW Pump	10,641	10,641	10,641	10,641	10,641	10,641	10,641	10,641	10,641			
Lighting	LED Specialty Lamps - Outdoor	2,393	1,483	1,483	1,483								
Hot Water	Low Flow Faucet Aerator	3,445	3,445	3,445	3,445								
Shell	Attic Insulation	165,073	165,073	165,073	165,073	165,073	165,073	165,073	165,073	165,073	165,073	165,073	165,073
HVAC	Advanced Thermostats	307	307	307	307	307							
HVAC	Residential Furnace Tune-Up												
Hot Water	Low Flow Showerhead	997	997	997	997								
Shell	Air Sealing	246,489	246,489	246,489	246,489	246,489	246,489	246,489	246,489	246,489	246,489	246,489	246,489
Hot Water	Custom - DHW Boiler	108,505	108,505	108,505	108,505	108,505	108,505	108,505	108,505	108,505			
CY2021 Program Total Contribution to CPAS		**1,493,721**	**1,475,659**	**1,475,659**	**1,475,659**	**1,430,539**	**1,430,233**	**1,395,217**	**1,395,217**	**1,395,217**	**1,253,065**	**1,253,065**	**1,241,415**
Historic Program Total Contribution to CPAS‡		**6,004,665**	**5,911,187**	**5,801,359**	**5,503,743**	**5,394,711**	**4,995,267**	**4,715,865**	**4,685,969**	**4,352,586**	**4,334,533**	**4,273,914**	**4,246,565**
Program Total CPAS		**7,498,385**	**7,386,846**	**7,277,018**	**6,979,401**	**6,825,250**	**6,425,500**	**6,111,082**	**6,081,186**	**5,747,803**	**5,587,598**	**5,526,980**	**5,487,980**
CY2021 Program Incremental Expiring Savings§		**98,046**	**18,062**	**-**	**-**	**45,119**	**307**	**35,016**	**-**	**-**	**142,151**	**-**	**11,651**
Historic Program Incremental Expiring Savings		**156,784**	**93,478**	**109,828**	**297,617**	**109,032**	**399,444**	**279,402**	**29,895**	**333,384**	**18,053**	**60,618**	**27,349**
Program Total Incremental Expiring Savings		**254,830**	**111,540**	**109,828**	**297,617**	**154,151**	**399,751**	**314,418**	**29,895**	**333,384**	**160,205**	**60,618**	**39,000**

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Appliances	Refrigerator												
HVAC	High Efficiency Bathroom Exhaust Fan	76,297											
HVAC	Custom - Heating Plant Improvements	753,556	753,556	753,556	495,205	495,205	495,205	495,205					
Appliances	Room Air Conditioner												
Lighting	LED Specialty Lamps - Indoor												
Lighting	LED Screw Based Omnidirectional Bulbs												
HVAC	Custom - Rooftop Units												
HVAC	Custom - HHW Pump												
Lighting	LED Specialty Lamps - Outdoor												
Hot Water	Low Flow Faucet Aerator												
Shell	Attic Insulation	165,073	165,073										
HVAC	Advanced Thermostats												
HVAC	Residential Furnace Tune-Up												
Hot Water	Low Flow Showerhead												
Shell	Air Sealing	246,489	246,489										
Hot Water	Custom - DHW Boiler												
CY2021 Program Total Contribution to CPAS		**1,241,415**	**1,165,118**	**753,556**	**495,205**	**495,205**	**495,205**	**495,205**	**-**	**-**	**-**	**-**	**-**
Historic Program Total Contribution to CPAS‡		**3,184,515**	**3,105,863**	**3,074,214**	**3,074,214**	**3,059,743**	**86,009**	**-**	**-**	**-**	**-**	**-**	**-**
Program Total CPAS		**4,425,930**	**4,270,980**	**3,827,770**	**3,569,419**	**3,554,948**	**581,214**	**495,205**	**-**	**-**	**-**	**-**	**-**
CY2021 Program Incremental Expiring Savings§		**-**	**76,297**	**411,562**	**258,351**	**-**	**-**	**-**	**495,205**	**-**	**-**	**-**	**-**
Historic Program Incremental Expiring Savings		**1,062,050**	**78,653**	**31,649**	**-**	**14,471**	**2,973,734**	**86,009**	**-**	**-**	**-**	**-**	**-**
Program Total Incremental Expiring Savings		**1,062,050**	**154,950**	**443,211**	**258,351**	**14,471**	**2,973,734**	**86,009**	**495,205**	**-**	**-**	**-**	**-**

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 CY2021.

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

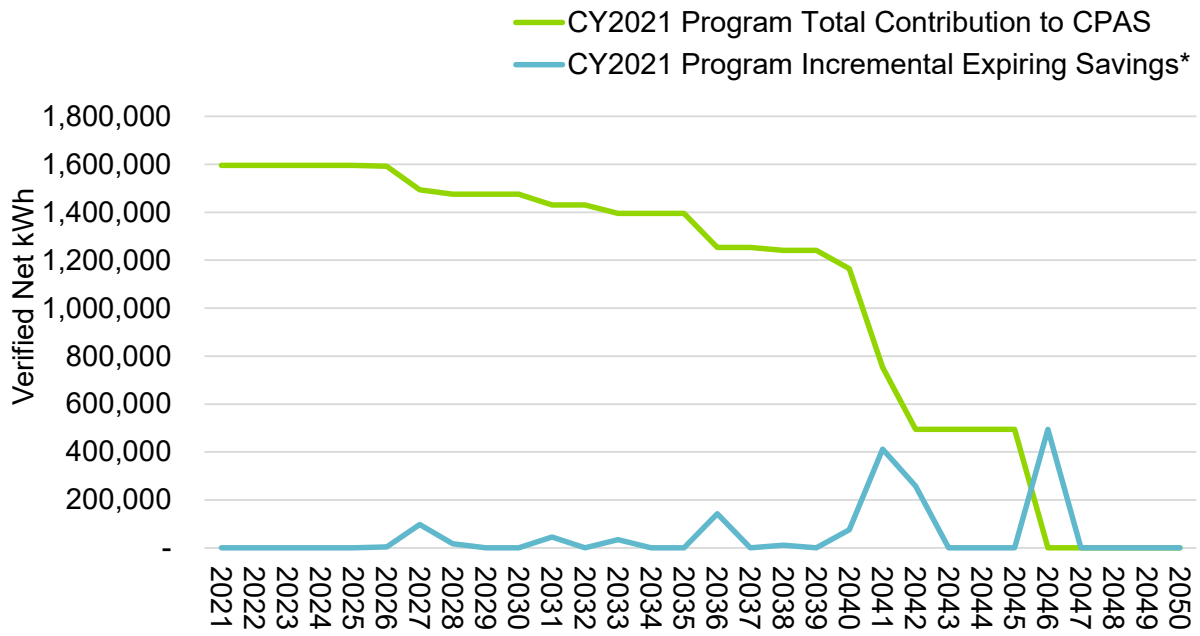
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Figure 4-2. IHWAP Cumulative Persisting Annual Savings



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

Source: Evaluation team analysis

5. Program Savings by Measure

5.1 IEMS

The IEMS program component included the measures shown in Table 5-1 and Figure 5-1.

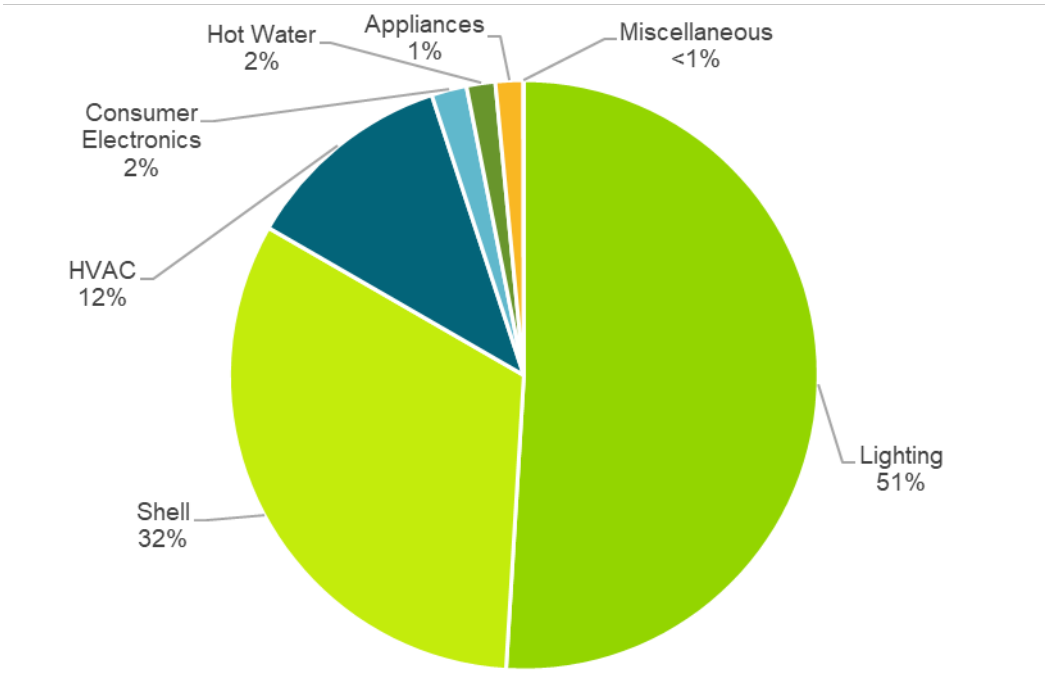
Table 5-1. IEMS Number of Measures by Type

End Use Type	Research Category	Quantity	Unit
Shell	CA Attic Insulation and Air Sealing	198	Projects
Lighting	LED CA Interior - Omnidirectional	1,628	Lamp
Lighting	LED CA Exterior - Fixture	606	Lamp
HVAC	IU PTHP	2	Projects
Lighting	Occupancy Sensor	3	Projects
Lighting	LED CA Interior 24/7 - Fixture	1,265	Lamp
Lighting	LED IU Interior - Omnidirectional	5,554	Lamp
Lighting	LED CA Interior High Rise - T12	372	Lamp
Lighting	LED CA Interior High Rise - T8	858	Lamp
Lighting	LED Exit Sign	477	Exit Sign
HVAC	IU Air Source Heat Pump	6	Projects
Lighting	LED CA Interior Mid Rise - T12	356	Lamp
Consumer Electronics	IU Advanced Power Strip	2,056	Each
Shell	CA Sidewall Insulation	37	Projects
Lighting	LED IU Interior - Decorative	2,395	Lamp
Appliances	IU Refrigerator	187	Each
Lighting	LED CA Interior Mid Rise - T8	357	Lamp
Shell	CA Floor Insulation	19	Projects
HVAC	IU Advanced Thermostat	337	Each
Hot Water	IU Kitchen Aerator	2,138	Each
Hot Water	IU Showerhead	1,494	Each
Lighting	LED CA Exterior - Omnidirectional	155	Lamp
Lighting	LED CA Exterior 24/7 - Fixture	99	Lamp
Lighting	LED CA Interior - Decorative	70	Lamp
HVAC	IU AC Cover and Gap Sealer	132	Each
Lighting	LED CA Interior - Directional	48	Lamp
Lighting	LED CA Garage - Fixture	24	Lamp
HVAC	IU Programmable Thermostat	262	Each
Appliances	IU Room Air Conditioner	17	Projects
Hot Water	IU Bathroom Aerator	1,281	Each
HVAC	IU Air Conditioner	9	Projects
Lighting	LED IU Interior - Directional	201	Lamp
Hot Water	CA On-Demand DHW Control	6	Projects
Hot Water	IU Shower Timer	1,671	Each
Lighting	LED IU Exterior - Omnidirectional	20	Lamp
Shell	CA Door Weatherstrip	158	Doors
Shell	CA Door Sweep	145	146
Shell	CA Wall Insulation	2	Projects
Miscellaneous	CA Advanced Power Strip	8	Each
HVAC	CA ECM Blower	1	Each
HVAC	IU Reprogram Thermostat	17	Each
HVAC	CA Steam Trap	143	Each
Hot Water	IU DHW Pipe Insulation	1	Projects
HVAC	CA Pipe Insulation	133	Projects
HVAC	CA Steam Boiler	66	Projects
HVAC	CA Averaging Controls	13	Projects
HVAC	CA Hydronic Boiler	2	Projects
HVAC	IU Furnace	8	Projects
Hot Water	IU DHW Heater	1	Projects
	Total	**25,038**	

Note: This is the same table as Table 2-2. The table is sorted by verified gross savings.

