



ComEd Small Business Impact Evaluation Report

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

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1. Introduction

This report presents the results of the impact evaluation of the CY2021 Small Business (SB) 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 SB Program is designed to assist qualified ComEd private and public sector nonresidential customers¹ in achieving electric energy savings. The program educates these customers about energy efficiency opportunities through no-cost onsite energy assessments conducted by authorized, specially trained energy efficiency service providers (EESPs) and installs no-cost direct install measures.² Further savings are available to participating customers through incentives of 30%-75% offered for select contractor-installed measures.³

EESPs are the primary means of promoting the SB Program and recruiting participants. Changes in the 2021 SB Program include opening up eligibility to public sector customers and raising the eligibility cap from 100 kW maximum monthly demand to 200 kW (for private businesses) or 400 kW (for the public sector). Resource Innovation was the implementation contractor for the day-to-day operations of the private and public sector portions of the program.

In CY2021, the program had 6,351 participants, including 5,919 private and 432 public sector participants. The program distributed 40,156 measures (see Table 2-1), including 35,032 lighting measures and 5,124 non-lighting measures.

Table 2-1. Number of Participants and Projects

Participation	Private	Public	Total
Participants*	5,919	432	6,351
Installed Projects	6,440	469	6,909
Total Measures†	36,408	3,748	40,156
Lighting Measures	31,401	3,631	35,032
Non-Lighting Measures	5,007	117	5,124

* Participant count is by unique project address.

† Total measures refers to the number of line items in the tracking data.

Source: ComEd tracking data and evaluation team analysis

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

¹ To qualify, participants must be ComEd commercial or industrial customers with monthly peak demand levels up to 200 kW for private businesses and 400 kW for the public sector.

² No-cost direct install measures include low flow showerheads and faucet aerators, pre-rinse spray valves, power strips, and controls for novelty coolers, beverage machines, and snack machines.

³ Incented measures may include upgrades to T8/T5 lighting, light-emitting diode (LED) retrofits and fixtures, high bay fluorescents, lighting controls, variable speed drives (VSDs) and heating, ventilation, and air conditioning (HVAC) system components, electric water heaters, refrigeration system components, commercial kitchen equipment, compressed air system measures, smart thermostats, and building envelope measures.

Table 2-2. Number of Measures by Type

End Use Type	Research Category	Quantity	Unit
Compressed Air	Air Compressors with Integrated VSD	1,975	Horsepower
Compressed Air	Compressed Air Leak Repair	1,792	Horsepower
Compressed Air	Compressed Air Pressure Reduction	1	Compressor
Compressed Air	Compressed Air Storage Tank	55	Horsepower
Compressed Air	Efficient Refrigerated CA Dryer	350	CFM
Compressed Air	High-Efficiency Air Nozzles	742	Each
Compressed Air	No-Loss Condensate Drains	196	Each
Envelope	Weather Stripping	19,080	Linear Foot
Food Service Equipment	Kitchen Fan with DCV	1	Each
Hot Water	Bathroom and Kitchen Faucet Aerators	284	Each
Hot Water	High Efficiency Pre-Rinse Spray Valve	3	Each
Hot Water	Showerhead - Low Flow	2	Each
HVAC	Advanced Rooftop Controls	962	Ton
HVAC	Air Conditioner Tune-Up	2,178	Ton
HVAC	Early Replacement for Air Cooled AC	3,475	Ton
HVAC	Economizer with DCV	3,822	Ton
HVAC	Economizer Repair and Optimization	722	Ton
HVAC	End of life Replacement for Air Cooled AC	48	Ton
HVAC	Guest Room Energy Management System	23	Ton
HVAC	Packaged RTU Sealing	2,131	Ton
HVAC	Restroom Exhaust Fan Occupancy Sensor	2,102	Sensor
HVAC	Smart Strip - Tier 1	2,807	Each
HVAC	Thermostat	717	Each
HVAC	Thermostat Adjustment	199	Each
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	472	Horsepower
Lighting	LED Decorative & Directional Lamps	15,336	Each
Lighting	LED Exit Signs	2,487	Sign
Lighting	LED Lamps and Fixtures	50,377,410	Watt Reduced
Lighting	LED Omnidirectional	9,664	Each
Lighting	Lighting Controls	1,092,293	Each or Watt Controlled
Lighting	Advanced Lighting Controls	1,152,529	Watt Controlled
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	4,681	Linear Foot
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	113	Each
Refrigeration	Beverage, Snack and Cooler Machine Controls	38	Each
Refrigeration	EC Motor for Cooler or Freezer	2,452	Motor
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	1,433	Motor
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	10	Each
Refrigeration	LED Refrigerated Display Case Lighting	2,027	Lamp
Refrigeration	Night Covers	4,949	Linear Foot
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	76	Motor
Refrigeration	Strip Curtains for Cooler or Freezer	372	Door

VSD – variable speed drive

CA – compressed air

DVC – demand control ventilation

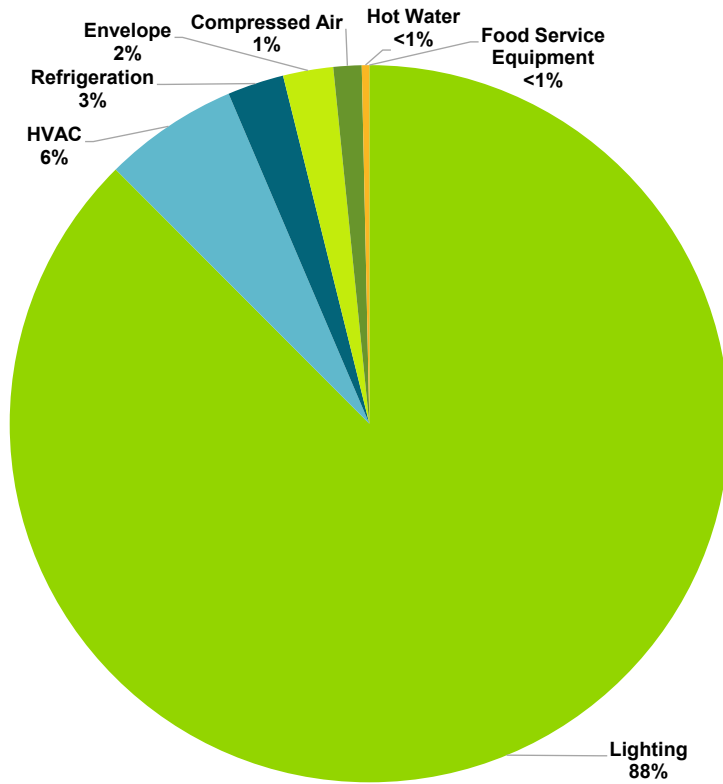
AC – air conditioner

RTU – rooftop unit

EC – electrically commutated

Source: ComEd tracking data and evaluation team analysis

Figure 2-1. Measures Installed by End Use Type



Note: Measure count for this chart is by total number of line items in the tracking data.
Source: ComEd tracking data and evaluation team analysis

3. Program Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the SB Program achieved in CY2021. The gas savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim, either via joint or non-joint programs.⁴

Table 3-1. 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	231,131,314	0.96	222,829,653	0.97/1.00	N/A	N/A	216,199,143
Electric Energy Savings - Converted from Gas†	kWh	10,777,892	1.00	10,777,396	0.97/1.00	N/A	N/A	10,553,057
Total Electric Energy Savings	kWh	241,909,207	0.97	233,607,049	0.97/1.00	N/A	N/A	226,752,200
Summer Peak‡ Demand Savings	kW	44,837.57	1.00	44,833.82	0.97/1.00	N/A	N/A	43,495.04

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

The “Verified Net Savings” in row one (Electric Energy Savings – Direct) includes primary kWh savings as a result of measure implementation, secondary kWh savings from wastewater treatment, and electric heating penalties. It does not include carryover savings as they don’t apply to this program.

* The deemed net-to-gross (NTG) ratio for 2021 program measures is 0.97, except for thermostats which is 1.00.

† 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.

Source: ComEd tracking data and evaluation team analysis

⁴ The evaluation will determine which gas savings will be counted toward goal while producing the portfolio-wide Summary Report.

4. Cumulative Persisting Annual Savings

Table 4-1 to Table 4-3 and Figure 4-1 show the measure-specific and total verified gross savings for the SB Program 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 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.

CPAS accounts for midlife savings adjustments to LED lighting measures with T12 baselines, screw-based omnidirectional lamps, specialty decorative, and directional lamps as required by the Illinois Statewide Technical Reference Manual v9.0 (IL-TRM)⁵ and the Energy Independence and Security Act (EISA 2007) baseline adjustment requirements. The evaluation team applied a baseline midlife CPAS adjustment for the early replacement of air-cooled air conditioners (ACs) measure according to the IL-TRM. Details of the midlife adjustment assumptions are provided in Appendix A.3.

⁵ In this report, unless stated otherwise, IL-TRM refers to version 9.0 (v9.0).

