



ComEd Single-Family Upgrades Program Impact Evaluation Report

Energy Efficiency/Demand Response Plan:
Program Year 2023 (CY2023)
(1/1/2023-12/31/2023)

Prepared for:

ComEd

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Introduction

This report presents the results of the impact evaluation of the Single-Family Upgrades program from the program year from January 1 to December 31, 2023 (CY2023). The program was designed to provide energy saving products to single family homes.

The program is offered jointly to customers served by ComEd, Nicor Gas, Peoples Gas, and North Shore Gas. This report presents the results just for ComEd. The results for the gas utilities will be in separate reports.

Program Savings Detail

Table 1 summarizes the incremental energy and demand savings the Single-Family Upgrades program achieved in CY2023. The gas or other fuel savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim. ¹ The electrification savings are those resulting from electrification measures. ² A subset of installed heat pumps had a Beneficial Electrification rebate applied. The associated savings were adjusted accordingly based on the incentive split between Beneficial Electrification and Energy Efficiency. ³ Table 2 summarizes the savings achieved from income eligible participants and Table 3 summarizes savings from non-income eligible participants. Together they make up the total shown in Table 1. Guidehouse applied the CY2022 realization rates for the Single-Family Upgrades Program to determine the gross verified savings for CY2023.

Table 1. Total Annual Incremental Electric Savings - Total

Savings Category	Units	Ex Ante Gross Savings*	Program Gross Realization Rate	Verified Gross Savings*	Program Net-to-Gross Ratio (NTG)	CY2021 Net Carryover Savings	CY2022 Net Carryover Savings	Verified Net Savings†
Electric Energy Savings - Direct‡ kWh		11,727,636	1.00	11,779,157	0.99		111,751	11,842,186
Electric Energy Savings - Converted from Other Fuels§	kWh	43,757,279	1.00	43,820,836	1.00			43,680,358
Electric Energy Savings - Electrification	kWh	2,198,063	1.00	2,193,550	1.00			2,193,550
Total Electric Energy Savings##	kWh	57,682,979	1.00	57,793,543	1.00		111,751	57,716,094
Total Electric Energy Savings Including Carryover##	kWh	57,682,979	1.00	57,926,728	1.00		111,751	57,716,094
Summer Peak*†† Demand Savings	kW	2,608	1.00	2,607	1.00		15	2,612
Summer Peak*†† Demand Savings Including Carryover	kW	2,608	1.01	2,625	1.00		15	2,612

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

¹ The evaluation will determine which other fuel savings will be counted toward 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 total savings requirement as defined in paragraph (7.5) of subsection (g) of this Section be met through savings of fuels other than electricity."

² The evaluation team will determine which electrification savings will be counted toward ComEd's electric savings goal while producing the portfolio-wide Summary Report. According to Section 8-103B(b-27) of the Illinois Public Utilities Act, "In no event shall electrification savings counted toward each year's applicable annual total savings requirement, as defined in paragraph (7.5) of subsection (g) of this Section, be greater than 5% per year for each year from 2022 through 2025."

³ ComEd Beneficial Electrification Plan 1 (2023-2025) Annual Report PY2023: <https://www.icc.illinois.gov/docket/P2022-0432/documents/348887/files/609880.pdf>. In accordance with the final order section (i) sub-section (iii) Residential BE Technology Adoption Sub-program, at page 38-39, pursuant to 220 ILCS 5/8-103B, Docket No. 22-0432/22-0442 (Cons.).

* The “Ex Ante Gross Savings” and “Verified Gross Savings” in row one (Electric Energy Savings - Direct) and row six (Summer Peak Demand Savings) exclude gross carryover savings from CY2021 and CY2022.

† The “Verified Net Savings” in row one and row six include net carryover savings from CY2021 and CY2022.

‡ The Electric Energy Savings - Direct includes primary kWh savings from efficient measures (includes efficiency savings from electrification measures but excludes the electrification savings), secondary kWh savings from wastewater treatment, and electric heating penalties.

§ Gas savings converted to kWh by multiplying Therms * 29.31 (which is based on 100,000 Btu/Therm and 3,412 Btu/kWh) and/or propane savings converted to kWh by multiplying Gallons * 26.77 (which is based on 91,333 Btu/Gallon and 3,412 Btu/kWh). The evaluation team will determine which other fuel savings will be converted to kWh and counted toward ComEd’s electric savings goal while producing the portfolio-wide Summary Report.

|| Electrification savings excluding direct efficiency savings. Calculated from net electric savings from increase in kWh consumption and decrease in gas consumption from electrification (kWh equivalent).