Source: ComEd tracking data and evaluation team analysis

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



Source: ComEd tracking data and evaluation team analysis

Measure-level energy and demand savings for the IEMS program component are provided in the following tables.

Table 5-2. IEMS 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)
Shell	CA Attic Insulation and Air Sealing	1,373,284	0.94	1,286,633	1.00	1,286,633	20.0
Lighting	LED CA Interior - Omnidirectional	374,212	1.02	381,809	1.00	381,809	3.4
Lighting	LED CA Exterior - Fixture	371,367	1.00	371,367	1.00	371,367	11.6
HVAC	IU PTHP	236,638	1.28	302,793	1.00	302,793	8.0
Lighting	Occupancy Sensor	261,373	1.00	261,373	1.00	261,373	10.0
Lighting	LED CA Interior 24/7 - Fixture	233,616	1.05	244,264	1.00	244,264	5.7
Lighting	LED IU Interior - Omnidirectional	196,122	1.01	197,123	1.00	197,123	10.0
Lighting	LED CA Interior High Rise - T12	198,933	1.00	198,933	1.00	198,933	8.1
Lighting	LED CA Interior High Rise - T8	154,856	1.00	154,856	1.00	154,856	8.1
Lighting	LED Exit Sign	112,851	1.12	126,465	1.00	126,465	5.0
HVAC	IU Air Source Heat Pump	120,977	1.02	122,972	1.00	122,972	16.0
Lighting	LED CA Interior Mid Rise - T12	97,856	0.97	94,876	1.00	94,876	9.6
Consumer Electronics	IU Advanced Power Strip	84,707	1.00	84,707	1.00	84,707	7.0
Shell	CA Sidewall Insulation	68,642	1.03	71,012	1.00	71,012	20.0
Lighting	LED IU Interior - Decorative	60,235	1.00	60,235	1.00	60,235	10.0
Appliances	IU Refrigerator	59,189	0.97	57,544	1.00	57,544	17.0
Lighting	LED CA Interior Mid Rise - T8	53,034	1.00	53,279	1.00	53,279	9.6
Shell	CA Floor Insulation	53,286	1.00	53,095	1.00	53,095	20.0
HVAC	IU Advanced Thermostat	49,769	1.00	49,769	1.00	49,769	11.0
Hot Water	IU Kitchen Aerator	28,549	1.00	28,548	1.00	28,548	10.0
Hot Water	IU Showerhead	26,388	1.00	26,389	1.00	26,389	10.0
Lighting	LED CA Exterior - Omnidirectional	22,393	1.00	22,393	1.00	22,393	4.6
Lighting	LED CA Exterior 24/7 - Fixture	9,873	1.88	18,514	1.00	18,514	5.7
Lighting	LED CA Interior - Decorative	11,306	1.05	11,883	1.00	11,883	2.9
HVAC	IU AC Cover and Gap Sealer	14,433	1.00	14,433	1.00	14,433	5.0
Lighting	LED CA Interior - Directional	12,333	0.92	11,357	1.00	11,357	4.2
Lighting	LED CA Garage - Fixture	10,306	1.00	10,306	1.00	10,306	14.7
HVAC	IU Programmable Thermostat	10,167	0.96	9,784	1.00	9,784	16.0
Appliances	IU Room Air Conditioner	9,193	1.00	9,193	1.00	9,193	12.0
Hot Water	IU Bathroom Aerator	6,480	1.00	6,480	1.00	6,480	10.0
HVAC	IU Air Conditioner	6,171	1.00	6,168	1.00	6,168	18.0
Lighting	LED IU Interior - Directional	6,141	1.00	6,141	1.00	6,141	10.0
Hot Water	CA On-Demand DHW Control	3,936	1.00	3,936	1.00	3,936	15.0
Hot Water	IU Shower Timer	3,381	1.00	3,380	1.00	3,380	2.0
Lighting	LED IU Exterior - Omnidirectional	1,590	1.00	1,590	1.00	1,590	8.0
Shell	CA Door Weatherstrip	1,165	1.00	1,165	1.00	1,165	20.0
Shell	CA Door Sweep	1,094	1.00	1,094	1.00	1,094	20.0
Shell	CA Wall Insulation	2,476	0.38	945	1.00	945	20.0
Miscellaneous	CA Advanced Power Strip	869	1.00	869	1.00	869	7.0
HVAC	CA ECM Blower	644	1.00	644	1.00	644	16.5
HVAC	IU Reprogram Thermostat	827	0.77	633	1.00	633	2.0
HVAC	CA Steam Trap	147	1.00	147	1.00	147	6.0
Hot Water	IU DHW Pipe Insulation	96	1.00	96	1.00	96	15.0
HVAC	CA Pipe Insulation	0	N/A	0	1.00	0	15.0
HVAC	CA Steam Boiler	0	N/A	0	1.00	0	25.0
HVAC	CA Averaging Controls	0	N/A	0	1.00	0	20.0
HVAC	CA Hydronic Boiler	0	N/A	0	1.00	0	25.0
HVAC	IU Furnace	0	N/A	0	1.00	0	20.0
Hot Water	IU DHW Heater	0	N/A	0	1.00	0	13.0
	Total	**4,350,903**	**1.00**	**4,369,191**		**4,369,191**	

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

Note: The savings in this table include secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd. The savings account for electric heating penalties, where applicable.

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

Source: ComEd tracking data and evaluation team analysis

Table 5-3. IEMS 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)
Shell	CA Attic Insulation and Air Sealing	147.34	0.17	24.85	1.00	24.85
Lighting	LED CA Interior - Omnidirectional	52.10	1.02	52.93	1.00	52.93
Lighting	LED CA Exterior - Fixture	0.00	N/A	0.00	1.00	0.00
HVAC	IU PTHP	12.91	1.00	12.91	1.00	12.91
Lighting	Occupancy Sensor	102.55	1.00	102.55	1.00	102.55
Lighting	LED CA Interior 24/7 - Fixture	23.42	1.28	29.94	1.00	29.94
Lighting	LED IU Interior - Omnidirectional	24.44	1.00	24.44	1.00	24.44
Lighting	LED CA Interior High Rise - T12	30.14	1.00	30.14	1.00	30.14
Lighting	LED CA Interior High Rise - T8	23.46	1.00	23.46	1.00	23.46
Lighting	LED Exit Sign	11.55	1.32	15.21	1.00	15.21
HVAC	IU Air Source Heat Pump	0.00	N/A	0.71	1.00	0.71
Lighting	LED CA Interior Mid Rise - T12	12.54	1.00	12.54	1.00	12.54
Consumer Electronics	IU Advanced Power Strip	9.50	1.00	9.51	1.00	9.51
Shell	CA Sidewall Insulation	31.63	1.00	31.63	1.00	31.63
Lighting	LED IU Interior - Decorative	9.12	1.00	9.12	1.00	9.12
Appliances	IU Refrigerator	8.92	0.97	8.67	1.00	8.67
Lighting	LED CA Interior Mid Rise - T8	6.96	1.00	6.99	1.00	6.99
Shell	CA Floor Insulation	0.19	0.00	0.00	1.00	0.00
HVAC	IU Advanced Thermostat	27.96	1.00	27.96	1.00	27.96
Hot Water	IU Kitchen Aerator	4.46	1.00	4.46	1.00	4.46
Hot Water	IU Showerhead	2.28	1.00	2.28	1.00	2.28
Lighting	LED CA Exterior - Omnidirectional	0.00	N/A	0.00	1.00	0.00
Lighting	LED CA Exterior 24/7 - Fixture	0.00	N/A	2.11	1.00	2.11
Lighting	LED CA Interior - Decorative	1.65	1.05	1.73	1.00	1.73
HVAC	IU AC Cover and Gap Sealer	0.00	N/A	0.00	1.00	0.00
Lighting	LED CA Interior - Directional	1.34	1.06	1.42	1.00	1.42
Lighting	LED CA Garage - Fixture	2.79	1.00	2.79	1.00	2.79
HVAC	IU Programmable Thermostat	0.00	N/A	0.00	1.00	0.00
Appliances	IU Room Air Conditioner	8.38	1.00	8.38	1.00	8.38
Hot Water	IU Bathroom Aerator	4.72	1.00	4.72	1.00	4.72
HVAC	IU Air Conditioner	7.07	1.00	7.07	1.00	7.07
Lighting	LED IU Interior - Directional	0.90	1.00	0.90	1.00	0.90
Hot Water	CA On-Demand DHW Control	0.00	N/A	15.00	1.00	15.00
Hot Water	IU Shower Timer	0.00	N/A	0.00	1.00	0.00
Lighting	LED IU Exterior - Omnidirectional	0.18	1.00	0.18	1.00	0.18
Shell	CA Door Weatherstrip	0.00	N/A	0.00	1.00	0.00
Shell	CA Door Sweep	0.00	N/A	0.00	1.00	0.00
Shell	CA Wall Insulation	1.90	0.26	0.49	1.00	0.49
Miscellaneous	CA Advanced Power Strip	0.00	N/A	0.00	1.00	0.00
HVAC	CA ECM Blower	0.01	0.99	0.01	1.00	0.01
HVAC	IU Reprogram Thermostat	0.00	N/A	0.00	1.00	0.00
HVAC	CA Steam Trap	0.00	N/A	0.00	1.00	0.00
Hot Water	IU DHW Pipe Insulation	0.01	1.00	0.01	1.00	0.01
HVAC	CA Pipe Insulation	0.00	N/A	0.00	1.00	0.00
HVAC	CA Steam Boiler	0.00	N/A	0.00	1.00	0.00
HVAC	CA Averaging Controls	0.00	N/A	0.00	1.00	0.00
HVAC	CA Hydronic Boiler	0.00	N/A	0.00	1.00	0.00
HVAC	IU Furnace	0.00	N/A	0.00	1.00	0.00
Hot Water	IU DHW Heater	0.00	N/A	0.00	1.00	0.00
	Total	**570.44**	**0.83**	**475.12**		**475.12**

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

Source: ComEd tracking data and evaluation team analysis

The IEMS program component includes measures that save water. That reduction in water produces secondary kWh savings from water supply and wastewater treatment. Table 5-4 shows the secondary measure-level savings. The savings in this table are included in the electricity savings in the previous tables in this section.