Table 4-1. Cumulative Persisting Annual Savings – Electric

End Use Type	Research Category	EUL	CY2021 Verified Gross Savings		Lifetime Net Savings (kWh)	Verified Net kWh Savings											
			(kWh)	NTG*		2018	2019	2020	2021	2022	2023	2024	2025	2026			
Lighting	LED Lamps and Fixtures	12.9	185,729,104	0.97	2,109,662,583				180,157,230	180,029,845	178,985,496	172,106,174	163,142,937	158,270,380			
Lighting	Lighting Controls	10.0	12,721,424	0.97	123,397,812				12,339,781	12,339,781	12,339,781	12,339,781	12,339,781	12,339,781			
Refrigeration	EC Motor for Cooler or Freezer	15.0	2,608,928	0.97	37,959,902				2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660			
Lighting	LED Decorative & Directional Lamps	7.0	2,466,354	0.97	13,836,746				2,392,363	2,392,363	2,392,363	2,279,099	1,254,422	1,053,392			
Lighting	Advanced Lighting Controls	15.0	2,067,873	0.97	30,087,545				2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836			
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	13.0	1,976,107	0.97	24,918,709				1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824			
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	10.0	1,919,246	0.97	18,616,690				1,861,669	1,861,669	1,861,669	1,861,669	1,861,669	1,861,669			
Envelope	Weather Stripping	10.0	1,522,571	0.97	14,768,941				1,476,894	1,476,894	1,476,894	1,476,894	1,476,894	1,476,894			
HVAC	Thermostat	11.0	1,519,108	1.00	16,710,187				1,519,108	1,519,108	1,519,108	1,519,108	1,519,108	1,519,108			
HVAC	Economizer with DCV	10.0	1,394,849	0.97	13,530,039				1,353,004	1,353,004	1,353,004	1,353,004	1,353,004	1,353,004			
Compressed Air	Air Compressors with Integrated VSD	13.0	1,340,469	0.97	16,903,314				1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255			
Lighting	LED Omnidirectional	6.8	1,308,636	0.97	6,405,819				1,269,376	1,269,376	1,265,081	1,265,081	431,707	336,686			
Refrigeration	LED Refrigerated Display Case Lighting	8.6	1,183,357	0.97	9,871,564				1,147,856	1,147,856	1,147,856	1,147,856	1,147,856	1,147,856			
Refrigeration	Night Covers	5.0	919,318	0.97	4,458,690				891,738	891,738	891,738	891,738	891,738	891,738			
HVAC	Early Replacement for Air Cooled AC	15.0	820,302	0.97	11,696,683				795,693	795,693	795,693	795,693	795,693	771,822			
Refrigeration	Strip Curtains for Cooler or Freezer	4.0	354,483	0.97	1,375,394				343,849	343,849	343,849	343,849	343,849	343,849			
HVAC	Advanced Rooftop Controls	10.0	324,479	0.97	3,147,445				314,745	314,745	314,745	314,745	314,745	314,745			
HVAC	Smart Strip - Tier 1	7.0	304,772	0.97	2,069,405				295,629	295,629	295,629	295,629	295,629	295,629			
HVAC	Thermostat Adjustment	2.0	293,553	1.00	587,106				293,553	293,553							
HVAC	Restroom Exhaust Fan Occupancy Sensor	10.0	257,436	0.97	2,497,130				249,713	249,713	249,713	249,713	249,713	249,713			
Compressed Air	No-Loss Condensate Drains	10.0	248,644	0.97	2,411,847				241,185	241,185	241,185	241,185	241,185	241,185			
HVAC	Air Conditioner Tune-Up	3.0	246,799	0.97	718,184				239,395	239,395	239,395						
Compressed Air	Compressed Air Leak Repair	2.0	240,787	0.97	467,128				233,564	233,564							
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	15.0	220,083	0.97	3,202,209				213,481	213,481	213,481	213,481	213,481	213,481			
Compressed Air	High-Efficiency Air Nozzles	15.0	200,135	0.97	2,911,967				194,131	194,131	194,131	194,131	194,131	194,131			
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	8.0	133,839	0.97	1,038,591				129,824	129,824	129,824	129,824	129,824	129,824			
HVAC	Packaged RTU Sealing	5.0	120,783	0.97	585,796				117,159	117,159	117,159	117,159	117,159	117,159			
Lighting	LED Exit Signs	5.0	114,108	0.97	553,425				110,685	110,685	110,685	110,685	110,685	110,685			
Refrigeration	Beverage, Snack and Cooler Machine Controls	5.0	57,481	0.97	278,784				55,757	55,757	55,757	55,757	55,757	55,757			
Hot Water	Bathroom and Kitchen Faucet Aerators	10.0	56,958	0.97	552,489				55,249	55,249	55,249	55,249	55,249	55,249			
Food Service Equipment	Kitchen Fan with DCV	20.0	38,487	0.97	746,638				37,332	37,332	37,332	37,332	37,332	37,332			
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	10.0	35,036	0.97	339,849				33,985	33,985	33,985	33,985	33,985	33,985			
HVAC	Economizer Repair and Optimization	5.0	28,503	0.97	138,240				27,648	27,648	27,648	27,648	27,648	27,648			
Hot Water	High Efficiency Pre-Rinse Spray Valve	5.0	21,137	0.97	102,517				20,503	20,503	20,503	20,503	20,503	20,503			
Compressed Air	Compressed Air Storage Tank	10.0	15,259	0.97	148,009				14,801	14,801	14,801	14,801	14,801	14,801			
HVAC	End of life Replacement for Air Cooled AC	15.0	8,933	0.97	129,971				8,665	8,665	8,665	8,665	8,665	8,665			
HVAC	Guest Room Energy Management System	15.0	3,059	0.97	44,508				2,967	2,967	2,967	2,967	2,967	2,967			
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	12.0	2,674	0.97	31,121				2,593	2,593	2,593	2,593	2,593	2,593			
Compressed Air	Efficient Refrigerated CA Dryer	13.0	2,414	0.97	30,442				2,342	2,342	2,342	2,342	2,342	2,342			
Compressed Air	Compressed Air Pressure Reduction	5.0	1,514	0.97	7,341				1,468	1,468	1,468	1,468	1,468	1,468			
Hot Water	Showerhead - Low Flow	10.0	653	0.97	6,337				634	634	634	634	634	634			
CY2021 Program Total Electric Contribution to CPAS			222,829,653		2,476,947,097				216,199,143	216,071,758	214,495,997	207,264,017	196,098,879	189,681,442			
Historic Program Total Electric Contribution to CPAS†									196,963,232	329,370,837	536,386,617	535,181,078	533,052,104	522,531,303	480,109,371	478,932,018	468,958,786
Program Total Electric CPAS									196,963,232	329,370,837	536,386,617	751,380,221	749,123,862	737,027,299	687,373,387	675,030,897	658,640,228
CY2021 Program Incremental Expiring Electric Savings§												127,385	1,575,761	7,231,960	11,165,138	6,417,437	
Historic Program Incremental Expiring Electric Savings												1,205,539	2,128,973	10,520,802	42,421,932	1,177,352	9,973,232
Program Total Incremental Expiring Electric Savings												1,205,539	2,256,358	12,096,563	49,653,912	12,342,490	16,390,670

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	LED Lamps and Fixtures	156,333,412	154,970,898	154,970,554	150,019,599	147,150,374	117,556,066	70,729,744	64,875,827	60,364,048			
Lighting	Lighting Controls	12,339,781	12,339,781	12,339,781	12,339,781								
Refrigeration	EC Motor for Cooler or Freezer	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660			
Lighting	LED Decorative & Directional Lamps	844,025	657,736	361,972	209,010								
Lighting	Advanced Lighting Controls	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836			
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824			
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	1,861,669	1,861,669	1,861,669	1,861,669								
Envelope	Weather Stripping	1,476,894	1,476,894	1,476,894	1,476,894								
HVAC	Thermostat	1,519,108	1,519,108	1,519,108	1,519,108	1,519,108							
HVAC	Economizer with DCV	1,353,004	1,353,004	1,353,004	1,353,004								
Compressed Air	Air Compressors with Integrated VSD	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255					
Lighting	LED Omnidirectional	241,201	149,237	108,975	69,097								
Refrigeration	LED Refrigerated Display Case Lighting	1,147,856	1,147,856	688,714									
Refrigeration	Night Covers												
HVAC	Early Replacement for Air Cooled AC	771,822	771,822	771,822	771,822	771,822	771,822	771,822	771,822	771,822			
Refrigeration	Strip Curtains for Cooler or Freezer												
HVAC	Advanced Rooftop Controls	314,745	314,745	314,745	314,745								
HVAC	Smart Strip - Tier 1	295,629											
HVAC	Thermostat Adjustment												
HVAC	Restroom Exhaust Fan Occupancy Sensor	249,713	249,713	249,713	249,713								
Compressed Air	No-Loss Condensate Drains	241,185	241,185	241,185	241,185								
HVAC	Air Conditioner Tune-Up												
Compressed Air	Compressed Air Leak Repair												
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	213,481	213,481	213,481	213,481	213,481	213,481	213,481	213,481	213,481			
Compressed Air	High-Efficiency Air Nozzles	194,131	194,131	194,131	194,131	194,131	194,131	194,131	194,131	194,131			
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	129,824	129,824										
HVAC	Packaged RTU Sealing												
Lighting	LED Exit Signs												
Refrigeration	Beverage, Snack and Cooler Machine Controls												
Hot Water	Bathroom and Kitchen Faucet Aerators	55,249	55,249	55,249	55,249								
Food Service Equipment	Kitchen Fan with DCV	37,332	37,332	37,332	37,332	37,332	37,332	37,332	37,332	37,332	37,332	37,332	37,332
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	33,985	33,985	33,985	33,985								
HVAC	Economizer Repair and Optimization												
Hot Water	High Efficiency Pre-Rinse Spray Valve												
Compressed Air	Compressed Air Storage Tank	14,801	14,801	14,801	14,801								
HVAC	End of life Replacement for Air Cooled AC	8,665	8,665	8,665	8,665	8,665	8,665	8,665	8,665	8,665			
HVAC	Guest Room Energy Management System	2,967	2,967	2,967	2,967	2,967	2,967	2,967	2,967	2,967			
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	2,593	2,593	2,593	2,593	2,593	2,593	2,593	2,593	2,593			
Compressed Air	Efficient Refrigerated CA Dryer	2,342	2,342	2,342	2,342	2,342	2,342	2,342					
Compressed Air	Compressed Air Pressure Reduction												
Hot Water	Showerhead - Low Flow	634	634	634	634								
CY2021 Program Total Electric Contribution to CPAS		187,439,622	185,503,225	184,577,889	178,745,380	157,656,390	126,542,974	79,714,058	70,640,721	66,128,942	37,332	37,332	37,332
Historic Program Total Electric Contribution to CPAS†		462,620,953	425,204,802	412,777,683	287,318,204	235,589,707	186,909,111	165,684,439	55,537,067	45,276	45,276	45,276	34,430
Program Total Electric CPAS		650,060,575	610,708,026	597,355,572	466,063,584	393,246,098	313,452,085	245,398,497	126,177,788	66,174,218	82,608	82,608	71,762
CY2021 Program Incremental Expiring Electric Savings‡		2,241,820	1,936,398	925,335	5,832,509	21,088,990	31,113,417	46,828,915	9,073,337	4,511,780	66,091,610	-	-
Historic Program Incremental Expiring Electric Savings		6,337,833	37,416,151	12,427,119	125,459,478	51,728,497	48,680,596	21,224,673	110,147,372	55,491,791	-	-	10,846
Program Total Incremental Expiring Electric Savings		8,579,652	39,352,549	13,352,454	131,291,988	72,817,487	79,794,013	68,053,588	119,220,709	60,003,570	66,091,610	-	10,846

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	LED Lamps and Fixtures												
Lighting	Lighting Controls												
Refrigeration	EC Motor for Cooler or Freezer												
Lighting	LED Decorative & Directional Lamps												
Lighting	Advanced Lighting Controls												
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer												
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator												
Envelope	Weather Stripping												
HVAC	Thermostat												
HVAC	Economizer with DCV												
Compressed Air	Air Compressors with Integrated VSD												
Lighting	LED Omnidirectional												
Refrigeration	LED Refrigerated Display Case Lighting												
Refrigeration	Night Covers												
HVAC	Early Replacement for Air Cooled AC												
Refrigeration	Strip Curtains for Cooler or Freezer												
HVAC	Advanced Rooftop Controls												
HVAC	Smart Strip - Tier 1												
HVAC	Thermostat Adjustment												
HVAC	Restroom Exhaust Fan Occupancy Sensor												
Compressed Air	No-Loss Condensate Drains												
HVAC	Air Conditioner Tune-Up												
Compressed Air	Compressed Air Leak Repair												
HVAC	Variable Speed Drive on HVAC - Pumps and Fans												
Compressed Air	High-Efficiency Air Nozzles												
Refrigeration	Auto Closer for Walk-in Cooler or Freezer												
HVAC	Packaged RTU Sealing												
Lighting	LED Exit Signs												
Refrigeration	Beverage, Snack and Cooler Machine Controls												
Hot Water	Bathroom and Kitchen Faucet Aerators												
Food Service Equipment	Kitchen Fan with DCV	37,332	37,332										
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers												
HVAC	Economizer Repair and Optimization												
Hot Water	High Efficiency Pre-Rinse Spray Valve												
Compressed Air	Compressed Air Storage Tank												
HVAC	End of life Replacement for Air Cooled AC												
HVAC	Guest Room Energy Management System												
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer												
Compressed Air	Efficient Refrigerated CA Dryer												
Compressed Air	Compressed Air Pressure Reduction												
Hot Water	Showerhead - Low Flow												
CY2021 Program Total Electric Contribution to CPAS		37,332	37,332										
Historic Program Total Electric Contribution to CPAS†		20,549	-										
Program Total Electric CPAS		57,881	37,332										
CY2021 Program Incremental Expiring Electric Savings§		-	-										
Historic Program Incremental Expiring Electric Savings		13,881	20,549										
Program Total Incremental Expiring Electric Savings		13,881	20,549										

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 Stakeholder Advisory Group (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. 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			
HVAC	Economizer with DCV	10.0	118,452	0.97	1,148,982				114,898	114,898	114,898	114,898	114,898	114,898	114,898		
HVAC	Thermostat	11.0	94,438	1.00	1,038,819				94,438	94,438	94,438	94,438	94,438	94,438	94,438		
Envelope	Weather Stripping	10.0	70,118	0.97	680,149				68,015	68,015	68,015	68,015	68,015	68,015	68,015		
HVAC	Advanced Rooftop Controls	10.0	42,349	0.97	410,783				41,078	41,078	41,078	41,078	41,078	41,078	41,078		
HVAC	Thermostat Adjustment	2.0	18,133	1.00	36,266				18,133	18,133							
HVAC	Packaged RTU Sealing	5.0	17,425	0.97	84,510				16,902	16,902	16,902	16,902	16,902				
Food Service Equipment	Kitchen Fan with DCV	20.0	6,207	0.97	120,412				6,021	6,021	6,021	6,021	6,021	6,021	6,021		
HVAC	Guest Room Energy Management System	15.0	582	0.97	8,471				565	565	565	565	565	565	565		
CY2021 Program Total Gas Contribution to CPAS (Therms)			367,704		3,528,391				360,050	360,050	341,917	341,917	341,917	341,917	325,015		
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)‡			10,777,396		103,417,149				10,553,057	10,553,057	10,021,580	10,021,580	10,021,580	10,021,580	9,526,184		
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§									9,794,779	21,307,759	33,883,907	33,868,895	32,806,570	32,806,570	32,732,391	32,469,322	
Program Total Gas CPAS (kWh Equivalent)										43,359,627	42,828,150	42,753,971	42,490,901	41,995,506			
CY2021 Program Incremental Expiring Gas Savings (Therms)												18,133			16,902		
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent) 												531,478			495,396		
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)										15,012	1,062,325		74,179	263,070			
Program Total Incremental Expiring Gas Savings (kWh Equivalent)										15,012	1,062,325	531,478	74,179	263,070	495,396		