Total Electric Energy Savings is the sum of the Electric Energy Savings - Direct, the Electric Energy Savings Converted from Other Fuel, and the Electrification Savings. Note: This row does not include carryover gross savings, but the next one includes carryover verified gross savings, for the purpose of recalculating the gross realization rate resulting from including carryover savings (same for the peak demand savings).

*† The Peak Demand Savings are savings occurring at coincident Summer Peak period, defined as 1:00-5:00 PM Central Prevailing Time on non-holiday weekdays, June through August. This definition is in accordance with PJM requirement.

Note: The program-level NTG values are calculated as Verified Net/Verified Gross. The program-level analysis typically used measure-level deemed NTG values, which are listed here: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023>.

Source: Evaluation team analysis

Table 2. Incremental Electric Savings – Income Eligible

Savings Category	Units	Ex Ante Gross Savings*	Program Gross Realization Rate	Verified Gross Savings*	Program Net-to-Gross Ratio (NTG)	CY2021 Net Carryover Savings	CY2022 Net Carryover Savings	Verified Net Savings†
Electric Energy Savings - Direct‡ kWh		11,272,531	1.00	11,304,775	1.00		39,991	11,344,766
Electric Energy Savings - Converted from Other Fuels§	kWh	42,308,619	1.00	42,369,250	1.00			42,369,250
Electric Energy Savings - Electrification	kWh	2,198,063	1.00	2,193,550	1.00			2,193,550
Total Electric Energy Savings#	kWh	55,779,214	1.00	55,867,575	1.00		39,991	55,907,566
Total Electric Energy Savings Including Carryover#	kWh	55,779,214	1.00	55,907,566	1.00		39,991	55,907,566
Summer Peak*† Demand Savings	kW	2,511	1.00	2,510	1.00		5	2,515
Summer Peak*† Demand Savings Including Carryover	kW	2,511	1.00	2,515	1.00		5	2,515

Footnotes are defined similarly as found in Table 1.

Source: Evaluation team analysis

Table 3. Total Annual Incremental Electric Savings – Non-Income Eligible

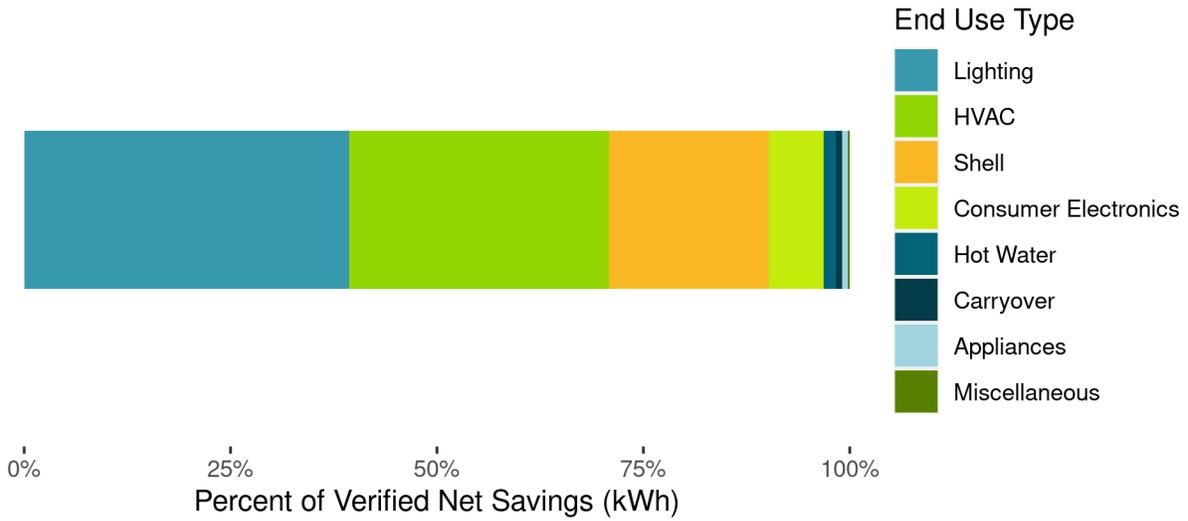
Savings Category	Units	Ex Ante Gross Savings*	Program Gross Realization Rate	Verified Gross Savings*	Program Net-to-Gross Ratio (NTG)	CY2021 Net Carryover Savings	CY2022 Net Carryover Savings	Verified Net Savings†
Electric Energy Savings - Direct‡	kWh	455,105	1.16	527,584	0.88		71,759	497,420
Electric Energy Savings - Converted from Other Fuels§	kWh	1,448,660	1.00	1,451,586	0.90			1,311,108
Electric Energy Savings - Electrification	kWh	0		0				0
Total Electric Energy Savings#	kWh	1,903,765	1.04	1,979,171	0.88		71,759	1,808,528
Total Electric Energy Savings Including Carryover#	kWh	1,903,765	1.09	2,072,365	0.87		71,759	1,808,528
Summer Peak*† Demand Savings	kW	97	1.00	97	0.88		10	96
Summer Peak*† Demand Savings Including Carryover	kW	97	1.13	109	0.88		10	96