Table 5-4. IEMS 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)
Shell	CA Attic Insulation and Air Sealing	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior - Omnidirectional	0	NR	N/A	0	1.00	0
Lighting	LED CA Exterior - Fixture	0	NR	N/A	0	1.00	0
HVAC	IU PTHP	0	NR	N/A	0	1.00	0
Lighting	Occupancy Sensor	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior 24/7 - Fixture	0	NR	N/A	0	1.00	0
Lighting	LED IU Interior - Omnidirectional	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior High Rise - T12	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior High Rise - T8	0	NR	N/A	0	1.00	0
Lighting	LED Exit Sign	0	NR	N/A	0	1.00	0
HVAC	IU Air Source Heat Pump	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior Mid Rise - T12	0	NR	N/A	0	1.00	0
Consumer Electronics	IU Advanced Power Strip	0	NR	N/A	0	1.00	0
Shell	CA Sidewall Insulation	0	NR	N/A	0	1.00	0
Lighting	LED IU Interior - Decorative	0	NR	N/A	0	1.00	0
Appliances	IU Refrigerator	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior Mid Rise - T8	0	NR	N/A	0	1.00	0
Shell	CA Floor Insulation	0	NR	N/A	0	1.00	0
HVAC	IU Advanced Thermostat	0	NR	N/A	0	1.00	0
Hot Water	IU Kitchen Aerator	3,475,214	NR	N/A	11,538	1.00	11,538
Hot Water	IU Showerhead	2,900,133	NR	N/A	9,355	1.00	9,355
Lighting	LED CA Exterior - Omnidirectional	0	NR	N/A	0	1.00	0
Lighting	LED CA Exterior 24/7 - Fixture	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior - Decorative	0	NR	N/A	0	1.00	0
HVAC	IU AC Cover and Gap Sealer	0	NR	N/A	0	1.00	0
Lighting	LED CA Interior - Directional	0	NR	N/A	0	1.00	0
Lighting	LED CA Garage - Fixture	0	NR	N/A	0	1.00	0
HVAC	IU Programmable Thermostat	0	NR	N/A	0	1.00	0
Appliances	IU Room Air Conditioner	0	NR	N/A	0	1.00	0
Hot Water	IU Bathroom Aerator	528,696	NR	N/A	1,756	1.00	1,756
HVAC	IU Air Conditioner	0	NR	N/A	0	1.00	0
Lighting	LED IU Interior - Directional	0	NR	N/A	0	1.00	0
Hot Water	CA On-Demand DHW Control	0	NR	N/A	0	1.00	0
Hot Water	IU Shower Timer	1,014,307	NR	N/A	3,380	1.00	3,380
Lighting	LED IU Exterior - Omnidirectional	0	NR	N/A	0	1.00	0
Shell	CA Door Weatherstrip	0	NR	N/A	0	1.00	0
Shell	CA Door Sweep	0	NR	N/A	0	1.00	0
Shell	CA Wall Insulation	0	NR	N/A	0	1.00	0
Miscellaneous	CA Advanced Power Strip	0	NR	N/A	0	1.00	0
HVAC	CA ECM Blower	0	NR	N/A	0	1.00	0
HVAC	IU Reprogram Thermostat	0	NR	N/A	0	1.00	0
HVAC	CA Steam Trap	57,106	NR	N/A	147	1.00	147
Hot Water	IU DHW Pipe Insulation	0	NR	N/A	0	1.00	0
HVAC	CA Pipe Insulation	0	NR	N/A	0	1.00	0
HVAC	CA Steam Boiler	0	NR	N/A	0	1.00	0
HVAC	CA Averaging Controls	0	NR	N/A	0	1.00	0
HVAC	CA Hydronic Boiler	0	NR	N/A	0	1.00	0
HVAC	IU Furnace	0	NR	N/A	0	1.00	0
Hot Water	IU DHW Heater	0	NR	N/A	0	1.00	0
	Total	**7,975,457**	**NR**	**N/A**	**26,175**		**26,175**

NR = not reported.

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

Note: The savings in this table reflect 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: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

Source: ComEd tracking data and evaluation team analysis

Measure level gas therms savings are provided in Table 5-5.

Table 5-5. IEMS 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)
Shell	CA Attic Insulation and Air Sealing	164,673	1.02	167,678	1.00	167,678	20.0
Lighting	LED CA Interior - Omnidirectional	0	N/A	0	1.00	0	3.4
Lighting	LED CA Exterior - Fixture	0	N/A	0	1.00	0	11.6
HVAC	IU PTHP	0	N/A	0	1.00	0	8.0
Lighting	Occupancy Sensor	0	N/A	0	1.00	0	10.0
Lighting	LED CA Interior 24/7 - Fixture	0	N/A	0	1.00	0	5.7
Lighting	LED IU Interior - Omnidirectional	0	N/A	0	1.00	0	10.0
Lighting	LED CA Interior High Rise - T12	0	N/A	0	1.00	0	8.1
Lighting	LED CA Interior High Rise - T8	0	N/A	0	1.00	0	8.1
Lighting	LED Exit Sign	0	N/A	0	1.00	0	5.0
HVAC	IU Air Source Heat Pump	0	N/A	0	1.00	0	16.0
Lighting	LED CA Interior Mid Rise - T12	0	N/A	0	1.00	0	9.6
Consumer Electronics	IU Advanced Power Strip	0	N/A	0	1.00	0	7.0
Shell	CA Sidewall Insulation	36,819	1.07	39,395	1.00	39,395	20.0
Lighting	LED IU Interior - Decorative	0	N/A	0	1.00	0	10.0
Appliances	IU Refrigerator	0	N/A	0	1.00	0	17.0
Lighting	LED CA Interior Mid Rise - T8	0	N/A	0	1.00	0	9.6
Shell	CA Floor Insulation	410	1.13	465	1.00	465	20.0
HVAC	IU Advanced Thermostat	22,128	1.00	22,128	1.00	22,128	11.0
Hot Water	IU Kitchen Aerator	14,775	1.00	14,797	1.00	14,797	10.0
Hot Water	IU Showerhead	14,819	1.00	14,830	1.00	14,830	10.0
Lighting	LED CA Exterior - Omnidirectional	0	N/A	0	1.00	0	4.6
Lighting	LED CA Exterior 24/7 - Fixture	0	N/A	0	1.00	0	5.7
Lighting	LED CA Interior - Decorative	0	N/A	0	1.00	0	2.9
HVAC	IU AC Cover and Gap Sealer	181	1.00	181	1.00	181	5.0
Lighting	LED CA Interior - Directional	0	N/A	0	1.00	0	4.2
Lighting	LED CA Garage - Fixture	0	N/A	0	1.00	0	14.7
HVAC	IU Programmable Thermostat	10,199	0.96	9,788	1.00	9,788	16.0
Appliances	IU Room Air Conditioner	0	N/A	0	1.00	0	12.0
Hot Water	IU Bathroom Aerator	1,695	1.00	1,697	1.00	1,697	10.0
HVAC	IU Air Conditioner	0	N/A	0	1.00	0	18.0
Lighting	LED IU Interior - Directional	0	N/A	0	1.00	0	10.0
Hot Water	CA On-Demand DHW Control	9,834	1.00	9,834	1.00	9,834	15.0
Hot Water	IU Shower Timer	5,524	1.00	5,524	1.00	5,524	2.0
Lighting	LED IU Exterior - Omnidirectional	0	N/A	0	1.00	0	8.0
Shell	CA Door Weatherstrip	1,045	1.00	1,045	1.00	1,045	20.0
Shell	CA Door Sweep	894	1.00	894	1.00	894	20.0
Shell	CA Wall Insulation	396	1.56	617	1.00	617	20.0
Miscellaneous	CA Advanced Power Strip	0	N/A	0	1.00	0	7.0
HVAC	CA ECM Blower	0	N/A	0	1.00	0	16.5
HVAC	IU Reprogram Thermostat	821	0.75	616	1.00	616	2.0
HVAC	CA Steam Trap	4,337	1.00	4,336	1.00	4,336	6.0
Hot Water	IU DHW Pipe Insulation	0	N/A	0	1.00	0	15.0
HVAC	CA Pipe Insulation	202,710	0.99	200,544	1.00	200,544	15.0
HVAC	CA Steam Boiler	123,697	1.00	123,697	1.00	123,697	25.0
HVAC	CA Averaging Controls	34,828	1.00	34,828	1.00	34,828	20.0
HVAC	CA Hydronic Boiler	6,377	1.00	6,377	1.00	6,377	25.0
HVAC	IU Furnace	1,986	1.00	1,986	1.00	1,986	20.0
Hot Water	IU DHW Heater	74	1.00	74	1.00	74	13.0
	Total Therms	**658,222**	**1.00**	**661,332**		**661,332**	
	Total kWh Converted From Therms†	**19,292,499**	**1.00**	**19,383,645**		**19,383,645**	

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

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

Source: ComEd tracking data and evaluation team analysis

The total energy savings are provided in Table 5-6. The total includes electric energy savings and converted electric savings from gas measures.