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
HVAC	Economizer with DCV	114,898	114,898	114,898	114,898								
HVAC	Thermostat	94,438	94,438	94,438	94,438	94,438							
Envelope	Weather Stripping	68,015	68,015	68,015	68,015								
HVAC	Advanced Rooftop Controls	41,078	41,078	41,078	41,078								
HVAC	Thermostat Adjustment												
HVAC	Packaged RTU Sealing												
Food Service Equipment	Kitchen Fan with DCV	6,021	6,021	6,021	6,021	6,021	6,021	6,021	6,021	6,021	6,021	6,021	6,021
HVAC	Guest Room Energy Management System	565	565	565	565	565	565	565	565	565			
CY2021 Program Total Gas Contribution to CPAS (Therms)		325,015	325,015	325,015	325,015	101,023	6,585	6,585	6,585	6,585	6,021	6,021	6,021
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		9,526,184	9,526,184	9,526,184	9,526,184	2,960,997	193,015	193,015	193,015	193,015	176,463	176,463	176,463
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§		32,257,495	26,157,719	17,394,026	9,262,407	6,051,896	6,051,896	3,237,582	3,237,582	732,555	732,555	732,555	21,050
Program Total Gas CPAS (kWh Equivalent)		41,783,679	35,683,903	26,920,210	18,788,591	9,012,893	6,244,911	3,430,597	3,430,597	925,570	909,018	909,018	197,513
CY2021 Program Incremental Expiring Gas Savings (Therms)		-	-	-	-	223,991	94,438				565		
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent) 		-	-	-	-	6,565,188	2,767,982				16,552		
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)		211,827	6,099,776	8,763,693	8,131,619	3,210,510		2,814,314		2,505,027			711,505
Program Total Incremental Expiring Gas Savings (kWh Equivalent)		211,827	6,099,776	8,763,693	8,131,619	9,775,698	2,767,982	2,814,314		2,505,027	16,552		711,505

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
HVAC	Economizer with DCV												
HVAC	Thermostat												
Envelope	Weather Stripping												
HVAC	Advanced Rooftop Controls												
HVAC	Thermostat Adjustment												
HVAC	Packaged RTU Sealing												
Food Service Equipment	Kitchen Fan with DCV	6,021	6,021										
HVAC	Guest Room Energy Management System												
CY2021 Program Total Gas Contribution to CPAS (Therms)		6,021	6,021	-	-	-	-	-	-	-	-	-	-
CY2021 Program Total Gas Contribution to CPAS (kWh Equivalent)†		176,463	176,463	-	-	-	-	-	-	-	-	-	-
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)§		21,050	-										
Program Total Gas CPAS (kWh Equivalent)		197,513	176,463	-	-	-	-	-	-	-	-	-	-
CY2021 Program Incremental Expiring Gas Savings (Therms)		-	-	6,021	-	-	-	-	-	-	-	-	-
CY2021 Program Incremental Expiring Gas Savings (kWh Equivalent) 		-	-	176,463	-	-	-	-	-	-	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)		-	21,050	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)		-	21,050	176,463	-	-	-	-	-	-	-	-	-

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 4-3. Cumulative Persisting Annual Savings – Total

End Use Type	Research Category	CY2021 Verified Gross Savings (kWh)		NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings (Including Those Converted from Gas Savings)											
		EUL				2018	2019	2020	2021	2022	2023	2024	2025	2026			
Lighting	LED Lamps and Fixtures	12.9	185,729,104	0.97	2,109,662,583				180,157,230	180,029,845	178,985,496	172,106,174	163,142,937	158,270,380			
Lighting	Lighting Controls	10.0	12,721,424	0.97	123,397,812				12,339,781	12,339,781	12,339,781	12,339,781	12,339,781	12,339,781			
Refrigeration	EC Motor for Cooler or Freezer	15.0	2,608,928	0.97	37,959,902				2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660			
Lighting	LED Decorative & Directional Lamps	7.0	2,466,354	0.97	13,836,746				2,392,363	2,392,363	2,392,363	2,279,099	1,254,422	1,053,392			
Lighting	Advanced Lighting Controls	15.0	2,067,873	0.97	30,087,545				2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836			
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	13.0	1,976,107	0.97	24,918,709				1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824			
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	10.0	1,919,246	0.97	18,616,690				1,861,669	1,861,669	1,861,669	1,861,669	1,861,669	1,861,669			
Envelope	Weather Stripping	10.0	3,577,742	0.97	34,704,096				3,470,410	3,470,410	3,470,410	3,470,410	3,470,410	3,470,410			
HVAC	Thermostat	11.0	4,287,089	1.00	47,157,984				4,287,089	4,287,089	4,287,089	4,287,089	4,287,089	4,287,089			
HVAC	Economizer with DCV	10.0	4,866,672	0.97	47,206,715				4,720,671	4,720,671	4,720,671	4,720,671	4,720,671	4,720,671			
Compressed Air	Air Compressors with Integrated VSD	13.0	1,340,469	0.97	16,903,314				1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255			
Lighting	LED Omnidirectional	6.8	1,308,636	0.97	6,405,819				1,269,376	1,269,376	1,265,081	1,265,081	431,707	336,686			
Refrigeration	LED Refrigerated Display Case Lighting	8.6	1,183,357	0.97	9,871,564				1,147,856	1,147,856	1,147,856	1,147,856	1,147,856	1,147,856			
Refrigeration	Night Covers	5.0	919,318	0.97	4,458,690				891,738	891,738	891,738	891,738	891,738	-			
HVAC	Early Replacement for Air Cooled AC	15.0	820,302	0.97	11,696,683				795,693	795,693	795,693	795,693	795,693	771,822			
Refrigeration	Strip Curtains for Cooler or Freezer	4.0	354,483	0.97	1,375,394				343,849	343,849	343,849	343,849	-	-			
HVAC	Advanced Rooftop Controls	10.0	1,565,721	0.97	15,187,489				1,518,749	1,518,749	1,518,749	1,518,749	1,518,749	1,518,749			
HVAC	Smart Strip - Tier 1	7.0	304,772	0.97	2,069,405				295,629	295,629	295,629	295,629	295,629	295,629			
HVAC	Thermostat Adjustment	2.0	825,030	1.00	1,650,061				825,030	825,030	-	-	-	-			
HVAC	Restroom Exhaust Fan Occupancy Sensor	10.0	257,436	0.97	2,497,130				249,713	249,713	249,713	249,713	249,713	249,713			
Compressed Air	No-Loss Condensate Drains	10.0	248,644	0.97	2,411,847				241,185	241,185	241,185	241,185	241,185	241,185			
HVAC	Air Conditioner Tune-Up	3.0	246,799	0.97	718,184				239,395	239,395	239,395	-	-	-			
Compressed Air	Compressed Air Leak Repair	2.0	240,787	0.97	467,128				233,564	233,564	-	-	-	-			
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	15.0	220,083	0.97	3,202,209				213,481	213,481	213,481	213,481	213,481	213,481			
Compressed Air	High-Efficiency Air Nozzles	15.0	200,135	0.97	2,911,967				194,131	194,131	194,131	194,131	194,131	194,131			
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	8.0	133,839	0.97	1,038,591				129,824	129,824	129,824	129,824	129,824	129,824			
HVAC	Packaged RTU Sealing	5.0	631,500	0.97	3,062,774				612,555	612,555	612,555	612,555	612,555	-			
Lighting	LED Exit Signs	5.0	114,108	0.97	553,425				110,685	110,685	110,685	110,685	110,685	-			
Refrigeration	Beverage, Snack and Cooler Machine Controls	5.0	57,481	0.97	278,784				55,757	55,757	55,757	55,757	55,757	-			
Hot Water	Bathroom and Kitchen Faucet Aerators	10.0	56,958	0.97	552,489				55,249	55,249	55,249	55,249	55,249	55,249			
Food Service Equipment	Kitchen Fan with DCV	20.0	220,407	0.97	4,275,901				213,795	213,795	213,795	213,795	213,795	213,795			
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	10.0	35,036	0.97	339,849				33,985	33,985	33,985	33,985	33,985	33,985			
HVAC	Economizer Repair and Optimization	5.0	28,503	0.97	138,240				27,648	27,648	27,648	27,648	27,648	-			
Hot Water	High Efficiency Pre-Rinse Spray Valve	5.0	21,137	0.97	102,517				20,503	20,503	20,503	20,503	20,503	-			
Compressed Air	Compressed Air Storage Tank	10.0	15,259	0.97	148,009				14,801	14,801	14,801	14,801	14,801	14,801			
HVAC	End of life Replacement for Air Cooled AC	15.0	8,933	0.97	129,971				8,665	8,665	8,665	8,665	8,665	8,665			
HVAC	Guest Room Energy Management System	15.0	20,123	0.97	292,788				19,519	19,519	19,519	19,519	19,519	19,519			
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	12.0	2,674	0.97	31,121				2,593	2,593	2,593	2,593	2,593	2,593			
Compressed Air	Efficient Refrigerated CA Dryer	13.0	2,414	0.97	30,442				2,342	2,342	2,342	2,342	2,342	2,342			
Compressed Air	Compressed Air Pressure Reduction	5.0	1,514	0.97	7,341				1,468	1,468	1,468	1,468	1,468	-			
Hot Water	Showerhead - Low Flow	10.0	653	0.97	6,337				634	634	634	634	634	634			
CY2021 Program Total Contribution to CPAS			233,607,049		2,580,364,246				226,752,201	226,624,816	224,517,576	217,285,597	206,120,459	199,207,626			
Historic Program Total Contribution to CPAS†									206,758,011	350,678,596	570,270,523	569,049,973	565,858,674	555,337,873	512,841,762	511,401,340	501,428,107
Program Total CPAS									206,758,011	350,678,596	570,270,523	795,802,173	779,855,449	730,127,359	717,521,799	700,635,733	
CY2021 Program Incremental Expiring Savings§												127,385	2,107,239	7,231,980	11,165,138	6,912,833	
Historic Program Incremental Expiring Savings												1,220,551	3,191,298	10,520,802	42,496,111	1,440,422	9,973,232
Program Total Incremental Expiring Savings									1,220,551	3,318,684	12,628,041	49,728,090	12,605,560	16,886,065			