Footnotes are defined similarly as found in Table 1.

Source: Evaluation team analysis

Figure 1 shows the electric energy savings by measure end use. It includes measure efficiency savings, carryover kWh, secondary water kWh, and electrification savings. It does not include other fuel savings converted to kWh.

Figure 1. Verified Net Savings by Measure – Electric



Source: Evaluation team analysis

Cumulative Persisting Annual Savings

Table 4 to Table 6 show the cumulative persisting annual savings (CPAS) for the measures installed in CY2023. The electric CPAS across all measures installed in 2023 is shown in Table 4. The gas and other fuel contribution to CPAS (converted to equivalent electricity) are shown in Table 5. The combined savings are shown in Table 6.

Table 4. CPAS – Electric

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh)†	CPAS Verified Net kWh Savings											
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
CY2023 Program Total Contribution to CPAS	14,105,892	163,855,612							14,035,736	14,015,688	14,015,688	13,864,089	13,807,002	13,703,269
Historic Program Total Contribution to CPAS‡			27,169,963	58,956,418	73,452,481	79,772,240	95,786,882	95,530,030	76,789,620	66,385,386	60,814,819	58,700,275	39,534,202	
Program Total CPAS	14,105,892	163,855,612	27,169,963	58,956,418	73,452,481	79,772,240	95,786,882	109,565,766	90,805,308	80,401,073	74,678,908	72,507,277	53,237,471	
CY2023 Program Incremental Expiring Savings§									20,049	0	151,599	57,087	103,734	
Historic Program Incremental Expiring Savings								256,852	18,740,410	10,404,235	5,570,567	2,114,544	19,166,072	
Program Total Incremental Expiring Savings#								256,852	18,760,458	10,404,235	5,722,165	2,171,631	19,269,806	

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh)†	CPAS Verified Net kWh Savings										
			2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
CY2023 Program Total Contribution to CPAS	14,105,892	163,855,612	13,548,921	12,535,103	7,041,616	7,039,442	5,940,711	5,089,155	5,079,134	5,068,295	5,045,003	4,480,571	2,548,109
Historic Program Total Contribution to CPAS‡			31,596,664	25,012,716	18,077,725	10,553,643	8,509,568	8,472,851	8,458,560	8,394,188	7,626,798	6,713,309	4,933,884
Program Total CPAS	14,105,892	163,855,612	45,145,585	37,547,819	25,119,341	17,593,085	14,450,279	13,562,005	13,537,694	13,462,483	12,671,801	11,193,880	7,481,993
CY2023 Program Incremental Expiring Savings§			154,347	1,013,818	5,493,487	2,174	1,098,731	851,557	10,021	10,839	23,292	564,432	1,932,462
Historic Program Incremental Expiring Savings			7,937,539	6,583,948	6,934,991	7,524,081	2,044,075	36,717	14,290	64,372	767,390	913,489	1,779,424
Program Total Incremental Expiring Savings#			8,091,886	7,597,766	12,428,478	7,526,256	3,142,806	888,274	24,311	75,211	790,682	1,477,921	3,711,887

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh)†	CPAS Verified Net kWh Savings										
			2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
CY2023 Program Total Contribution to CPAS	14,105,892	163,855,612	2,548,109	2,402,578	2,047,137	255	0	0	0	0	0	0	0
Historic Program Total Contribution to CPAS‡			4,167,639	2,232,065	614,445	499	0	0	0	0	0	0	0
Program Total CPAS	14,105,892	163,855,612	6,715,748	4,634,643	2,661,582	754	0	0	0	0	0	0	0
CY2023 Program Incremental Expiring Savings§			0	145,531	355,441	2,046,882	255	0	0	0	0	0	0
Historic Program Incremental Expiring Savings			766,245	1,935,574	1,617,620	613,946	499	0	0	0	0	0	0
Program Total Incremental Expiring Savings#			766,245	2,081,105	1,973,061	2,660,828	754	0	0	0	0	0	0

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

‡ Historical savings go back to CY2018.