Table 5-6. IEMS Energy Savings by Measure – Total

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Shell	CA Attic Insulation and Air Sealing	6,199,837	1.00	6,201,274	1.00	6,201,274
Lighting	LED CA Interior - Omnidirectional	374,212	1.02	381,809	1.00	381,809
Lighting	LED CA Exterior - Fixture	371,367	1.00	371,367	1.00	371,367
HVAC	IU PTHP	236,638	1.28	302,793	1.00	302,793
Lighting	Occupancy Sensor	261,373	1.00	261,373	1.00	261,373
Lighting	LED CA Interior 24/7 - Fixture	233,616	1.05	244,264	1.00	244,264
Lighting	LED IU Interior - Omnidirectional	196,122	1.01	197,123	1.00	197,123
Lighting	LED CA Interior High Rise - T12	198,933	1.00	198,933	1.00	198,933
Lighting	LED CA Interior High Rise - T8	154,856	1.00	154,856	1.00	154,856
Lighting	LED Exit Sign	112,851	1.12	126,465	1.00	126,465
HVAC	IU Air Source Heat Pump	120,977	1.02	122,972	1.00	122,972
Lighting	LED CA Interior Mid Rise - T12	97,856	0.97	94,876	1.00	94,876
Consumer Electronics	IU Advanced Power Strip	84,707	1.00	84,707	1.00	84,707
Shell	CA Sidewall Insulation	1,147,810	1.07	1,225,669	1.00	1,225,669
Lighting	LED IU Interior - Decorative	60,235	1.00	60,235	1.00	60,235
Appliances	IU Refrigerator	59,189	0.97	57,544	1.00	57,544
Lighting	LED CA Interior Mid Rise - T8	53,034	1.00	53,279	1.00	53,279
Shell	CA Floor Insulation	65,301	1.02	66,711	1.00	66,711
HVAC	IU Advanced Thermostat	698,342	1.00	698,341	1.00	698,341
Hot Water	IU Kitchen Aerator	461,610	1.00	462,248	1.00	462,248
Hot Water	IU Showerhead	460,724	1.00	461,067	1.00	461,067
Lighting	LED CA Exterior - Omnidirectional	22,393	1.00	22,393	1.00	22,393
Lighting	LED CA Exterior 24/7 - Fixture	9,873	1.88	18,514	1.00	18,514
Lighting	LED CA Interior - Decorative	11,306	1.05	11,883	1.00	11,883
HVAC	IU AC Cover and Gap Sealer	19,741	1.00	19,741	1.00	19,741
Lighting	LED CA Interior - Directional	12,333	0.92	11,357	1.00	11,357
Lighting	LED CA Garage - Fixture	10,306	1.00	10,306	1.00	10,306
HVAC	IU Programmable Thermostat	309,109	0.96	296,665	1.00	296,665
Appliances	IU Room Air Conditioner	9,193	1.00	9,193	1.00	9,193
Hot Water	IU Bathroom Aerator	56,170	1.00	56,228	1.00	56,228
HVAC	IU Air Conditioner	6,171	1.00	6,168	1.00	6,168
Lighting	LED IU Interior - Directional	6,141	1.00	6,141	1.00	6,141
Hot Water	CA On-Demand DHW Control	292,181	1.00	292,181	1.00	292,181
Hot Water	IU Shower Timer	165,300	1.00	165,293	1.00	165,293
Lighting	LED IU Exterior - Omnidirectional	1,590	1.00	1,590	1.00	1,590
Shell	CA Door Weatherstrip	31,791	1.00	31,791	1.00	31,791
Shell	CA Door Sweep	27,295	1.00	27,295	1.00	27,295
Shell	CA Wall Insulation	14,075	1.35	19,041	1.00	19,041
Miscellaneous	CA Advanced Power Strip	869	1.00	869	1.00	869
HVAC	CA ECM Blower	644	1.00	644	1.00	644
HVAC	IU Reprogram Thermostat	24,884	0.75	18,676	1.00	18,676
HVAC	CA Steam Trap	127,254	1.00	127,247	1.00	127,247
Hot Water	IU DHW Pipe Insulation	96	1.00	96	1.00	96
HVAC	CA Pipe Insulation	5,941,433	0.99	5,877,951	1.00	5,877,951
HVAC	CA Steam Boiler	3,625,572	1.00	3,625,572	1.00	3,625,572
HVAC	CA Averaging Controls	1,020,808	1.00	1,020,808	1.00	1,020,808
HVAC	CA Hydronic Boiler	186,907	1.00	186,907	1.00	186,907
HVAC	IU Furnace	58,220	1.00	58,220	1.00	58,220
Hot Water	IU DHW Heater	2,160	1.00	2,160	1.00	2,160
	Total†	**23,643,402**	**1.00**	**23,752,835**		**23,752,835**

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

† The total includes the electric equivalent of the total therms.

Source: ComEd tracking data and evaluation team analysis

5.2 IHWAP

The IHWAP program component included the measures shown in Table 5-7 and Figure 5-2.

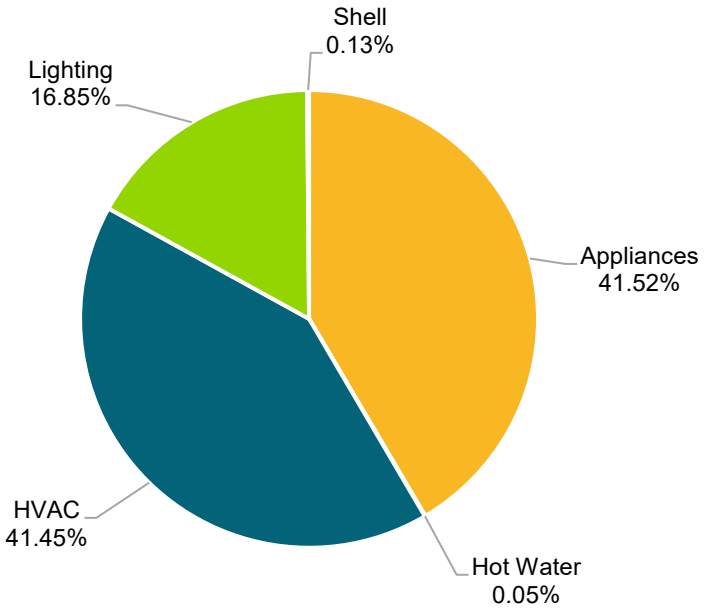
Table 5-7. IHWAP Number of Measures by Type

End Use Type	Research Category	Quantity	Unit
Appliances	Refrigerator	263	Each
HVAC	High Efficiency Bathroom Exhaust Fan	453	Each
HVAC	Custom - Heating Plant Improvements	3	Project
Appliances	Room Air Conditioner	200	Each
Lighting	LED Specialty Lamps - Indoor	3791	Lamp
Lighting	LED Screw Based Omnidirectional Bulbs	700	Lamp
HVAC	Custom - Rooftop Units	3	Project
HVAC	Custom - HHW Pump	2	Project
Lighting	LED Specialty Lamps - Outdoor	14	Lamp
Shell	Attic Insulation	7	Project
HVAC	Advanced Thermostats	5	Each
HVAC	Residential Furnace Tune-Up	4	Each
Hot Water	Low Flow Faucet Aerator	58	Each
Hot Water	Low Flow Showerhead	9	Each
Shell	Air Sealing	123	Project
Hot Water	Custom - DHW Boiler	3	Project
	Total	**5,638**	

Note: This is the same table as Table 2-3. The table is sorted by verified gross savings.

Source: ComEd tracking data and evaluation team analysis

Figure 5-2. IHWAP Verified Net Savings by Measure – Electric



Source: ComEd tracking data and evaluation team analysis

Measure-level energy and demand savings for the IHWAP program component are provided in the following tables.

Table 5-8. IHWAP 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)
Appliances	Refrigerator	109,697	1.00	109,697	1.00	109,697	17.0
HVAC	High Efficiency Bathroom Exhaust Fan	76,297	1.00	76,297	1.00	76,297	19.0
HVAC	Custom - Heating Plant Improvements	46,385	1.00	46,356	1.00	46,356	23.4
Appliances	Room Air Conditioner	35,016	1.00	35,016	1.00	35,016	12.0
Lighting	LED Specialty Lamps - Indoor	31,294	1.00	31,294	1.00	31,294	10.0
Lighting	LED Screw Based Omnidirectional Bulbs	25,053	1.00	25,053	1.00	25,053	10.0
HVAC	Custom - Rooftop Units	10,511	1.02	10,692	1.00	10,692	15.0
HVAC	Custom - HHW Pump	13,130	0.81	10,641	1.00	10,641	15.0
Lighting	LED Specialty Lamps - Outdoor	2,393	1.00	2,393	1.00	2,393	10.0
Shell	Attic Insulation	523	0.84	441	1.00	441	20.0
HVAC	Advanced Thermostats	307	1.00	307	1.00	307	11.0
HVAC	Residential Furnace Tune-Up	173	1.00	173	1.00	173	3.0
Hot Water	Low Flow Faucet Aerator	0	N/A	130	1.00	130	10.0
Hot Water	Low Flow Showerhead	0	N/A	28	1.00	28	10.0
Shell	Air Sealing	20	0.91	18	1.00	18	20.0
Hot Water	Custom - DHW Boiler	0	N/A	0	1.00	0	15.0
	Total	**350,799**	**0.99**	**348,535**		**348,535**	

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

Note: The savings in this table include secondary electric energy (kWh) savings from water supply and wastewater treatment plants for measures claimed by ComEd. The savings account for electric heating penalties, where applicable.

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

Source: ComEd tracking data and evaluation team analysis

Table 5-9. IHWAP 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)
Appliances	Refrigerator	16.53	1.00	16.53	1.00	16.53
HVAC	High Efficiency Bathroom Exhaust Fan	8.71	1.00	8.71	1.00	8.71
HVAC	Custom - Heating Plant Improvements	3.40	1.00	3.41	1.00	3.41
Appliances	Room Air Conditioner	31.94	1.00	31.94	1.00	31.94
Lighting	LED Specialty Lamps - Indoor	4.60	1.00	4.60	1.00	4.60
Lighting	LED Screw Based Omnidirectional Bulbs	3.03	1.00	3.03	1.00	3.03
HVAC	Custom - Rooftop Units	3.30	0.53	1.74	1.00	1.74
HVAC	Custom - HHW Pump	0.00	N/A	0.00	1.00	0.00
Lighting	LED Specialty Lamps - Outdoor	0.26	1.00	0.26	1.00	0.26
Shell	Attic Insulation	0.00	N/A	0.00	1.00	0.00
HVAC	Advanced Thermostats	0.00	N/A	0.00	1.00	0.00
HVAC	Residential Furnace Tune-Up	0.00	N/A	0.00	1.00	0.00
Hot Water	Low Flow Faucet Aerator	0.00	N/A	0.00	1.00	0.00
Hot Water	Low Flow Showerhead	0.00	N/A	0.00	1.00	0.00
Shell	Air Sealing	0.00	N/A	0.00	1.00	0.00
Hot Water	Custom - DHW Boiler	0.00	N/A	0.00	1.00	0.00
	Total	**71.78**	**0.98**	**70.23**		**70.23**

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

Source: ComEd tracking data and evaluation team analysis

The IHWAP program component includes measures that save water. That reduction in water produces secondary kWh savings from water supply and wastewater treatment. Table 5-10

shows the secondary measure-level savings. The savings in this table are included in the electricity savings in the previous tables in this section.

Table 5-10. IHWAP 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)
Appliances	Refrigerator	0	NR	N/A	0	1.00	0
HVAC	High Efficiency Bathroom Exhaust Fan	0	NR	N/A	0	1.00	0
HVAC	Custom - Heating Plant Improvements	0	NR	N/A	0	1.00	0
Appliances	Room Air Conditioner	0	NR	N/A	0	1.00	0
Lighting	LED Specialty Lamps - Indoor	0	NR	N/A	0	1.00	0
Lighting	LED Screw Based Omnidirectional Bulbs	0	NR	N/A	0	1.00	0
HVAC	Custom - Rooftop Units	0	NR	N/A	0	1.00	0
HVAC	Custom - HHW Pump	0	NR	N/A	0	1.00	0
Lighting	LED Specialty Lamps - Outdoor	0	NR	N/A	0	1.00	0
Shell	Attic Insulation	0	NR	N/A	0	1.00	0
HVAC	Advanced Thermostats	0	NR	N/A	0	1.00	0
HVAC	Residential Furnace Tune-Up	0	NR	N/A	0	1.00	0
Hot Water	Low Flow Faucet Aerator	688,889	NR	N/A	130	1.00	130
Hot Water	Low Flow Showerhead	5,666	NR	N/A	28	1.00	28
Shell	Air Sealing	0	NR	N/A	0	1.00	0
Hot Water	Custom - DHW Boiler	0	NR	N/A	0	1.00	0
	Total	**694,555**	**NR**	**N/A**	**158**		**158**

NR = not reported.
N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

Note: The savings in this table reflect 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: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

Source: ComEd tracking data and evaluation team analysis

The IHWAP program component includes measures that save gas. Table 5-11 shows the measure-level gas savings.