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
Lighting	LED Lamps and Fixtures	156,333,412	154,970,898	154,970,554	150,019,599	147,150,374	117,556,066	70,729,744	64,875,827	60,364,048	-	-	-
Lighting	Lighting Controls	12,339,781	12,339,781	12,339,781	12,339,781	-	-	-	-	-	-	-	-
Refrigeration	EC Motor for Cooler or Freezer	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	2,530,660	-	-	-
Lighting	LED Decorative & Directional Lamps	844,025	657,736	361,972	209,010	-	-	-	-	-	-	-	-
Lighting	Advanced Lighting Controls	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	2,005,836	-	-	-
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	1,916,824	-	-	-	-	-
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	1,861,669	1,861,669	1,861,669	1,861,669	-	-	-	-	-	-	-	-
Envelope	Weather Stripping	3,470,410	3,470,410	3,470,410	3,470,410	-	-	-	-	-	-	-	-
HVAC	Thermostat	4,287,089	4,287,089	4,287,089	4,287,089	4,287,089	-	-	-	-	-	-	-
HVAC	Economizer with DCV	4,720,671	4,720,671	4,720,671	4,720,671	-	-	-	-	-	-	-	-
Compressed Air	Air Compressors with Integrated VSD	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	1,300,255	-	-	-	-	-
Lighting	LED Omnidirectional	241,201	149,237	108,975	69,097	-	-	-	-	-	-	-	-
Refrigeration	LED Refrigerated Display Case Lighting	1,147,856	1,147,856	688,714	-	-	-	-	-	-	-	-	-
Refrigeration	Night Covers	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Early Replacement for Air Cooled AC	771,822	771,822	771,822	771,822	771,822	771,822	771,822	771,822	771,822	-	-	-
Refrigeration	Strip Curtains for Cooler or Freezer	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Advanced Rooftop Controls	1,518,749	1,518,749	1,518,749	1,518,749	-	-	-	-	-	-	-	-
HVAC	Smart Strip - Tier 1	295,629	-	-	-	-	-	-	-	-	-	-	-
HVAC	Thermostat Adjustment	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Restroom Exhaust Fan Occupancy Sensor	249,713	249,713	249,713	249,713	-	-	-	-	-	-	-	-
Compressed Air	No-Loss Condensate Drains	241,185	241,185	241,185	241,185	-	-	-	-	-	-	-	-
HVAC	Air Conditioner Tune-Up	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Compressed Air Leak Repair	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	213,481	213,481	213,481	213,481	213,481	213,481	213,481	213,481	213,481	-	-	-
Compressed Air	High-Efficiency Air Nozzles	194,131	194,131	194,131	194,131	194,131	194,131	194,131	194,131	194,131	-	-	-
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	129,824	129,824	-	-	-	-	-	-	-	-	-	-
HVAC	Packaged RTU Sealing	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED Exit Signs	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Beverage, Snack and Cooler Machine Controls	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Bathroom and Kitchen Faucet Aerators	55,249	55,249	55,249	55,249	-	-	-	-	-	-	-	-
Food Service Equipment	Kitchen Fan with DCV	213,795	213,795	213,795	213,795	213,795	213,795	213,795	213,795	213,795	213,795	213,795	213,795
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	33,985	33,985	33,985	33,985	-	-	-	-	-	-	-	-
HVAC	Economizer Repair and Optimization	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	High Efficiency Pre-Rinse Spray Valve	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Compressed Air Storage Tank	14,801	14,801	14,801	14,801	-	-	-	-	-	-	-	-
HVAC	End of life Replacement for Air Cooled AC	8,665	8,665	8,665	8,665	8,665	8,665	8,665	8,665	8,665	-	-	-
HVAC	Guest Room Energy Management System	19,519	19,519	19,519	19,519	19,519	19,519	19,519	19,519	19,519	-	-	-
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	2,593	2,593	2,593	2,593	2,593	2,593	-	-	-	-	-	-
Compressed Air	Efficient Refrigerated CA Dryer	2,342	2,342	2,342	2,342	2,342	2,342	2,342	-	-	-	-	-
Compressed Air	Compressed Air Pressure Reduction	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Showerhead - Low Flow	634	634	634	634	-	-	-	-	-	-	-	-
CY2021 Program Total Contribution to CPAS		196,965,807	195,029,409	194,104,074	188,271,564	160,617,387	126,735,989	79,907,074	70,833,736	66,321,957	213,795	213,795	213,795
Historic Program Total Contribution to CPAS†		494,878,448	451,362,521	430,171,709	296,580,611	241,641,604	192,961,008	168,922,021	58,774,649	777,831	777,831	777,831	55,480
Program Total CPAS		691,844,254	646,391,930	624,275,782	484,852,175	402,258,991	319,696,996	248,829,094	129,608,385	67,099,788	991,626	991,626	269,275
CY2021 Program Incremental Expiring Savings‡		2,241,820	1,936,398	925,335	5,832,509	27,654,177	33,881,398	46,828,915	9,073,337	4,511,780	66,108,162	-	-
Historic Program Incremental Expiring Savings		6,549,659	43,515,927	21,190,812	133,591,098	54,939,007	48,680,596	24,038,987	110,147,372	57,996,818	-	-	722,351
Program Total Incremental Expiring Savings		8,791,479	45,452,325	22,116,147	139,423,607	82,593,184	82,561,994	70,867,902	119,220,709	62,508,597	66,108,162	-	722,351

End Use Type	Research Category	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lighting	LED Lamps and Fixtures	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	Lighting Controls	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	EC Motor for Cooler or Freezer	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED Decorative & Directional Lamps	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	Advanced Lighting Controls	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	-	-	-	-	-	-	-	-	-	-	-	-
Envelope	Weather Stripping	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Thermostat	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Economizer with DCV	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Air Compressors with Integrated VSD	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED Omnidirectional	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	LED Refrigerated Display Case Lighting	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Night Covers	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Early Replacement for Air Cooled AC	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Strip Curtains for Cooler or Freezer	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Advanced Rooftop Controls	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Smart Strip - Tier 1	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Thermostat Adjustment	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Restroom Exhaust Fan Occupancy Sensor	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	No-Loss Condensate Drains	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Air Conditioner Tune-Up	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Compressed Air Leak Repair	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	High-Efficiency Air Nozzles	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Packaged RTU Sealing	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED Exit Signs	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	Beverage, Snack and Cooler Machine Controls	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Bathroom and Kitchen Faucet Aerators	-	-	-	-	-	-	-	-	-	-	-	-
Food Service Equipment	Kitchen Fan with DCV	213,795	213,795	-	-	-	-	-	-	-	-	-	-
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Economizer Repair and Optimization	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	High Efficiency Pre-Rinse Spray Valve	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Compressed Air Storage Tank	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	End of life Replacement for Air Cooled AC	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Guest Room Energy Management System	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Efficient Refrigerated CA Dryer	-	-	-	-	-	-	-	-	-	-	-	-
Compressed Air	Compressed Air Pressure Reduction	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Showerhead - Low Flow	-	-	-	-	-	-	-	-	-	-	-	-
CY2021 Program Total Contribution to CPAS		213,795	213,795	-	-	-	-	-	-	-	-	-	-
Historic Program Total Contribution to CPAS†		41,599	-	-	-	-	-	-	-	-	-	-	-
Program Total CPAS		255,394	213,795	-	-	-	-	-	-	-	-	-	-
CY2021 Program Incremental Expiring Savings§		-	-	213,795	-	-	-	-	-	-	-	-	-
Historic Program Incremental Expiring Savings		13,881	41,599	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Savings		13,881	41,599	213,795	-	-	-	-	-	-	-	-	-

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>.

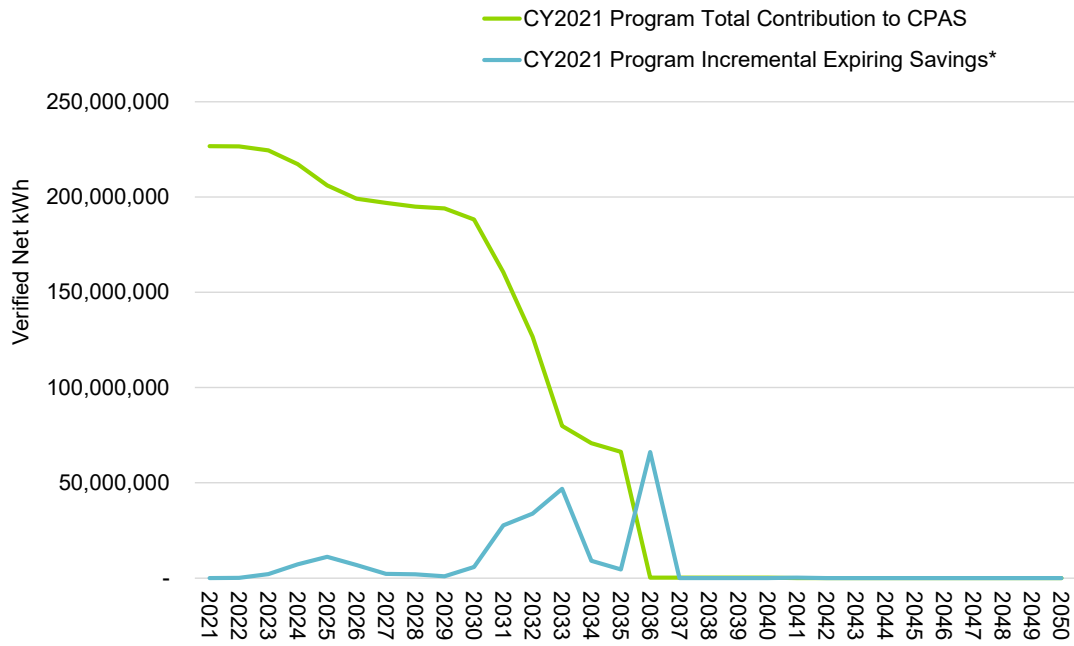
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Figure 4-1. Cumulative Persisting Annual Savings



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

Source: Evaluation team analysis

5. Program Savings by Measure

The program included the measures shown in Table 5-1 and Figure 5-1. In CY2021, exterior and interior LED fixture replacements contributed substantial savings. Overall, the lighting end use accounts for the majority of the program's verified energy savings (see Figure 5-1), with 92% of verified net savings. Refrigeration end use measures account for 4%, followed by HVAC with 2% of verified net savings. The program had water measures and claimed secondary electric energy (kWh) savings from water supply and wastewater treatment plants. The overall electric gross realization rate was 0.96.