Table 5-11. IHWAP 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)
Appliances	Refrigerator	0	N/A	0	1.00	0	17.0
HVAC	High Efficiency Bathroom Exhaust Fan	0	N/A	0	1.00	0	19.0
HVAC	Custom - Heating Plant Improvements	24,745	1.00	24,690	1.00	24,690	23.4
Appliances	Room Air Conditioner	0	N/A	0	1.00	0	12.0
Lighting	LED Specialty Lamps - Indoor	0	N/A	0	1.00	0	10.0
Lighting	LED Screw Based Omnidirectional Bulbs	0	N/A	0	1.00	0	10.0
HVAC	Custom - Rooftop Units	0	N/A	0	1.00	0	15.0
HVAC	Custom - HHW Pump	0	N/A	0	1.00	0	15.0
Lighting	LED Specialty Lamps - Outdoor	0	N/A	0	1.00	0	10.0
Shell	Attic Insulation	5,617	1.00	5,617	1.00	5,617	20.0
HVAC	Advanced Thermostats	0	N/A	0	1.00	0	11.0
HVAC	Residential Furnace Tune-Up	0	N/A	0	1.00	0	3.0
Hot Water	Low Flow Faucet Aerator	1,651	0.07	113	1.00	113	10.0
Hot Water	Low Flow Showerhead	33	1.00	33	1.00	33	10.0
Shell	Air Sealing	8,409	1.00	8,409	1.00	8,409	20.0
Hot Water	Custom - DHW Boiler	3,435	1.08	3,702	1.00	3,702	15.0
	Total Therms	**43,889**	**0.97**	**42,564**		**42,564**	
	Total kWh Converted From Therms†	**1,286,389**	**0.97**	**1,247,553**		**1,247,553**	

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

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

Source: ComEd tracking data and evaluation team analysis

The total energy savings are provided in Table 5-12. The total includes electric energy savings and converted electric savings from gas measures.

Table 5-12. IHWAP Energy Savings by Measure – Total

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Appliances	Refrigerator	109,697	1.00	109,697	1.00	109,697
HVAC	High Efficiency Bathroom Exhaust Fan	76,297	1.00	76,297	1.00	76,297
HVAC	Custom - Heating Plant Improvements	771,650	1.00	770,019	1.00	770,019
Appliances	Room Air Conditioner	35,016	1.00	35,016	1.00	35,016
Lighting	LED Specialty Lamps - Indoor	31,294	1.00	31,294	1.00	31,294
Lighting	LED Screw Based Omnidirectional Bulbs	25,053	1.00	25,053	1.00	25,053
HVAC	Custom - Rooftop Units	10,511	1.02	10,692	1.00	10,692
HVAC	Custom - HHW Pump	13,130	0.81	10,641	1.00	10,641
Lighting	LED Specialty Lamps - Outdoor	2,393	1.00	2,393	1.00	2,393
Shell	Attic Insulation	165,155	1.00	165,073	1.00	165,073
HVAC	Advanced Thermostats	307	1.00	307	1.00	307
HVAC	Residential Furnace Tune-Up	173	1.00	173	1.00	173
Hot Water	Low Flow Faucet Aerator	48,383	0.07	3,445	1.00	3,445
Hot Water	Low Flow Showerhead	968	1.03	997	1.00	997
Shell	Air Sealing	246,490	1.00	246,489	1.00	246,489
Hot Water	Custom - DHW Boiler	100,671	1.08	108,505	1.00	108,505
	Total†	**1,637,188**	**0.97**	**1,596,089**		**1,596,089**

* A deemed value. Source: Illinois SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2021**.

† The total includes the electric equivalent of the total therms.

Source: ComEd tracking data and evaluation team analysis

6. Impact Analysis Findings and Recommendations

6.1 IEMS

The measures that had the largest effect on adjusting ex ante gross energy savings for the IEMS program component were common area (CA) attic insulation and air sealing (see findings 1 - 5) and in unit (IU) packaged terminal heat pump (PTHP) (see findings 7 and 8).

The evaluation team developed several recommendations based on findings from the CY2021 evaluation.

6.1.1 CA Attic, Sidewall, Floor Insulation and Air Sealing

CA attic insulation and air sealing have a realization rate of 0.94. The main factors for this realization rate were the existing heating systems efficiencies.

Finding 1. Ex ante calculations claimed cooling energy and demand savings for 42 attic insulation projects with a natural gas, window, or packaged terminal air conditioner (AC) cooling system and did not calculate cooling savings for one project (10007626) that had a central cooling system. The Illinois Technical Reference Manual v9.0 (IL-TRM),[3] Section 5.6.5 indicates cooling energy and demand savings should only be claimed for projects with central cooling. Guidehouse verified cooling energy and demand savings for these projects based on their cooling system type per the IL-TRM, Section 5.6.5.

> **Recommendation 1.** Calculate and claim cooling energy and demand savings for projects with a central cooling system type.

Finding 2. Ex ante calculations for 15 projects with a natural gas furnace heating system type used an income eligible net correction factor in the kWh savings algorithm for reduction in fan runtime. Guidehouse did not use the IE net correction to calculate the verified savings for these projects per the IL-TRM Errata, Section 5.6.5.

> **Recommendation 2.** Remove the IE net correction multiplier from the kWh savings for reduction in fan runtime algorithm per the TRM Errata, Section 5.6.5.

Finding 3. Ex ante savings for project IDs 10008481 and 10008482 with an electric heat pump heating system type were calculated using a heating efficiency of 1.28 coefficient of performance (COP) corresponding to an unknown heating system type. Guidehouse calculated savings for this project using a heating efficiency of 1.89 COP per the IL-TRM, Section 5.6.5 for the heat pump system type with unknown age of equipment.

> **Recommendation 3.** Use the COP corresponding to the heating system type installed at the property.

Finding 4. Ex ante cooling energy and peak demand savings for project ID 10008752 are off by a factor of 100 as compared to the verified savings for this project (see Table 6-1).

[3] In this report, unless stated otherwise, IL-TRM and IL-TRM Errata refers to version 9.0 (v9.0).

Table 6-1. CA Attic Insulation and Air Sealing – Project Savings

Savings Category	Ex Ante Savings	Verified Savings
Electric Energy kWh	105,810	2,327
Cooling Energy kWh	104,619	1,046
Heating Energy kWh – Insulation	806*	896
Heating Energy kWh – Air Sealing	385	385
Peak Demand kW	96.35	0.96
Natural Gas Therms	1,211	1,301

*Difference in savings explained in Finding 6

Source: ComEd tracking data and evaluation team analysis

Recommendation 4. Ensure tracking data savings are consistent with the measure inputs.

Finding 5. Ex ante calculations claimed therm savings for two projects that have an electric resistance heating type and packaged terminal air conditioner (PTAC) cooling system (IDs 10009042 and 10009040). Ex ante calculations for project ID 10009042 also claimed cooling energy and peak demand savings (see Table 6-2). Guidehouse verified energy savings but no peak demand or therm savings for these projects based on the heating and cooling system type at the property.

Table 6-2. CA Attic Insulation and Air Sealing – Savings

Savings Category	Ex Ante Savings	Verified Savings
10009042		
Electric Energy kWh	478	21,995
Peak Demand kW	0.44	0.00
Natural Gas Therms	1,072	0
10009040		
Electric Energy kWh	0	24,742
Peak Demand kW	0.00	0.00
Natural Gas Therms	1,201	0

Source: ComEd tracking data and evaluation team analysis

Recommendation 5. Calculate and claim energy and demand savings based on the heating and cooling system type at the property.

Finding 6. Ex ante therm savings for 25 out of 37 CA sidewall insulation projects with a natural gas heating system were calculated using a custom heating system efficiency of 80%. Guidehouse was unable to verify the existing system efficiencies, so the team calculated natural gas savings using a deemed efficiency of 72% per the IL-TRM, Section 5.6.2. The heating system efficiency should account for the equipment efficiency and the distribution efficiency.

> **Recommendation 6.** Use a deemed existing heating system efficiency of 72% to calculate therm savings for this measure per IL-TRM, Section 5.6.2.

6.1.2 IU PTHP

IU PTHP have an electric energy realization rate of 1.28 because of the operating hours and the baseline heating system types used to evaluate savings.

Finding 7. The ex ante energy savings for project ID 10006496 were calculated using equivalent full load hours (EFLH) corresponding to the commercial MF-High Rise building type. Guidehouse used the Residential MF building type because this measure was installed IU. The MF-High Rise-Residential building type applies only to the residential units in the building per the IL-TRM.

> **Recommendation 7.** Use EFLH values corresponding to the MF – High Rise – Residential building type for this measure.

Finding 8. The measure description for record locator IDs a0B0d00000lWuoiEAC and a0B6Q00000lWz8tUAC in the tracking data is indicated to be IU PTHP (Heat Pump Baseline). However, the tracking data also notes the heating system type for these projects to be electric resistance. Guidehouse calculated verified savings for these projects using an electric resistance baseline heating system based on the heating system type field in the tracking data.

> **Recommendation 8.** Confirm the heating system type at the facility for these records. Ensure the measure description is consistent with the baseline heating system noted in the tracking data.

6.1.3 CA Pipe Insulation

Finding 9. Twenty seven domestic hot water (DHW) and nine hydronic pipe insulation measures had electric hot water fuel per the tracking data. Guidehouse verified no therms savings for these records.

> **Recommendation 9.** Only claim therm savings for this measure if the corresponding heating fuel is natural gas.

Finding 10. Ex ante savings for 16 out of 458 records were calculated using custom delta heat loss values that Guidehouse was unable to verify. The evaluation team calculated verified savings for all records using delta heat loss values calculated using 3E Plus software and approved in the ex ante calculators.

> **Recommendation 10.** Ensure delta heat loss values are consistent with the approved ex ante calculators for all records. Provide additional documentation supporting the use of custom delta heat loss values if applicable.

6.1.4 Lighting

6.1.4.1 LED Exit Signs and 24/7 Usage

Finding 11. Ex ante demand and energy savings for exit signs and LED fixtures that operate on a 24/7 basis were using hours of use (HOU) and coincidence factors (CFs) based on the

building type they were installed in. Guidehouse uses the HOU and CF of 8,766 and 1.00, respectively per the IL-TRM.

> **Recommendation 11.** Use a CF of 1.00 and HOU of 8,766 to reflect the fixtures usage.

6.1.4.2 LED In-Service Rate

Finding 12. Ex ante savings for LEDs in interior CA were calculated using an in-service rate (ISR) of 0.945 from the Residential IL-TRM, Sections 5.5.6 and 5.5.8. Guidehouse calculated verified savings for this measure using an ISR of 1.00 based on the service provider installation application that requires all equipment to be installed and operational.

> **Recommendation 12.** Use an ISR of 1.00 for lighting measures that are direct installed.

6.1.4.3 LED CA Interior Mid Rise – T8

Finding 13. Project ID 10008166 is an interior mid-rise building T8 with a 2-lamp, 8-feet configuration. Savings were calculated using a baseline wattage of 112.64 W (28.16 W * 4), where 28.16 W is the wattage corresponding to a 1-lamp, 4-feet T8 configuration per the IL-TRM. Guidehouse calculated verified savings for this project using a baseline wattage of 123.20 W (61.6 W * 2), where 61.6 W is the wattage corresponding to a 1-lamp, 8-feet T8 configuration per the IL-TRM.

> **Recommendation 13.** Calculate savings based on the 2-lamp, 8-feet configuration using a baseline wattage of 123.20 W.

6.1.4.4 LED Heating Penalty

Finding 14. Two LED CA interior projects (10006952 and 1000876) do not include heating penalties and two LED IU interior projects (10008300 and 1008321) include heating penalties based on a different heating system. Guidehouse calculated the heating penalties for these projects using a (COP) for electric heat pumps based on the tracked heating systems.

> **Recommendation 14.** Calculate the electric heating penalty for applicable measures installed in buildings with an electric heating system per the program tracking data.

6.1.5 IU Programmable Thermostat and IU Reprogram Thermostat

Finding 15. For four properties, ex ante calculations claimed savings for more thermostats than the number of units at the property (see Table 6-3). Guidehouse updated the quantity of IU programmable, and IU reprogram thermostats installed at these properties and verified savings for only one thermostat per household.

Table 6-3. IU Programmable and IU Reprogram Thermostat – Quantity Adjustment

Property	Number of Units	Ex Ante Quantity		Verified Quantity	
		IU Programmable Thermostat	IU Reprogram Thermostat	IU Programmable Thermostat	IU Reprogram Thermostat
Property 1	12	18	4	12	0
Property 2	3	3	1	3	0
Property 3	5	6	0	5	0
Property 4	4	7	0	4	0

Source: ComEd tracking data and evaluation team analysis

Recommendation 15. Claim savings for only one thermostat per household for this measure to be consistent with the IL-TRM, Section 5.3.16. Track the apartment or unit number as part of the site address for this measure.

6.1.6 CA Wall Insulation

Finding 16. The ex ante savings claimed electric energy and peak demand savings for project ID 10007752 with a gas boiler heating system type and no cooling system (see Table 6-4). Guidehouse verified no electric kWh and peak demand savings for this project because there was no cooling system.

Table 6-4. CA Wall Insulation – Project Savings

Savings Category	Ex Ante Savings	Verified Savings
Electric Energy kWh	1,531	0
Peak Demand kW	1.41	0
Natural Gas Therms	1	253

Source: ComEd tracking data and evaluation team analysis

Recommendation 16. Ensure the savings claimed are consistent with the heating and cooling system installed at the property.

6.1.7 IU Air Source Heat Pump

Finding 17. Ex ante calculations did not claim any cooling energy and peak demand savings for this measure for projects with an electric resistance heating and no existing cooling system. Guidehouse calculated cooling savings and peak demand savings for these projects using baseline energy efficiency ratio and seasonal energy efficiency ratio values corresponding to the no central cooling system type based on the assumption that the decision to replace the existing systems includes a desire to add cooling per the IL-TRM, Section 5.3.1.

Recommendation 17. Calculate and claim cooling energy and peak demand savings for this measure per the IL-TRM, Section 5.3.1.

6.1.8 Refrigerator

Finding 18. There was a discrepancy between the quantity of refrigerators used in the ex ante calculations and the quantity of refrigerators in the tracking data (see Table 6-5). Guidehouse calculated verified savings for this measure using the tracking data quantity.

Table 6-5. Refrigerator Quantity – IEMS

Project ID	Tracking Data Quantity	Ex Ante Calculations Quantity
10008789	2	4
10008085	1	2
10008599	1	2

Source: ComEd tracking data and evaluation team analysis

Recommendation 18. Ensure consistency between the quantity of refrigerators in the tracking data and the number of refrigerators used in the calculations.

6.1.9 ComEd Therms Disposition

Finding 19. Ex ante therms for project IDs 10006012 and 10005581 jointly implemented with Peoples Gas were calculated using an incorrect ComEd therms allocation of 71%. Guidehouse calculated verified therms for these projects using a ComEd therms allocation of 88%. Ex ante therms for project ID 10008478 jointly implemented with Nicor Gas were calculated using an incorrect ComEd therms allocation of 98%. Guidehouse calculated verified therms for this project using a ComEd therms allocation of 100%.

Recommendation 19. Ensure the ComEd therms allocation parameter in the tracking data is accurate for all projects.

6.2 IHWAP

The measures that had the largest effect on adjusting ex ante gross savings for the IHWAP program component were from the custom project with the hot water heat pumps (see findings 23-24) being the main driver. Other adjustments to the ex ante savings came from the shell end use measures (see findings 34-35), and secondary electric energy savings from water supply and wastewater treatment (see finding 36).

The evaluation team developed several recommendations based on findings from the CY2021 evaluation.

6.2.1 Custom

The Custom - Heating Plant Improvements measure contributed to 48.2% of total program savings, defined as the sum of electric energy savings and converted gas energy savings. The Custom – Heating Plant Improvements measure category consists of the following measures: heating hot water (HHW) boiler efficiency, HHW boiler turndown and combustion fan decommission.

6.2.1.1 Custom – DHW Boiler Baseline Consumption and Tank Volume

Finding 20. Baseline DHW consumption was not calibrated at the facility using a scaling factor for one project. Guidehouse used a scaling factor calculated as the ratio of the benchmarked DHW usage (using utility bill analysis) at the building to the baseline usage as predicted by the custom calculations (using IL-TRM, Section 4.3.7) to ensure calibration. Guidehouse then multiplied the savings calculated using the custom approach by the scaling factor.

> **Recommendation 20.** Calibrate the baseline consumption calculated using the IL-TRM algorithm and the DHW consumption using a scaling factor.

Finding 21. Standby loss for this measure was calculated by dividing the tank volume by the number of tanks for both projects and using the input rating of the boiler in MBH for one project and the IL-TRM v9.0 algorithm. The tank volume used in the calculations corresponds to a single tank and the IL-TRM algorithm requires the boiler input rating in Btuh. Guidehouse calculated the standby loss for this measure using the boiler input rating in Btuh and the IL-TRM algorithm.

> **Recommendation 21.** Use the tank volume corresponding to a single tank and use the boiler input rating in Btuh and the IL-TRM algorithm to calculate the standby loss for this measure.

6.2.1.2 Custom – HHW Pumps Run Hours

Finding 22. Ex ante savings for this measure installed in a 9-story building were calculated using heating run hours corresponding to the MF – Mid Rise building type from the IL-TRM, Section 4.4.17. Guidehouse calculated verified savings using heating run hours corresponding to the MF – High Rise building type.

> **Recommendation 22.** Use heating run hours corresponding to the MF – High Rise building type for all residential buildings with five or more floors per the IL-TRM.

Finding 23. Ex ante savings for this measure assumed a pump efficiency of 65% based on the rated boiler horsepower (BHP) of the pump. Guidehouse calculated verified savings using a pump efficiency of 69% based on the pump performance datasheet provided as part of the project documentation.

> **Recommendation 23.** Use the actual pump efficiency when available.

6.2.1.3 Custom – Heating Plant Improvements

Finding 24. Normalized HHW usage was calculated for months with heating degree days (HDD) less than 100. Guidehouse calculated normalized HHW usage only for months with HDD greater than 100 and assumed zero HHW usage for months with HDD less than 100 consistent with the approach used to develop the regression coefficients used to calculate the normalized HHW usage in the IL-TRM.

> **Recommendation 24.** Only calculate normalized HHW usage for months with HDD greater than 100 to be consistent with the approach used to determine the regression coefficients.

Finding 25. The ex ante EFLH were calculated using the normalized HHW usage, the input capacity of the installed boiler and efficiency of the existing or baseline boiler. When using the input capacity of the boiler to calculate savings, the EFLH should correspond to the equivalent full load hours of the installed high efficiency unit. Guidehouse calculated the EFLH using the normalized HHW usage adjusted for the efficiency of the installed boiler, the input capacity, and the efficiency of the installed boiler.

> **Recommendation 25.** Use the input capacity, efficiency of the installed boiler, and HHW usage adjusted for the installed boiler to calculate EFLH.

Finding 26. Ex ante savings for the HHW boiler efficiency measure were calculated using the input capacity of the boiler and Equation 6-1. This savings algorithm is valid when using the output capacity of the boiler. Guidehouse calculated verified savings for this measure using the input capacity of the boiler and Equation 6-2 per the IL-TRM, Section 4.4.10.

Equation 6-1. Ex Ante Savings Algorithm

$$Savings = Capacity * EFLH * (\frac{1}{Efficiency_{Base}} - \frac{1}{Efficiency_{EE}})$$

Equation 6-2. Verified Savings Algorithm

$$Savings = Capacity * EFLH * \left(\frac{Efficiency_{EE} - Efficiency_{Base}}{Efficiency_{Base}}\right)$$

> **Recommendation 26.** Use Equation 6-2 along with the input capacity of the boiler to calculate savings for this measure.

Finding 27. The weighted average proposed boiler efficiency was calculated using standard boiler efficiency curves and typical meteorological year (TMY3) for Chicago O'Hare International Airport weather station data for one custom project site. Guidehouse calculated the weighted average proposed boiler efficiency using standard boiler efficiency curves and TMY3 weather data for the Midway International Airport weather station based on proximity to the site address and to be consistent with the TMY3 weather data used for the normalized HHW usage determination.

> **Recommendation 27.** Use TMY3 weather data for the weather station closest to the site address for all aspects of the project.

Finding 28. For the HHW boiler efficiency measure, ex ante savings for all boilers for one project were calculated using a baseline efficiency of 80% irrespective of the boiler capacity. Guidehouse calculated verified savings for this project using a baseline efficiency of 82% for boilers less than 300 kBtu/hr and 80% for boilers greater than or equal to 300 kBtu/hr per the IL-TRM Section, 4.4.10.

> **Recommendation 28.** Use a baseline boiler efficiency corresponding to the boiler capacity per the IL-TRM, Section 4.4.10.

Finding 29. For the HHW boiler turndown measure, the program calculated energy loss due to cycling for temperature bins where the percentage of boiler load was greater than the turndown ratio in the baseline and efficient cases. Guidehouse only calculated energy loss due to cycling

for temperature bins where the percentage of boiler load was less than or equal to the turndown ratio in the baseline and efficiency cases per the IL-TRM, Section 4.4.20

> **Recommendation 29.** Only calculate energy loss due to cycling for temperature bins where the percentage of boiler load is less than or equal to the turndown ratio per the IL-TRM, Section 4.4.20.