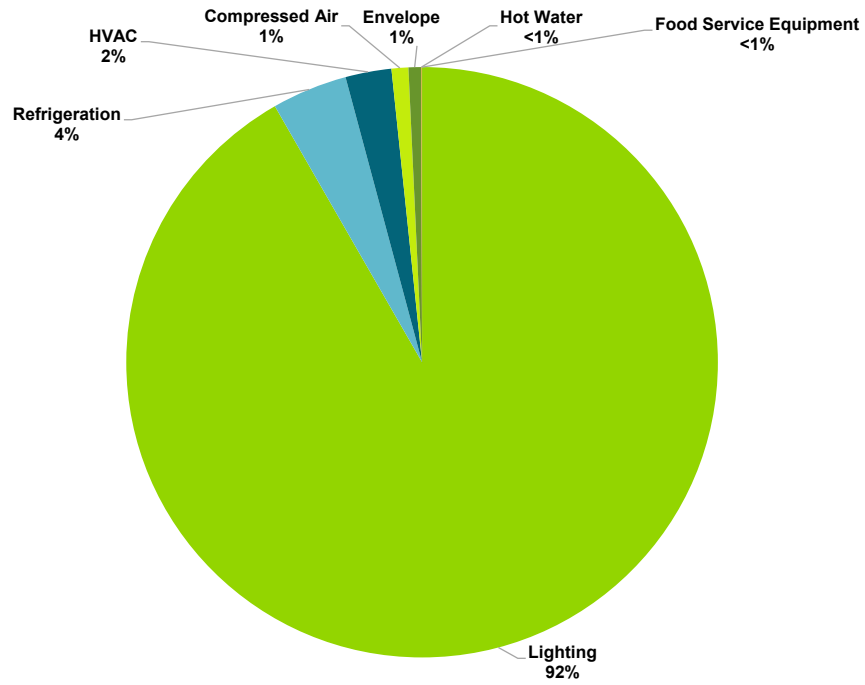
Table 5-1. Number of Measures by Type

End Use Type	Research Category	Quantity	Unit
Compressed Air	Air Compressors with Integrated VSD	1,975	Horsepower
Compressed Air	Compressed Air Leak Repair	1,792	Horsepower
Compressed Air	Compressed Air Pressure Reduction	1	Compressor
Compressed Air	Compressed Air Storage Tank	55	Horsepower
Compressed Air	Efficient Refrigerated CA Dryer	350	CFM
Compressed Air	High-Efficiency Air Nozzles	742	Each
Compressed Air	No-Loss Condensate Drains	196	Each
Envelope	Weather Stripping	19,080	Linear Foot
Food Service Equipment	Kitchen Fan with DCV	1	Each
Hot Water	Bathroom and Kitchen Faucet Aerators	284	Each
Hot Water	High Efficiency Pre-Rinse Spray Valve	3	Each
Hot Water	Showerhead - Low Flow	2	Each
HVAC	Advanced Rooftop Controls	962	Ton
HVAC	Air Conditioner Tune-Up	2,178	Ton
HVAC	Early Replacement for Air Cooled AC	3,475	Ton
HVAC	Economizer with DCV	3,822	Ton
HVAC	Economizer Repair and Optimization	722	Ton
HVAC	End of life Replacement for Air Cooled AC	48	Ton
HVAC	Guest Room Energy Management System	23	Ton
HVAC	Packaged RTU Sealing	2,131	Ton
HVAC	Restroom Exhaust Fan Occupancy Sensor	2,102	Sensor
HVAC	Smart Strip - Tier 1	2,807	Each
HVAC	Thermostat	717	Each
HVAC	Thermostat Adjustment	199	Each
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	472	Horsepower
Lighting	LED Decorative & Directional Lamps	15,336	Each
Lighting	LED Exit Signs	2,487	Sign
Lighting	LED Lamps and Fixtures	50,377,410	Watt Reduced
Lighting	LED Omnidirectional	9,664	Each
Lighting	Lighting Controls	1,092,293	Each or Watt Controlled
Lighting	Advanced Lighting Controls	1,152,529	Watt Controlled
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	4,681	Linear Foot
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	113	Each
Refrigeration	Beverage, Snack and Cooler Machine Controls	38	Each
Refrigeration	EC Motor for Cooler or Freezer	2,452	Motor
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	1,433	Motor
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	10	Each
Refrigeration	LED Refrigerated Display Case Lighting	2,027	Lamp
Refrigeration	Night Covers	4,949	Linear Foot
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	76	Motor
Refrigeration	Strip Curtains for Cooler or Freezer	372	Door

Note: This is the same table as Table 2-2.

Source: ComEd tracking data and evaluation team analysis

Figure 5-1. Verified Net Savings by End Use Type – Electric



Source: ComEd tracking data and evaluation team analysis

Measure-level energy and demand savings are provided in Table 5-2 and Table 5-3.

Table 5-2. Energy Savings by Measure – Electric

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)	EUL (years)
Lighting	LED Lamps and Fixtures	193,014,353	0.96	185,729,104	0.97	180,157,230	12.9
Lighting	Lighting Controls	13,578,298	0.94	12,721,424	0.97	12,339,781	10.0
Refrigeration	EC Motor for Cooler or Freezer	2,608,928	1.00	2,608,928	0.97	2,530,660	15.0
Lighting	LED Decorative & Directional Lamps	2,557,557	0.96	2,466,354	0.97	2,392,363	7.0
Lighting	Advanced Lighting Controls	2,089,371	0.99	2,067,873	0.97	2,005,836	15.0
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	1,976,107	1.00	1,976,107	0.97	1,916,824	13.0
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	1,919,248	1.00	1,919,246	0.97	1,861,669	10.0
Envelope	Weather Stripping	1,522,571	1.00	1,522,571	0.97	1,476,894	10.0
HVAC	Thermostat	1,519,440	1.00	1,519,108	1.00	1,519,108	11.0
HVAC	Economizer with DCV	1,394,895	1.00	1,394,849	0.97	1,353,004	10.0
Compressed Air	Air Compressors with Integrated VSD	1,340,469	1.00	1,340,469	0.97	1,300,255	13.0
Lighting	LED Omnidirectional	1,361,910	0.96	1,308,636	0.97	1,269,376	6.8
Refrigeration	LED Refrigerated Display Case Lighting	1,183,357	1.00	1,183,357	0.97	1,147,856	8.6
Refrigeration	Night Covers	921,792	1.00	919,318	0.97	891,738	5.0
HVAC	Early Replacement for Air Cooled AC	820,557	1.00	820,302	0.97	795,693	15.0
Refrigeration	Strip Curtains for Cooler or Freezer	354,483	1.00	354,483	0.97	343,849	4.0
HVAC	Advanced Rooftop Controls	324,466	1.00	324,479	0.97	314,745	10.0
HVAC	Smart Strip - Tier 1	304,772	1.00	304,772	0.97	295,629	7.0
HVAC	Thermostat Adjustment	293,621	1.00	293,553	1.00	293,553	2.0
HVAC	Restroom Exhaust Fan Occupancy Sensor	257,436	1.00	257,436	0.97	249,713	10.0
Compressed Air	No-Loss Condensate Drains	248,644	1.00	248,644	0.97	241,185	10.0
HVAC	Air Conditioner Tune-Up	246,889	1.00	246,799	0.97	239,395	3.0
Compressed Air	Compressed Air Leak Repair	240,859	1.00	240,787	0.97	233,564	2.0
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	219,849	1.00	220,083	0.97	213,481	15.0
Compressed Air	High-Efficiency Air Nozzles	200,135	1.00	200,135	0.97	194,131	15.0
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	133,839	1.00	133,839	0.97	129,824	8.0
HVAC	Packaged RTU Sealing	120,783	1.00	120,783	0.97	117,159	5.0
Lighting	LED Exit Signs	118,731	0.96	114,108	0.97	110,685	5.0
Refrigeration	Beverage, Snack and Cooler Machine Controls	57,481	1.00	57,481	0.97	55,757	5.0
Hot Water	Bathroom and Kitchen Faucet Aerators	43,148	1.32	56,958	0.97	55,249	10.0
Food Service Equipment	Kitchen Fan with DCV	38,487	1.00	38,487	0.97	37,332	20.0
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	35,036	1.00	35,036	0.97	33,985	10.0
HVAC	Economizer Repair and Optimization	28,503	1.00	28,503	0.97	27,648	5.0
Hot Water	High Efficiency Pre-Rinse Spray Valve	20,827	1.01	21,137	0.97	20,503	5.0
Compressed Air	Compressed Air Storage Tank	15,259	1.00	15,259	0.97	14,801	10.0
HVAC	End of life Replacement for Air Cooled AC	8,933	1.00	8,933	0.97	8,665	15.0
HVAC	Guest Room Energy Management System	3,059	1.00	3,059	0.97	2,967	15.0
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	2,665	1.00	2,674	0.97	2,593	12.0
Compressed Air	Efficient Refrigerated CA Dryer	2,411	1.00	2,414	0.97	2,342	13.0
Compressed Air	Compressed Air Pressure Reduction	1,514	1.00	1,514	0.97	1,468	5.0
Hot Water	Showerhead - Low Flow	631	1.04	653	0.97	634	10.0
Total		231,131,314	0.96	222,829,653	0.97	216,199,143	12.5

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-ntq-recommendations-for-2021>.

Source: ComEd tracking data and evaluation team analysis

Table 5-3. Summer Peak Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
Lighting	LED Lamps and Fixtures	33,610.94	1.00	33,605.69	0.97	32,597.52
Lighting	Lighting Controls	7,196.46	1.00	7,197.76	0.97	6,981.83
Lighting	Advanced Lighting Controls	736.44	1.00	735.14	0.97	713.08
Lighting	LED Decorative & Directional Lamps	633.83	1.00	633.83	0.97	614.81
HVAC	Early Replacement for Air Cooled AC	375.98	1.00	375.98	0.97	364.70
Lighting	LED Omnidirectional	369.17	1.00	369.17	0.97	358.10
Compressed Air	Air Compressors with Integrated VSD	322.23	1.00	322.23	0.97	312.56
Refrigeration	EC Motor for Cooler or Freezer	296.69	1.00	297.82	0.97	288.89
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	224.98	1.00	224.98	0.97	218.23
Refrigeration	LED Refrigerated Display Case Lighting	203.96	1.00	203.96	0.97	197.84
HVAC	Thermostat	162.33	1.00	162.78	1.00	162.78
HVAC	Restroom Exhaust Fan Occupancy Sensor	121.47	1.00	121.47	0.97	117.83
HVAC	Air Conditioner Tune-Up	120.92	1.00	120.92	0.97	117.29
Compressed Air	Compressed Air Leak Repair	60.95	1.00	60.95	0.97	59.12
Compressed Air	No-Loss Condensate Drains	59.77	1.00	59.77	0.97	57.98
HVAC	Packaged RTU Sealing	56.51	1.00	56.51	0.97	54.81
HVAC	Advanced Rooftop Controls	49.90	1.00	49.91	0.97	48.41
Compressed Air	High-Efficiency Air Nozzles	48.11	1.00	48.11	0.97	46.67
HVAC	Thermostat Adjustment	45.18	1.00	45.18	1.00	45.18
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	44.82	1.00	44.72	0.97	43.38
Refrigeration	Strip Curtains for Cooler or Freezer	40.44	1.00	40.44	0.97	39.23
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	18.92	1.00	18.92	0.97	18.35
Lighting	LED Exit Signs	15.74	1.00	15.74	0.97	15.27
Hot Water	Bathroom and Kitchen Faucet Aerators	6.86	1.00	6.86	0.97	6.66
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	4.03	1.00	4.03	0.97	3.91
Compressed Air	Compressed Air Storage Tank	3.67	1.00	3.67	0.97	3.56
HVAC	Guest Room Energy Management System	2.53	1.00	2.53	0.97	2.45
HVAC	End of life Replacement for Air Cooled AC	2.78	1.00	2.78	0.97	2.70
Food Service Equipment	Kitchen Fan with DCV	0.68	1.00	0.68	0.97	0.66
Compressed Air	Efficient Refrigerated CA Dryer	0.58	1.00	0.58	0.97	0.56
Compressed Air	Compressed Air Pressure Reduction	0.36	1.00	0.36	0.97	0.35
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	0.28	1.00	0.29	0.97	0.28
Hot Water	Showerhead - Low Flow	0.08	1.00	0.08	0.97	0.08
Envelope	Weather Stripping	-	-	-	0.97	-
Hot Water	High Efficiency Pre-Rinse Spray Valve	-	-	-	0.97	-
HVAC	Economizer with DCV	-	-	-	0.97	-
HVAC	Economizer Repair and Optimization	-	-	-	0.97	-
HVAC	Smart Strip - Tier 1	-	-	-	0.97	-
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	-	-	-	0.97	-
Refrigeration	Beverage, Snack and Cooler Machine Controls	-	-	-	0.97	-
Refrigeration	Night Covers	-	-	-	0.97	-
	Total	44,837.57	1.00	44,833.82	0.97	43,495.04

* 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 SB Program 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. 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)
Hot Water	Bathroom and Kitchen Faucet Aerators	529,145	NR	N/A	13,797	0.97	13,383
Hot Water	High Efficiency Pre-Rinse Spray Valve	119,434	NR	N/A	344	0.97	334
Hot Water	Showerhead - Low Flow	5,401	NR	N/A	21	0.97	21
Total		653,980	NR	N/A	14,162	0.97	13,738

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

NR = not reported

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.

* Water savings converted to kWh by water savings (gallons) divided by 1,000,000 and then multiplied by E_{water}, where E_{water} equals 5,010 (kWh/million gallons) or 2,937 (kWh/million gallons) for measures installed in Cook County. IL-TRM, Section 4.3.2, p. 134.

† 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 SB Program includes measures that save gas. Table 5-5 shows the measure-level gas savings.

Table 5-5. Energy Savings by Measure – Gas

End Use Type	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)	NTG*	Verified Net Savings (Therms)	EUL (years)
HVAC	Economizer with DCV	118,452	1.00	118,452	0.97	114,898	10.0
HVAC	Thermostat	94,453	1.00	94,438	1.00	94,438	11.0
Envelope	Weather Stripping	70,118	1.00	70,118	0.97	68,015	10.0
HVAC	Advanced Rooftop Controls	42,349	1.00	42,349	0.97	41,078	10.0
HVAC	Thermostat Adjustment	18,136	1.00	18,133	1.00	18,133	2.0
HVAC	Packaged RTU Sealing	17,425	1.00	17,425	0.97	16,902	5.0
Food Service Equipment	Kitchen Fan with DCV	6,207	1.00	6,207	0.97	6,021	20.0
HVAC	Guest Room Energy Management System	582	1.00	582	0.97	565	15.0
Total Therms		367,721	1.00	367,704		360,050	
Total kWh Converted From Therms†		10,777,892	1.00	10,777,396		10,553,057	

* 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

Table 5-6 is the combined savings from Table 5-2 and Table 5-5.