6.2.1.4 Custom – Rooftop Units

Finding 30. Ex ante peak demand savings for this measure were calculated using the summer system peak CF from the IL-TRM, Section 4.4.15. Guidehouse calculated verified peak demand savings using the PJM CF.

> **Recommendation 30.** Use the PJM CF to calculate peak demand savings for this measure.

Finding 31. Ex ante savings for this measure were calculated using the nominal cooling capacity of the installed units. Guidehouse calculated verified savings using the actual cooling capacity based on specification sheets corresponding to the model number of the installed units (see Table 6-6).

Table 6-6. Custom – Rooftop Units – Capacity

Model Number	Ex Ante Cooling Capacity MBH	Verified Cooling Capacity MBH
YHD150G4RLD	150	152.4
YHC074F4RMA	72	73
YHC092F4RMA	90	92

Source: ComEd tracking data and evaluation team analysis

> **Recommendation 31.** Use the actual capacity of the units based on specification sheets to calculate savings for this measure.

Finding 32. The ex ante reported demand savings differed between the tracking data and the values provided in the custom workbook. The discrepancy was due to rounded values in the tracking data. The realization rates use the ex ante values provided in the tracking data to be consistent with other measures in the program. This was also found in the custom heating hot water (HHW) pumps.

> **Recommendation 32.** Do not round demand savings in the tracking data.

6.2.2 Air Sealing and Attic Insulation TRM Inputs

Air sealing contributed to 15.4% of total program savings and had an electric energy realization rate of 0.91 and a gas realization rate of 1.00. Attic insulation measures contributed to 10.3% of total program savings and had an electric energy realization rate of 0.84 and a gas realization rate of 1.00.

Finding 33. The ex ante savings used an IE net correction value of 1.1 for electric savings, where applicable, and gas savings for all attic insulation measures and the air sealing measure using IL-TRM methodology 2. The net correction value of 1.1 should only be used in the gas

savings equation for measures that are installed with air sealing. A value of 1 should then be applied to all other measures not installed with air sealing. IE net correction should not be incorporated in the energy equation as per the IL-TRM v9.0 Errata. The evaluation team confirmed if attic insulation measures were installed with air sealing using a comparison of project IDs and ComEd account numbers. Verified electric energy savings apply the appropriate IE net correction value to the gas savings equation.

> **Recommendation 33.** Follow the IL-TRM and IL-TRM v9.0 Errata definitions of IE net correction, using 1.1 in the gas savings equation for measures installed with air sealing and 1 for measures installed without.

6.2.3 Secondary Water Savings

Hot water measures contributed to 0.28% of total program savings.

Finding 34. Ex ante electric energy savings did not include secondary savings for water supply and wastewater treatment. This should be calculated per the IL-TRM to ensure all associated energy savings are accounted for.

> **Recommendation 34.** Calculate all necessary savings values as per the IL-TRM.

6.2.4 Low Flow Faucet Aerator

Low flow faucet aerator measures contributed to 0.2% of total program savings. There was no electric energy realization rate for this measure as electric energy values were not provided, and the measure type had a gas realization rate of 0.07. The total realization rate was 0.07 with verified secondary water savings.

Finding 35. The evaluation team found one measure used a custom value of 90 for people per household in the ex ante savings calculation. This value is very high in comparison to the IL-TRM's deemed value of 2.1, which the other two aerator measures used in their ex ante calculations.

> **Recommendation 35.** Provide more information to support custom values that largely differ from IL-TRM deemed values. This can be shared in the Meausure_Notes column of the tracking data or in a comment in the tracking data summary workbook.

6.2.5 ENERGY STAR and Consortium for Energy Efficiency Tier 1 Refrigerator

The ENERGY STAR and Consortium for Energy Efficiency (CEE) Tier 1 refrigerator measure contributed to 6.9% of total program savings. It had an electric energy realization rate of 1.00 and no associated gas savings.

Finding 36. The evaluation team assumed all refrigerator measures to be early replacement and meet ENERGY STAR efficiency standards. There was no information provided in the tracking data on this, so the team based its calculations on assumptions made in prior evaluations.

> **Recommendation 36.** Provide two data fields in the tracking data moving forward: one to differentiate between early replacement and time of sale measures, and one to identify a measure's efficiency standard.

6.2.6 High Efficiency Bathroom Exhaust Fan

The high efficiency bathroom exhaust fan measure contributed to 4.8% of total program savings. It had an electric energy realization rate of 1.00 and no associated gas savings.

Finding 37. Details were not provided to determine the standard mode measures' cubic feet per minute (CFM) deemed values. Verified electric energy savings values assumed all applicable measures used the smaller deemed CFM values. This assumption was based off prior years' evaluations as the necessary information was not provided in the tracking data.

> **Recommendation 37.** Provide a tracking data field containing bathroom exhaust fan CFM information.

6.2.7 LED Bulbs

LED bulb measures contributed to 3.7% of total program savings. They had electric energy realization rates of 1.00 and no associated gas savings. The related gas savings are gas heating penalty values provided in Table B-2.

Finding 38. The tracking data did not differentiate decorative specialty lamps from directional specialty lamps. This information is important for midlife adjustments in the CPAS table as the two types of specialty lamps have different adjustment factors. Guidehouse assumed all specialty lamps were decorative for this analysis and used an adjustment factor of 62%.

> **Recommendation 38.** Include a field in the tracking data to provide the lamp's baseline measure or specialty type. Either of these pieces of information will help confirm the type of lamp and ensure the accuracy of CPAS values.

Appendix A. Impact Analysis Methodology

The evaluation team calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by the net-to-gross (NTG) ratio of 1.0. For CY2021, the Multi-Family Retrofits – Income Eligible Program's NTG estimate was defined by a consensus process through the Illinois SAG.

A.1 IEMS Program Component Impact Analysis Methodology

The evaluation team calculated gross verified savings for the IEMS program component by applying savings algorithms from the IL-TRM v9.0. The team determined verified gross savings for each program measure by:

- Reviewing the savings algorithm inputs in the measure workbook for agreement with the IL-TRM v9.0 and IL-TRM v9.0 Errata.
- Validating savings algorithms were applied correctly.
- Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in the team's calculations if the workbook did not agree with the IL-TRM v9.0.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

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

- Final CY2021 tracking data: MFLI_CY2021_EOY_Data_Rev0_2022-01-10.xlsx
- IL-TRM v9.0 for deemed input parameters or secondary evaluation research to verify any custom inputs used in the ex ante calculations
- Implementer Savings Calculations: Refrigerator Calculation Documentation 021820
- Implementer Savings Calculations: 2021 IEMS PHES Measure Workbook 03112021

A.2 IHWAP Program Component Impact Analysis Methodology

The evaluation team calculated gross verified savings for the IHWAP program component by applying savings from the IL-TRM. The team determined verified gross savings for each program measure by:

- Reviewing the savings algorithm inputs provided in the tracking data for agreement with the IL-TRM v9.0 and IL-TRM v9.0 Errata.
- Validating savings algorithms were applied correctly to ex antes savings values.
- Cross-checking per-unit savings values in the tracking data with verified values in the tracking data or in the evaluation team's calculations if the tracking data values did not agree with the IL-TRM v9.0.
- Multiplying the verified per-unit savings values by the quantity reported in the tracking data.

Guidehouse relied on the following documents to verify the per-unit savings for each measure:

- Final CY2021 tracking data: IHWAP-MF_CY2021_EOY_Data_Rev0_2022-01-05.xlsx
- IL-TRM v9.0 for deemed input parameters and any necessary secondary evaluation research to verify custom inputs used in ex ante calculations

Appendix B. Total Resource Cost Detail

Table B-1 shows the IEMS TRC cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. This table does not include additional required cost data (e.g., measure costs, program-level incentives, and non-incentive costs). ComEd will provide this data to the evaluation team later.