Table 5-6. 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)	EUL (years)
Lighting	LED Lamps and Fixtures	193,014,353	0.96	185,729,104	0.97	180,157,230	12.9
Lighting	Lighting Controls	13,578,298	0.94	12,721,424	0.97	12,339,781	10.0
Refrigeration	EC Motor for Cooler or Freezer	2,608,928	1.00	2,608,928	0.97	2,530,660	15.0
Lighting	LED Decorative & Directional Lamps	2,557,557	0.96	2,466,354	0.97	2,392,363	7.0
Lighting	Advanced Lighting Controls	2,089,371	0.99	2,067,873	0.97	2,005,836	15.0
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	1,976,107	1.00	1,976,107	0.97	1,916,824	13.0
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	1,919,248	1.00	1,919,246	0.97	1,861,669	10.0
Envelope	Weather Stripping	3,577,742	1.00	3,577,742	0.97	3,470,410	10.0
HVAC	Thermostat	4,287,849	1.00	4,287,089	1.00	4,287,089	11.0
HVAC	Economizer with DCV	4,866,718	1.00	4,866,672	0.97	4,720,671	10.0
Compressed Air	Air Compressors with Integrated VSD	1,340,469	1.00	1,340,469	0.97	1,300,255	13.0
Lighting	LED Omnidirectional	1,361,910	0.96	1,308,636	0.97	1,269,376	6.8
Refrigeration	LED Refrigerated Display Case Lighting	1,183,357	1.00	1,183,357	0.97	1,147,856	8.6
Refrigeration	Night Covers	921,792	1.00	919,318	0.97	891,738	5.0
HVAC	Early Replacement for Air Cooled AC	820,557	1.00	820,302	0.97	795,693	15.0
Refrigeration	Strip Curtains for Cooler or Freezer	354,483	1.00	354,483	0.97	343,849	4.0
HVAC	Advanced Rooftop Controls	1,565,708	1.00	1,565,721	0.97	1,518,749	10.0
HVAC	Smart Strip - Tier 1	304,773	1.00	304,772	0.97	295,629	7.0
HVAC	Thermostat Adjustment	825,176	1.00	825,030	1.00	825,030	2.0
HVAC	Restroom Exhaust Fan Occupancy Sensor	257,436	1.00	257,436	0.97	249,713	10.0
Compressed Air	No-Loss Condensate Drains	248,644	1.00	248,644	0.97	241,185	10.0
HVAC	Air Conditioner Tune-Up	246,889	1.00	246,799	0.97	239,395	3.0
Compressed Air	Compressed Air Leak Repair	240,859	1.00	240,787	0.97	233,564	2.0
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	219,849	1.00	220,083	0.97	213,481	15.0
Compressed Air	High-Efficiency Air Nozzles	200,135	1.00	200,135	0.97	194,131	15.0
Refrigeration	Auto Closer for Walk-in Cooler or Freezer	133,839	1.00	133,839	0.97	129,824	8.0
HVAC	Packaged RTU Sealing	631,500	1.00	631,500	0.97	612,555	5.0
Lighting	LED Exit Signs	118,731	0.96	114,108	0.97	110,685	5.0
Refrigeration	Beverage, Snack and Cooler Machine Controls	57,481	1.00	57,481	0.97	55,757	5.0
Hot Water	Bathroom and Kitchen Faucet Aerators	43,148	1.32	56,958	0.97	55,249	10.0
Food Service Equipment	Kitchen Fan with DCV	220,407	1.00	220,407	0.97	213,795	20.0
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	35,036	1.00	35,036	0.97	33,985	10.0
HVAC	Economizer Repair and Optimization	28,503	1.00	28,503	0.97	27,648	5.0
Hot Water	High Efficiency Pre-Rinse Spray Valve	20,827	1.01	21,137	0.97	20,503	5.0
Compressed Air	Compressed Air Storage Tank	15,259	1.00	15,259	0.97	14,801	10.0
HVAC	End of life Replacement for Air Cooled AC	8,933	1.00	8,933	0.97	8,665	15.0
HVAC	Guest Room Energy Management System	20,114	1.00	20,123	0.97	19,519	15.0
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	2,665	1.00	2,674	0.97	2,593	12.0
Compressed Air	Efficient Refrigerated CA Dryer	2,411	1.00	2,414	0.97	2,342	13.0
Compressed Air	Compressed Air Pressure Reduction	1,514	1.00	1,514	0.97	1,468	5.0
Hot Water	Showerhead - Low Flow	631	1.04	653	0.97	634	10.0
Total†		241,909,207	0.97	233,607,049	0.97	226,752,200	12.4

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

† The kWh savings include the electric equivalent of the total therms.

Source: ComEd tracking data and evaluation team analysis

6. Impact Analysis Findings and Recommendations

The evaluation team developed several recommendations for ComEd and the implementation contractor based on findings from the CY2021 evaluation.

The issue that had the largest impact on verified gross savings was the electric heating penalty adjustments due to lighting-HVAC interactions. Erroneous tracking of HVAC heating systems was a major issue that triggered evaluation research to determine the appropriate adjustment factor for projects affected.

Finding 1. Guidehouse identified 1,263 lighting projects in the SB Program tracking data that were installed in building types with electric energy as the primary source for heating (this excluded exterior lighting, garages, and refrigerated case lighting). The evaluation team identified 857 of the 1,263 projects during the midyear impact review, but the post-inspection of a sample of these project sites by the program implementation contractor (IC) found instances where some buildings initially tracked as having electric heating systems were actually gas heating, and vice versa. The evaluation team conducted a regression-based analysis (see Appendix B for details of the research and results) to analyze 12 months of electric usage data from a sample of customer accounts and determined that 56% of the 857 projects were likely electric heating and accordingly applied a 56% adjustment factor to calculate the electric heating penalty from these lighting projects. Due to further and properly screening the customer application process by the IC for the remaining of the program year, the evaluation team determined and applied a 100% heating penalty factor to calculate electric heating penalty from the remaining 406 projects (of the 1,263 projects) in the final impact evaluation.

Finding 2. The ex ante savings did not account for an electric heating penalty adjustment for lighting-HVAC interaction as required by the IL-TRM. Guidehouse determined that at least 886 lighting projects (14% of all lighting projects in CY2021) would have savings affected by the heating penalty adjustment. The evaluation team's verified gross savings adjusted for 8,311,759 kWh of heating penalties. Because lighting accounted for 92% of the SB Program electric savings, the heating penalty impact resulted in a program gross electric realization rate of 0.96. Guidehouse acknowledges that the IC is implementing measures to address the findings and recommendations below.

Recommendation 1. The IC should adequately review the application screening process with the evaluation team and the EESPs to ensure the most accurate information on the heating system is tracked. Where a customer has both heating types present (possible presence of dual fuel heating), the screening process should adequately establish the primary heating source on the application.

Recommendation 2. The IC should increase post-inspection activities to validate a larger sample size of projects' heating systems to compare with application documents. This will ensure the most accurate heating system information is recorded in eTrack. Guidehouse can coordinate with the IC for future onsite verification activities to increase the rigor and strengthen the evaluation method for determining the most appropriate heating penalty adjustment factor.

Finding 3. The tracking data provides gallons of water saved but does not calculate the secondary electric energy (kWh) savings from water supply and wastewater treatment plants. Guidehouse calculated 14,162 kWh as the total secondary water savings, which increased the

gross savings realization rates for the bathroom aerator, kitchen aerator, pre-rinse spray valve, and showerhead measures.

Recommendation 3. Ensure the standard key fields⁶ developed by Guidehouse and ComEd to improve data collection in eTrack are implemented consistently. This effort will ensure the program tracking data incorporates lighting heating penalties and secondary kWh from water to produce realistic ex ante estimations.

Finding 4. The tracking data provides a field that tracks the EUL of measures. This field was updated to reflect changes in the IL-TRM and the Errata changes, however, the program maintained the EUL for outdoor photocells and timeclocks at 8 years, which should be 10 years and reflected in the tracking data. The TRM (v9) indicates that other than luminaire-level and networked lighting controls (15 years EUL), all other lighting controls measure life is assumed to be 10 years. We also found that all other lighting measures have their EUL capped at 15 years, although the EULs are supposed to be based on the lamp life divided by building type equivalent full load hours (EFLH).

Recommendation 4. Update the measure EUL to reflect updates in the IL-TRM and ensure the tracking lighting EULs are consistent with the IL-TRM definitions. They should consider adding one more data field to track the remaining useful life for CPAS adjustment that is consistent with the IL-TRM (measures affected include screw-in lamps, T-12 baseline lighting, and early replacement HVAC measures).

Finding 5. Guidehouse identified several measures where their savings inputs were based on average assumptions instead of tracking climate zone or IL-TRM recommendations for specific measure inputs. Table 6-1 highlights a few measures where savings inputs should be revised for future program updates due to IL-TRM changes.

Recommendation 5. The program should review the measure workpapers and calculator workbooks against eTrack inputs and update measure savings inputs instead of using average assumptions.

Table 6-1. Review of Measure Savings Inputs

Research Category	Evaluation Comments on Savings Assumptions
Guest Room Energy Management System	Averaging deemed_kwh when it could be based on heating type and climate zone
Variable Speed Drive on HVAC - Pumps and Fans	Averages energy and demand savings factors rather than using chilling type. The VSD for supply and return fans averages Part Load Ratio which could be based on control type
Air Conditioner Tune-Up	Uses static efficiency values. TRM advises to use data collected from each project
Economizer Repair and Optimization, Economizer with DCV	Averages climate coefficient between Chicago and Rockford instead of using tracking climate zone details by project
Packaged RTU Sealing	Averages %savings therm between climate zones of Rockford and Chicago. Could use project specific tracking climate zone

Source: ComEd tracking data and evaluation team analysis

⁶ ETrack Key Fields for ICs v3.xlsx (ComEd circulated to program managers on October 22, 2021).

Appendix A. Impact Analysis Methodology

A.1 Verified Gross Program Savings Analysis Approach

Guidehouse determined the verified gross savings for each program measure by:

- Reviewing the savings algorithm inputs in the measure workbook for agreement with the IL-TRM (including the Errata memo)⁷ or secondary research.
- Validating the savings algorithms were applied correctly.
- Cross-checking the per-unit savings values in the tracking data with the verified values in the workpapers, measure workbook, or in the evaluation team’s calculations if the workbook did not agree with the IL-TRM.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data.

The evaluation team downloaded the final tracking data and measure workbook for the CY2021 impact evaluation from the ComEd OneDrive site. The team relied on the following documents to verify the per-unit savings for each program measure:

- Final CY2021 tracking database file: “SBES_CY2021_EOY_Data_Rev0_2022-01-11”
- ComEd Small Business Offering Workpaper⁸
- ComEd SB Program Workbook⁹
- IL-TRM and Errata memo for deemed input parameters or secondary evaluation research to verify any custom inputs used in the ex ante calculations
- Early replacement, T12 and EISA baseline and midlife analysis using the IL-TRM

A.2 Verified Net Program Savings Analysis Approach

Guidehouse calculated verified net energy and demand (coincident peak and overall) savings by multiplying the verified gross savings estimates by a NTG ratio. In CY2021, the NTG ratio estimate used to calculate the net verified savings was 0.97 for all measures except thermostats, which was 1.00 based on past evaluation research and defined by a consensus process through the Illinois SAG. This document is found on the SAG website.¹⁰

A.3 T12 Baseline and EISA Midlife Adjustments

The tracking data provided enough information for the team to determine the measures affected by T12 adjustment (interior and outdoor linear LED fixtures, tubular LEDs, lit signage) and EISA midlife adjustment (LED screw-in omnidirectional, directional, and decorative lamps). In the tracking data, lighting measures with T12 baseline comprised 25% of the CY2021 ex ante savings, and the LED screw-in lamps comprised 2%.

⁷ <https://www.ilsag.info/technical-reference-manual/il-trm-version-9/>

⁸ 2021 SBO Workpaper_Final_012921.pdf

⁹ 2021 ComEd Measure Workbook_Final.xlsx

¹⁰ The Illinois SAG website is found here: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2021>.

To account for EISA backstop adjustment for omnidirectional, decorative, and directional lamps in CY2021, the IL-TRM specifies these lamps will have a baseline adjustment starting January 1, 2025. Table A-1 shows the EISA adjustment factors for screw-in lamps.

Table A-1. EISA Adjustment Factors

Lamp Type	Year from which Adjustment is Applied	Adjustment Factor Applied to Annual kWh Savings
Omnidirectional	2025	38%
Decorative	2025	61%
Directional	2025	60%

Source: Illinois SAG website: <https://www.ilsag.info/technical-reference-manual/il-trm-version-9/>

In CY2021, the remaining useful life for the T12 midlife adjustment was calculated as one-third of the 40,000-hour ballast life divided by the EFLH per year as prescribed by the IL-TRM. A savings adjustment was then applied to the annual savings for the remainder of the measure life. The adjustment factor applied for each T12 installation is 57%.

For early replacement air-cooled AC, the remaining life of existing equipment is assumed to be 5 years, after which the next 10 years assume a new baseline according to the IL-TRM.

A.4 Heating Penalty Research

During the 2021 midyear impact evaluation, Guidehouse identified 1,047 projects in the SB Program tracking data¹¹ that installed lighting projects in building types with electric energy indicated as the primary source for heating and cooling. Excluding exterior lighting, garages, and refrigerated case lighting, 857 of these projects were installed in buildings that qualified for electric heating penalty adjustment by applying the IL-TRM lighting-HVAC interaction factor for electric heating impacts. These interaction factors represent the increased electric space heating requirements due to the reduction of waste heat rejected by the efficient lighting.

The program IC, on further review of the tracking data, conducted further post-installation inspection of a sample of projects and found a potential error in the tracking of the heating system types at the customer sites. The post-inspection found some buildings initially tracked as having electric heating systems were gas heating, and vice versa.

To investigate the electric heating system of the projects described above, the evaluation team developed a research approach to analyze 12 months of electric usage data from a sample of 292 customer accounts (203 electric and 89 gas accounts). This research aimed at analyzing customers' billing data to identify cases where the energy consumption pattern of the customer account during the past heating season agreed with the designated primary heat source in the tracking data.

Research Method

Guidehouse considered two research approaches to analyze the customer usage data: a preliminary billing analysis using arbitrary seasonal definitions on usage, and an alternative regression analysis. Regression analysis was chosen as the better research method because it

¹¹ Small Business Program Wave 1 data extract from January 1 through June 30, 2021.

can account for weather and day length by segregating the customer's total electricity usage into temperature-sensitive, day length-sensitive, and insensitive loads. This segregation enabled the evaluation team to conclude that a positive coefficient on heating degree days (HDDs) for a customer indicates the presence of electric heat. From the results, the evaluation team developed a statistical adjustment factor and applied to the electric heating penalties calculated from the 857 projects and accordingly revised the verified total gross savings from the Wave 1 impact analysis.

Preliminary Billing Analysis

The preliminary billing analysis approach on the 292 customers' usage data involved the calculation of kWh/day using the billing period usage and number of days in the billing period, and then assigned the calculated kWh/day value as the daily consumption value for each day in the billing period. The team classified each day in the billing period as heating, cooling, or shoulder season based on the average monthly temperature and then calculated heating and cooling ratios¹² for each account number. A threshold of 1.15 was used to distinguish between electric and gas heat to allow for slight variations in the energy usage that could not necessarily be attributed to electric heating. All accounts that had a heating ratio greater than the threshold were classified as electric heat.

Billing analysis has the advantage of simplicity but also some limitations. One is that the preliminary billing analysis uses arbitrary seasonal definitions of usage rather than accounting for the actually observed temperature variations directly by incorporating heating and cooling degree day (HDD and CDD) values. Billing analysis also does not account for day length, which varies over the course of the year and can affect electricity demand via its effect on lighting load. Furthermore, the heating threshold value chosen by Guidehouse for the analysis was assumed because there were not enough post-install inspected electric heating sites to adequately define this parameter.

Regression Analysis

To address the limitations with billing analysis, Guidehouse developed an alternative that used regression analysis for each of the sample of SB Program participants using usage data from their billing data and weather variables. The proposed model has the following form:

$$ADU_t = \alpha + \beta HDD_t + \gamma CDD_t + \delta DAYLENGTH_t + \varepsilon_t$$

where ADU_t is the customer's average daily usage during billing period t , HDD_t and CDD_t are the number of heating and cooling degree days, respectively, during billing period t , $DAYLENGTH_t$ is the average day length in hours during billing period t (calculated as the differences of the sunrise and sunset times, averaged over the billing period), ε_t is a random error term, and α , β , γ and δ are parameters to be estimated.

This approach assumes that only customers with electric heat should see their usage systematically go up during the heating season (i.e., have a significant, positive partial

¹² Heating ratio is the average daily heating season consumption divided by the average daily shoulder season consumption. The cooling ratio is the average daily cooling season consumption divided by the average daily shoulder season consumption. The shoulder season is defined from April 16 to May 31 and September 1 to October 15, which is the period expected to be the least of heating or cooling consumption. Heating ratio values were expected to be greater than 1.00 for electric heat.

correlation with HDD), holding day length constant,¹³ the usage of customers with only non-electric heat should be insensitive to HDD, corresponding to a zero value for β .

If the team used hourly advanced metering infrastructure usage data instead, the approach would be similar: the team would aggregate usage up to daily values, and the regression variables would be actual rather than average daily values.

In pursuing the regression analysis, the evaluation team used 55°F as the base temperatures for calculating both HDDs and CDDs following the recommendation of the IL-TRM, recognizing the need to account for the higher internal heat gains typically seen in commercial and industrial settings.¹⁴

The team relied on ZIP codes pulled from the customer bill records to associate an average day length to each customer during each of their billing cycles. This was done by linking the ZIP codes to longitude/latitude pairs corresponding to the geographic centroids of each ZIP code area using the SimpleMaps.com Basic U.S. Zip Codes Database.¹⁵ The evaluation team fed the longitude/latitude pairs to the `getSunlightTimes` function, a component of the `suncalc` R package,¹⁶ which takes a calendar date, a longitude/latitude pair, and a time zone as inputs and produces the associated sunrise and sunset times for that date and location. Simple subtraction yields the associated sunlight times at each location on each date. The team then aggregated these daily daylight times to the average over each customer bill period.

The post-regression analysis consisted of counting the number of customers in the sample who had a positive, statistically significant HDD coefficient. Therefore, the evaluation team was only counting estimates that met its pre-set level of 90/10 confidence and precision. Each coefficient could be construed as a mean, and the heating penalty adjustment factor amounts to a linear function of n means (where n is the number of customers with sufficient data). The team extrapolated the adjustment factor to the population of 857 projects to determine the expected heating penalty impact from the Wave 1 data analysis.

Results and Conclusion

Table A-3 shows the sample disposition of the customer accounts used in the preliminary billing analysis and regression analysis, where the heating sources from the original tracking data match the research findings, and the count of the number of changes or deviation of the heating sources from the tracking data.

¹³ Accounting for day length is important in this context because of its effect on lighting demand, which increases as day length shrinks. Because day length is inversely correlated with HDD, there is a possibility that this could confound the test for the presence of electric heat using the coefficient on HDD in the above regression. Including $DAYLENGTH_t$ in the model solves the confounding problem because it would mean that the estimated β coefficient would capture the effect of HDD and CDD on energy usage *net* of any effect correlated with day length (including that of lighting demand). Thus, the team could be reasonably confident that any customer with a positive significant β value has electric heat. Similarly, a positive coefficient on CDDs and significant γ value indicates the presence of air conditioning.

¹⁴ IL-TRM, vol. 1, p.54. Due to the difficulty of developing site-specific base temps with the amount of data available, the team relied on the IL-TRM base temperature of 55°F for heating and cooling.

¹⁵ <https://simplemaps.com/data/us-zips>. This source was used under a Creative Commons Attribution 4.0 license (i.e., public domain).

¹⁶ <https://www.rdocumentation.org/packages/suncalc/versions/0.5.0/topics/getSunlightTimes>.

Focusing on the results from the regression analysis, from 203 accounts identified as having electric heating in the tracking data, the evaluation team characterized 94 (46%) as electric heating. Similarly, the regression analysis of 89 accounts identified as having gas heating, the team characterized 63 (71%) as gas or unknown heating. Overall, the regression analysis agreed with the heating type listed from the tracking data in 54% of the cases. When the team compared the analysis from 29 post-inspection project accounts from the IC, the approach yielded 59% match between the tracking data heat source and the regression results. The evaluation team then calculated a weighted average (54% and 59%) to estimate the 56% heating penalty adjustment factor.

Table A-2. Facility Heating Source from Billing Analysis and Regression Analysis

Heating Energy Type	Preliminary Billing Analysis				Regression Analysis		
	Tracking Primary Heating Source	Heating Source Match Tracking Data	Change in Heating Source Type	% Match	Heating Source Match Tracking Data	Change in Heating Source Type	% Match
Overall Sample (n=292)							
Electric	203	100	103	49%	94	109	46%
Gas	89	64	25	72%	63	26	71%
Total Sample	292	164	128	56%	157	135	54%
Post Inspection Sample (n=29)							
Electric	10	5	5	50%	6	4	60%
Gas	19	11	8	58%	11	8	58%
Total Sample	29	16	13	55%	17	12	59%
% Adjustment Factor				56%	56%		

Source: Evaluation team analysis of customer usage data.

Guidehouse found some correlation between the results from the regression analysis and the preliminary billing analysis in terms of arriving at the heating penalty adjustment factor (59% match between the methods agreed with the tracking data electric heat source). The evaluation team noticed that 3 out of 29 of post-inspection projects were confirmed as electric heating by the program IC. The regression results also confirmed these projects.

Overall, the regression analysis agreed with the heating type listed in the tracking data in 56% of the cases. This suggests that at least 44% of the heating penalty calculated during the Wave 1 impact analysis should be credited as savings to the program. The evaluation team applied the 56% adjustment factor to the 857 lighting projects and revised the total heating penalty in the Wave 1 impact results from 7,869,977 kWh to 4,407,188 kWh. The difference of 3,462,789 kWh was added to the program lighting savings to bring the adjusted Wave 1 verified total gross savings to 113,536,291 kWh. This update yields a lighting savings gross realization rate of 0.96 from the previous estimate of 0.93 for Wave 1 lighting savings. The evaluation team updated the end-of-year verified savings and the gross realization rates of the Wave 1 lighting measures based on the findings from this research as shown in the table below.

Table A-3. Adjustment of Lighting Energy Savings after Heating Penalty Research

Research Category	Before Heating Penalty Research				After Heating Penalty Research		
	Ex Ante Gross kWh	Electric Heating Penalty	Verified kWh w/ Electric Heating Penalty	Gross Realization Rate	Adjusted Electric Heating Penalty	Adjusted Verified kWh w/ Electric Heating Penalty	Adjusted Gross Realization Rate
LED Lamps and Fixtures	105,575,880	6,755,605	98,819,665	0.94	3,783,139	101,792,131	0.96
Lighting Controls	10,111,929	1,013,271	9,098,592	0.90	567,432	9,544,431	0.94
LED Omnidirectional	706,096	23,252	682,844	0.97	13,021	693,075	0.98
LED Decorative & Directional Lamps	1,489,133	73,771	1,415,362	0.95	41,312	1,447,821	0.97
LED Exit Signs	61,117	4,078	57,038	0.93	2,284	58,833	0.96
Total	117,944,154	7,869,977	110,073,501	0.93	4,407,188	113,536,291	0.96

Source: ComEd tracking data and evaluation team analysis

The IC provided additional training for the EESPs to enable them to properly screen customer applications and record the accurate building heating system source. Service Providers are now more familiar with the information required (i.e. primary facility heating type), and when possible, the IC engineers verify while on site. For this effort, Guidehouse agreed that the calculation of lighting electric heating penalties from Wave 2 data should apply a 100% adjustment factor. This resulted in additional 3,904,571 kWh heating penalties. The overall estimated electric heating penalties was 8,311,759 kWh in CY2021.