Table B-1. IEMS Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Gross Electric Energy Savings (kWh)†§	Gross Peak Demand Reduction (kW)	Gross Gas Savings (Therms)	Gross Secondary Savings due to Water Reduction (kWh)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Net Electric Energy Savings (kWh)	Net Peak Demand Reduction (kW)	Net Gas Savings (Therms)	Net Secondary Savings due to Water Reduction (kWh)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Shell	CA Attic Insulation and Air Sealing‡	Square Feet	927,311	20.0		1,286,633	24.85	167,678	0	0	0	1.00	1.00	1.00	1,286,633	24.85	167,678	0	0	0
Lighting	LED CA Interior - Omnidirectional	Lamp	1,628	3.4		381,809	52.93	0	0	-1,567	-3,704	1.00	1.00	1.00	381,809	52.93	0	0	-1,567	-3,704
Lighting	LED CA Exterior - Fixture	Lamp	606	11.6		371,367	0.00	0	0	0	0	1.00	1.00	1.00	371,367	0.00	0	0	0	0
HVAC	IU PTHP‡	MBH	899	8.0		302,793	12.91	0	0	0	0	1.00	1.00	1.00	302,793	12.91	0	0	0	0
Lighting	Occupancy Sensor	Varies	342	10.0		261,373	102.55	0	0	0	0	1.00	1.00	1.00	261,373	102.55	0	0	0	0
Lighting	LED CA Interior 24/7 - Fixture	Lamp	1,265	5.7		244,264	29.94	0	0	-8,519	-1,762	1.00	1.00	1.00	244,264	29.94	0	0	-8,519	-1,762
Lighting	LED IU Interior - Omnidirectional‡	Lamp	5,554	10.0		197,123	24.44	0	0	-5,000	-4,349	1.00	1.00	1.00	197,123	24.44	0	0	-5,000	-4,349
Lighting	LED CA Interior High Rise - T12‡	Lamp	372	8.1		198,933	30.14	0	0	0	-829	1.00	1.00	1.00	198,933	30.14	0	0	0	-829
Lighting	LED CA Interior High Rise - T8	Lamp	858	8.1		154,856	23.46	0	0	0	-645	1.00	1.00	1.00	154,856	23.46	0	0	0	-645
Lighting	LED Exit Sign	Exit Sign	477	5.0		126,465	15.21	0	0	-1,851	-1,381	1.00	1.00	1.00	126,465	15.21	0	0	-1,851	-1,381
HVAC	IU Air Source Heat Pump	Tons	22	16.0		122,972	0.71	0	0	0	0	1.00	1.00	1.00	122,972	0.71	0	0	0	0
Lighting	LED CA Interior Mid Rise - T12‡	Lamp	356	9.6		94,876	12.54	0	0	-6,100	-1,646	1.00	1.00	1.00	94,876	12.54	0	0	-6,100	-1,646
Consumer Electronics	IU Advanced Power Strip	Each	2,056	7.0		84,707	9.51	0	0	0	0	1.00	1.00	1.00	84,707	9.51	0	0	0	0
Shell	CA Sidewall Insulation‡	Square Feet	11,105	20.0		71,012	31.63	39,395	0	0	0	1.00	1.00	1.00	71,012	31.63	39,395	0	0	0
Lighting	LED IU Interior - Decorative‡	Lamp	2,395	10.0		60,235	9.12	0	0	-1,801	-1,337	1.00	1.00	1.00	60,235	9.12	0	0	-1,801	-1,337
Appliances	IU Refrigerator‡	Each	187	17.0		57,544	8.67	0	0	0	0	1.00	1.00	1.00	57,544	8.67	0	0	0	0
Lighting	LED CA Interior Mid Rise - T8	Lamp	357	9.6		53,279	6.99	0	0	-3,017	-894	1.00	1.00	1.00	53,279	6.99	0	0	-3,017	-894
Shell	CA Floor Insulation	Square Feet	24,316	20.0		53,095	0.00	465	0	0	0	1.00	1.00	1.00	53,095	0.00	465	0	0	0
HVAC	IU Advanced Thermostat	Each	337	11.0		49,769	27.96	22,128	0	0	0	1.00	1.00	1.00	49,769	27.96	22,128	0	0	0
Hot Water	IU Kitchen Aerator	Each	2,138	10.0		17,011	4.46	14,797	11,538	0	0	1.00	1.00	1.00	17,011	4.46	14,797	11,538	0	0
Hot Water	IU Showerhead	Each	1,494	10.0		17,034	2.28	14,830	9,355	0	0	1.00	1.00	1.00	17,034	2.28	14,830	9,355	0	0
Lighting	LED CA Exterior - Omnidirectional‡	Lamp	155	4.6		22,393	0.00	0	0	0	0	1.00	1.00	1.00	22,393	0.00	0	0	0	0
Lighting	LED CA Exterior 24/7 - Fixture	Lamp	99	5.7		18,514	2.11	0	0	0	0	1.00	1.00	1.00	18,514	2.11	0	0	0	0
Lighting	LED CA Interior - Decorative	Lamp	70	2.9		11,883	1.73	0	0	-4,014	-127	1.00	1.00	1.00	11,883	1.73	0	0	-4,014	-127
HVAC	IU AC Cover and Gap Sealer	Each	132	5.0		14,433	0.00	181	0	0	0	1.00	1.00	1.00	14,433	0.00	181	0	0	0
Lighting	LED CA Interior - Directional‡	Lamp	48	4.2		11,357	1.42	0	0	-1,693	-173	1.00	1.00	1.00	11,357	1.42	0	0	-1,693	-173
Lighting	LED CA Garage - Fixture	Lamp	24	14.7		10,306	2.79	0	0	0	0	1.00	1.00	1.00	10,306	2.79	0	0	0	0
HVAC	IU Programmable Thermostat‡	Each	262	16.0		9,784	0.00	9,788	0	0	0	1.00	1.00	1.00	9,784	0.00	9,788	0	0	0
Appliances	IU Room Air Conditioner	MBH	354	12.0		9,193	8.38	0	0	0	0	1.00	1.00	1.00	9,193	8.38	0	0	0	0
Hot Water	IU Bathroom Aerator	Each	1,281	10.0		4,725	4.72	1,697	1,756	0	0	1.00	1.00	1.00	4,725	4.72	1,697	1,756	0	0
HVAC	IU Air Conditioner‡	Tons	31	18.0		6,168	7.07	0	0	0	0	1.00	1.00	1.00	6,168	7.07	0	0	0	0
Lighting	LED IU Interior - Directional‡	Lamp	201	10.0		6,141	0.90	0	0	0	-141	1.00	1.00	1.00	6,141	0.90	0	0	0	-141
Hot Water	CA On-Demand DHW Control	Apt Units	196	15.0		3,936	15.00	9,834	0	0	0	1.00	1.00	1.00	3,936	15.00	9,834	0	0	0
Hot Water	IU Shower Timer	Each	1,671	2.0		0	0.00	5,524	3,380	0	0	1.00	1.00	1.00	0	0.00	5,524	3,380	0	0
Lighting	LED IU Exterior - Omnidirectional‡	Lamp	20	8.0		1,590	0.18	0	0	0	0	1.00	1.00	1.00	1,590	0.18	0	0	0	0
Shell	CA Door Weatherstrip	Doors	158	20.0		1,165	0.00	1,045	0	0	0	1.00	1.00	1.00	1,165	0.00	1,045	0	0	0
Shell	CA Door Sweep	Each	145	20.0		1,094	0.00	894	0	0	0	1.00	1.00	1.00	1,094	0.00	894	0	0	0
Shell	CA Wall Insulation‡	Square Feet	6,100	20.0		945	0.49	617	0	0	0	1.00	1.00	1.00	945	0.49	617	0	0	0
Miscellaneous	CA Advanced Power Strip	Each	8	7.0		869	0.00	0	0	0	0	1.00	1.00	1.00	869	0.00	0	0	0	0
HVAC	CA ECM Blower	Each	1	16.5		644	0.01	0	0	0	0	1.00	1.00	1.00	644	0.01	0	0	0	0
HVAC	IU Reprogram Thermostat	Each	17	2.0		633	0.00	616	0	0	0	1.00	1.00	1.00	633	0.00	616	0	0	0
HVAC	CA Steam Trap	Each	143	6.0		0	0.00	4,336	147	0	0	1.00	1.00	1.00	0	0.00	4,336	147	0	0
Hot Water	IU DHW Pipe Insulation	Linear Feet	7	15.0		96	0.01	0	0	0	0	1.00	1.00	1.00	96	0.01	0	0	0	0
HVAC	CA Pipe Insulation	Linear Feet	64,984	15.0		0	0.00	200,544	0	0	0	1.00	1.00	1.00	0	0.00	200,544	0	0	0
HVAC	CA Steam Boiler	MBH	105,009	25.0		0	0.00	123,697	0	0	0	1.00	1.00	1.00	0	0.00	123,697	0	0	0
HVAC	CA Averaging Controls	Apt Units	242	20.0		0	0.00	34,828	0	0	0	1.00	1.00	1.00	0	0.00	34,828	0	0	0
HVAC	CA Hydronic Boiler	Varies	199	25.0		0	0.00	6,377	0	0	0	1.00	1.00	1.00	0	0.00	6,377	0	0	0
HVAC	IU Furnace	MBH	1,083	20.0		0	0.00	1,986	0	0	0	1.00	1.00	1.00	0	0.00	1,986	0	0	0
Hot Water	IU DHW Heater	Apt Units	4	13.0		0	0.00	74	0	0	0	1.00	1.00	1.00	0	0.00	74	0	0	0
	Total			**12.3**		**4,343,016**	**475**	**661,332**	**26,175**	**-33,563**	**-16,988**				**4,343,016**	**475**	**661,332**	**26,175**	**-33,563**	**-16,988**

Note: To avoid double counting, the verified gross kWh and net kWh used in the TRC analysis exclude secondary energy savings from water reduction measures.

* 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 4-1 to Table 4-3).

†§ The kWh savings account for electric heating penalties, where applicable. The electric heating penalties columns show the magnitude of adjustments applied to the program savings. Gas heating penalties represent the program therms heating penalties. The therms penalties are not required to be applied to the program savings.

Source: ComEd tracking data and evaluation team analysis

Table B-2 shows the IHWAP TRC cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. This table does not include additional required cost data (e.g., measure costs, program-level incentives, and non-incentive costs). ComEd will provide this data to the evaluation team later.

Table B-2. IHWAP Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Gross Electric Energy Savings (kWh)	Gross Peak Demand Reduction (kW)	Gross Gas Savings (Therms)	Gross Secondary Savings due to Water Reduction (kWh)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Net Electric Energy Savings (kWh)	Net Peak Demand Reduction (kW)	Net Gas Savings (Therms)	Net Secondary Savings due to Water Reduction (kWh)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Appliances	Refrigerator	Each	263	17.0	YES	109,697	16.53	0	0	0	0	1.00	1.00	1.00	109,697	16.53	0	0	0	0
HVAC	High Efficiency Bathroom Exhaust Fan	Each	453	19.0	NO	76,297	8.71	0	0	0	0	1.00	1.00	1.00	76,297	8.71	0	0	0	0
HVAC	Custom - Heating Plant Improvements	Project	3	23.4	NO	46,356	3.41	24,690	0	0	0	1.00	1.00	1.00	46,356	3.41	24,690	0	0	0
Appliances	Room Air Conditioner	Each	200	12.0	NO	35,016	31.94	0	0	0	0	1.00	1.00	1.00	35,016	31.94	0	0	0	0
Lighting	LED Specialty Lamps - Indoor	Lamp	3,791	10.0	NO	31,294	4.60	0	0	0	-719	1.00	1.00	1.00	31,294	4.60	0	0	0	-719
Lighting	LED Screw Based Omnidirectional Bulbs	Lamp	700	10.0	NO	25,053	3.03	0	0	0	-575	1.00	1.00	1.00	25,053	3.03	0	0	0	-575
HVAC	Custom - Rooftop Units	Project	3	15.0	NO	10,692	1.74	0	0	0	0	1.00	1.00	1.00	10,692	1.74	0	0	0	0
HVAC	Custom - HHW Pump	Project	2	15.0	NO	10,641	0.00	0	0	0	0	1.00	1.00	1.00	10,641	0.00	0	0	0	0
Lighting	LED Specialty Lamps - Outdoor	Lamp	14	10.0	NO	2,393	0.26	0	0	0	0	1.00	1.00	1.00	2,393	0.26	0	0	0	0
Shell	Attic Insulation	Square Feet	7	20.0	NO	441	0.00	5,617	0	0	0	1.00	1.00	1.00	441	0.00	5,617	0	0	0
HVAC	Advanced Thermostats	Each	5	11.0	NO	307	0.00	0	0	0	0	1.00	1.00	1.00	307	0.00	0	0	0	0
HVAC	Residential Furnace Tune-Up	Each	4	3.0	NO	173	0.00	0	0	0	0	1.00	1.00	1.00	173	0.00	0	0	0	0
Hot Water	Low Flow Faucet Aerator	Each	58	10.0	NO	0	0.00	113	130	0	0	1.00	1.00	1.00	0	0.00	113	130	0	0
Hot Water	Low Flow Showerhead	Each	9	10.0	NO	0	0.00	33	28	0	0	1.00	1.00	1.00	0	0.00	33	28	0	0
Shell	Air Sealing	Varies§	123	20.0	NO	18	0.00	8,409	0	0	0	1.00	1.00	1.00	18	0.00	8,409	0	0	0
Hot Water	Custom - DHW Boiler	Project	3	15.0	NO	0	0.00	3,702	0	0	0	1.00	1.00	1.00	0	0.00	3,702	0	0	0
	Total					**348,377**	**70**	**42,564**	**158**	**0**	**-1,294**				**348,377**	**70**	**42,564**	**158**	**0**	**-1,294**

Note: To avoid double counting, the verified gross kWh and net kWh used in the TRC analysis exclude secondary energy savings from water reduction measures.

* The total of the EUL column is the WAML and is calculated as the sum product of EUL and measure savings divided by total program savings.

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

‡ The EUL for this measure varies over time. See the CPAS tables (Table 4-4 to Table 4-6).

§ The units for air sealing measures vary. Measures using methodology 1 and methodology 2-door sweep have a unit of project, and measures using methodology 2-sealing tape and methodology 2-weatherstripping have a unit of linear feet.

Source: ComEd tracking data and evaluation team analysis