Research Data Issues and Other Considerations

- Some customer account numbers only include data for a few months: In this case, it is hard to gauge the energy consumption pattern at the facility. Hence, 292 out of 295 available account data or premise IDs were used in this analysis.
- Some account numbers corresponded to very low consumption values: This probably indicates there are other meters at the facility that capture the energy consumption for the larger equipment (HVAC equipment).
- Neither approach (preliminary billing analysis, regression analysis) fully accounted for the possible presence of dual fuel heating. Customers that have both heating types (e.g., a central gas-fired furnace combined with supplementary baseboard electric around the periphery or in satellite areas) could be identified as having electric as their primary heating source.
- The regression model did not include a term indicating customer-specific effects of COVID-19. To the extent that this is correlated with HDDs, the model's ability to detect the presence of electric heat could be reduced.
- The regression model did not include binary indicators for building types. Doing so would not add anything to an analysis of this type because the evaluation team is running a separate regression for each customer (their building type is fixed over the entire sample period, so its effect is absorbed by the intercept). That said, if necessary, the evaluation could do post-regression check to sort the results by building type to see if there is a pattern (e.g., if a particular type tending to be flagged as electric heat).

Appendix B. Impact Findings Detailed Results

Guidehouse analyzed the tracking data and breakdown of the verified savings by program sector and program delivery channel. The private sector businesses contributed 87% of the CY2021 net electric savings and the public sector contributed 13%. The prescriptive delivery path contributed 99.7% of the CY2021 net electric savings and the direct install offers contributed 0.3%.

Table B-1. Program Electric Savings by Sector and Path

Program	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Program Sector					
Private Sector	202,176,454	0.96	194,872,012	0.97	189,071,425
Public Sector	28,954,860	0.97	27,957,641	0.97	27,127,718
Total	231,131,314	0.96	222,829,653	0.97	216,199,143
Program Path					
Prescriptive	230,504,318	0.96	222,191,100	0.97	215,570,940
Direct Install	626,996	1.02	638,553	0.97	628,203
Total	231,131,314	0.96	222,829,653	0.97	216,199,143

Source: ComEd tracking data and evaluation team analysis

Table B-2. Program Peak Demand Savings by Sector and Path

Program	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
Program Sector					
Private Sector	38,569.67	1.00	38,566.52	0.97	37,415.44
Public Sector	6,267.90	1.00	6,267.30	0.97	6,079.60
Total	44,837.57	1.00	44,833.82	0.97	43,495.04
Program Path					
Prescriptive	44,782.52	1.00	44,778.81	0.97	43,441.56
Direct Install	55.05	1.00	55.01	0.97	53.48
Total	44,837.57	1.00	44,833.82	0.97	43,495.04

Source: ComEd tracking data and evaluation team analysis

Appendix C. Total Resource Cost Detail

Table C-1 shows the TRC cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. 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 C-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)	ER Flag†	Gross Electric 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 Savings (kWh)	Net Peak Demand Reduction (kW)	Net Gas Savings (Therms)	Net Secondary Savings due to Water Reduction (kWh)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Lighting	LED Lamps and Fixtures‡	Watt Reduced	50,377,410	12.9	Yes	185,729,104	33,605.69	-	-	-7,284,449	-1,948,769	0.97	0.97	0.97	180,157,230	32,597.52	-	-	-7,065,915	-1,890,306
Lighting	Lighting Controls	Each or Watt Controlled	1,092,293	10.0	No	12,721,424	7,197.76	-	-	-856,876	-289,181	0.97	0.97	0.97	12,339,781	6,981.83	-	-	-831,170	-280,506
Refrigeration	EC Motor for Cooler or Freezer	Motor	2,452	15.0	No	2,608,928	297.82	-	-	-	-	0.97	0.97	0.97	2,530,660	288.89	-	-	-	-
Lighting	LED Decorative & Directional Lamp‡	Each	15,336	7.0	Yes	2,466,354	633.83	-	-	-91,202	-32,131	0.97	0.97	0.97	2,392,363	614.81	-	-	-88,466	-31,167
Lighting	Advanced Lighting Controls	Watt Controlled	1,152,529	15.0	No	2,067,873	735.14	-	-	-21,335	-25,577	0.97	0.97	0.97	2,005,836	713.08	-	-	-20,695	-24,809
Refrigeration	EC Motor with Evaporator Fan Controls for Cooler or Freezer	Motor	1,433	13.0	No	1,976,107	224.98	-	-	-	-	0.97	0.97	0.97	1,916,824	218.23	-	-	-	-
Refrigeration	Anti-Sweat Heater Controls for Glass Door Cooler or Refrigerator	Linear Foot	4,681	10.0	No	1,919,246	-	-	-	-	-	0.97	0.97	0.97	1,861,669	-	-	-	-	-
Envelope	Weather Stripping	Linear Foot	19,080	10.0	No	1,522,571	-	70,118	-	-	-	0.97	0.97	0.97	1,476,894	-	68,015	-	-	-
HVAC	Thermostat	Each	717	11.0	No	1,519,108	162.78	94,438	-	-	-	1.00	1.00	1.00	1,519,108	162.78	94,438	-	-	-
HVAC	Economizer with DCV	Ton	3,822	10.0	No	1,394,849	-	118,452	-	-	-	0.97	0.97	0.97	1,353,004	-	114,898	-	-	-
Compressed Air	Air Compressors with Integrated VSD	Horsepower	1,975	13.0	No	1,340,469	322.23	-	-	-	-	0.97	0.97	0.97	1,300,255	312.56	-	-	-	-
Lighting	LED Omnidirectional‡	Each	9,664	6.8	Yes	1,308,636	369.17	-	-	-53,274	-17,427	0.97	0.97	0.97	1,269,376	358.10	-	-	-51,676	-16,904
Refrigeration	LED Refrigerated Display Case Lighting	Lamp	2,027	8.6	No	1,183,357	203.96	-	-	-	-	0.97	0.97	0.97	1,147,856	197.84	-	-	-	-
Refrigeration	Night Covers	Linear Foot	4,949	5.0	No	919,318	-	-	-	-	-	0.97	0.97	0.97	891,738	-	-	-	-	-
HVAC	Early Replacement for Air Cooled AC	Ton	3,475	15.0	Yes	820,302	375.98	-	-	-	-	0.97	0.97	0.97	795,693	364.70	-	-	-	-
Refrigeration	Strip Curtains for Cooler or Freezer	Door	372	4.0	No	354,483	40.44	-	-	-	-	0.97	0.97	0.97	343,849	39.23	-	-	-	-
HVAC	Advanced Rooftop Controls	Ton	962	10.0	No	324,479	49.91	42,349	-	-	-	0.97	0.97	0.97	314,745	48.41	41,078	-	-	-
HVAC	Smart Strip - Tier 1	Each	2,807	7.0	No	304,772	-	-	-	-	-	0.97	0.97	0.97	295,629	-	-	-	-	-
HVAC	Thermostat Adjustment	Each	199	2.0	No	293,553	45.18	18,133	-	-	-	1.00	1.00	1.00	293,553	45.18	18,133	-	-	-
HVAC	Restroom Exhaust Fan Occupancy Sensor	Fan	2,102	10.0	No	257,436	121.47	-	-	-	-	0.97	0.97	0.97	249,713	117.83	-	-	-	-
Compressed Air	No-Loss Condensate Drains	Each	196	10.0	No	248,644	59.77	-	-	-	-	0.97	0.97	0.97	241,185	57.98	-	-	-	-
HVAC	Air Conditioner Tune-Up	Ton	2,178	3.0	No	246,799	120.92	-	-	-	-	0.97	0.97	0.97	239,395	117.29	-	-	-	-
Compressed Air	Compressed Air Leak Repair	Horsepower	1,792	2.0	No	240,787	60.95	-	-	-	-	0.97	0.97	0.97	233,564	59.12	-	-	-	-
HVAC	Variable Speed Drive on HVAC - Pumps and Fans	Horsepower	472	15.0	No	220,083	44.72	-	-	-	-	0.97	0.97	0.97	213,481	43.38	-	-	-	-
Compressed Air	High-Efficiency Air Nozzles	Each	742	15.0	No	200,135	48.11	-	-	-	-	0.97	0.97	0.97	194,131	46.67	-	-	-	-
Refrigeration	Air Cooled for Walk-in Cooler or Freezer	Each	113	8.0	No	133,839	18.92	-	-	-	-	0.97	0.97	0.97	129,824	18.35	-	-	-	-
HVAC	Packaged RTU Sealing	Ton	2,131	5.0	No	120,783	56.51	17,425	-	-	-	0.97	0.97	0.97	117,159	54.81	16,902	-	-	-
Lighting	LED Exit Signs	Sign	2,487	5.0	No	114,108	15.74	-	-	-4,623	-1,627	0.97	0.97	0.97	110,885	15.27	-	-	-4,484	-1,578
Refrigeration	Beverage, Snack and Cooler Machine Controls	Each	38	5.0	No	57,481	-	-	-	-	-	0.97	0.97	0.97	55,757	-	-	-	-	-
Hot Water	Bathroom and Kitchen Faucet Aerators	Each	284	10.0	No	43,161	6.86	-	13,797	-	-	0.97	0.97	0.97	41,866	6.66	-	13,383	-	-
Food Service Equipment	Kitchen Fan with DCV	Each	1	20.0	No	38,487	0.68	6,207	-	-	-	0.97	0.97	0.97	37,332	0.66	6,021	-	-	-
Refrigeration	Q-Sync Motors for Reach-in Coolers/Freezers	Motor	76	10.0	No	35,036	4.03	-	-	-	-	0.97	0.97	0.97	33,985	3.91	-	-	-	-
HVAC	Economizer Repair and Optimization	Ton	722	5.0	No	28,503	-	-	-	-	-	0.97	0.97	0.97	27,648	-	-	-	-	-
Hot Water	High Efficiency Pre-Rinse Spray Valve	Each	3	5.0	No	20,793	-	-	344	-	-	0.97	0.97	0.97	20,169	-	-	334	-	-
Compressed Air	Compressed Air Storage Tank	Horsepower	55	10.0	No	15,259	3.67	-	-	-	-	0.97	0.97	0.97	14,801	3.56	-	-	-	-
HVAC	End of life Replacement for Air Cooled AC	Ton	48	15.0	No	8,933	2.78	-	-	-	-	0.97	0.97	0.97	8,665	2.70	-	-	-	-
HVAC	Guest Room Energy Management System	Ton	23	15.0	No	3,059	2.53	582	-	-	-	0.97	0.97	0.97	2,967	2.45	565	-	-	-
Refrigeration	ENERGY STAR Solid or Glass Door Refrigerator or Freezer	Each	10	12.0	No	2,674	0.29	-	-	-	-	0.97	0.97	0.97	2,593	0.28	-	-	-	-
Compressed Air	Efficient Refrigerated CA Dryer	CFM	350	13.0	No	2,414	0.58	-	-	-	-	0.97	0.97	0.97	2,342	0.56	-	-	-	-
Compressed Air	Compressed Air Pressure Reduction	Compressor	1	5.0	No	1,514	0.36	-	-	-	-	0.97	0.97	0.97	1,468	0.35	-	-	-	-
Hot Water	Showhead - Low Flow	Each	2	10.0	No	632	0.08	-	21	-	-	0.97	0.97	0.97	613	0.08	-	21	-	-
	Total			12.6		222,815,491	44,833.82	367,704	14,162	-8,311,759	-2,314,712				216,185,405	43,495	360,050	13,738	-8,062,406	-2,245,271

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