§ Incremental expiring savings are equal to CPAS Yn-1 - CPAS Yn.

|| Historic incremental expiring savings are equal to Historic CPAS Yn-1 – Historic CPAS Yn.

Program total incremental expiring savings are equal to current year total incremental expiring savings plus historic total incremental expiring savings.

Source: Evaluation team analysis

Table 5. CPAS – Other Fuel (Gas + Propane)

Savings Category	Verified Gross Savings (Therms)	Lifetime Net Savings†	CPAS Verified Net Therms Savings											
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
CY2023 Program Total Other Fuel Contribution to CPAS (Therms)	1,495,081	26,450,820							1,490,289	1,490,289	1,490,289	1,464,241	1,463,743	1,443,543
CY2023 Program Total Other Fuel Contribution to CPAS (kWh Equivalent)‡	43,820,836	775,273,522							43,680,358	43,680,381	43,680,381	42,916,916	42,902,301	42,310,248
Historic Program Total Other Fuel Contribution to CPAS (kWh Equivalent)§			1,480,075	2,178,396	10,471,724	21,634,821	57,346,933	56,101,931	55,731,283	53,583,473	53,521,207	53,054,757	52,233,745	
Program Total Other Fuel CPAS (kWh Equivalent)	43,820,836	775,273,522	1,480,075	2,178,396	10,471,724	21,634,821	57,346,933	99,782,289	99,411,664	97,263,854	96,438,123	95,957,059	94,543,994	
CY2023 Program Incremental Expiring Other Fuel Savings (Therms)									-1	0	26,048	499	20,200	
CY2023 Program Incremental Expiring Other Fuel Savings (kWh Equivalent)									-23	0	763,465	14,615	592,053	
Historic Program Incremental Expiring Other Fuel Savings (kWh Equivalent)#									1,245,002	370,648	2,147,810	62,267	466,449	821,012
Program Total Incremental Expiring Other Fuel Savings (kWh Equivalent)*†									1,245,002	370,625	2,147,810	825,732	481,064	1,413,065

Savings Category	Verified Gross Savings (Therms)	Lifetime Net Savings†	CPAS Verified Net Therms Savings										
			2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
CY2023 Program Total Other Fuel Contribution to CPAS (Therms)	1,495,081	26,450,820	1,429,837	1,429,837	1,428,071	1,427,467	1,278,714	1,206,004	1,205,972	1,187,102	1,187,102	1,166,629	1,158,773
CY2023 Program Total Other Fuel Contribution to CPAS (kWh Equivalent)‡	43,820,836	775,273,522	41,908,529	41,908,529	41,856,750	41,839,070	37,479,093	35,347,965	35,347,037	34,793,966	34,793,966	34,193,891	33,963,648
Historic Program Total Other Fuel Contribution to CPAS (kWh Equivalent)§			52,166,478	50,723,204	50,108,903	42,752,106	40,095,459	39,212,104	38,091,947	38,054,367	37,392,271	36,996,989	36,569,770
Program Total Other Fuel CPAS (kWh Equivalent)	43,820,836	775,273,522	94,075,007	92,631,733	91,965,653	84,591,177	77,574,552	74,560,069	73,438,985	72,848,333	72,186,236	71,190,880	70,533,418
CY2023 Program Incremental Expiring Other Fuel Savings (Therms)			13,706	0	1,767	603	148,754	72,710	32	18,870	0	20,473	7,855
CY2023 Program Incremental Expiring Other Fuel Savings (kWh Equivalent)			401,719	0	51,780	17,679	4,359,978	2,131,128	927	553,071	0	600,075	230,243
Historic Program Incremental Expiring Other Fuel Savings (kWh Equivalent)#			67,268	1,443,274	614,301	7,356,797	2,656,647	883,355	1,120,157	37,580	662,097	395,282	427,219
Program Total Incremental Expiring Other Fuel Savings (kWh Equivalent)*†			468,986	1,443,274	666,080	7,374,476	7,016,625	3,014,483	1,121,084	590,651	662,097	995,356	657,462

Savings Category	Verified Gross Savings (Therms)	Lifetime Net Savings†	CPAS Verified Net Therms Savings										
			2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
CY2023 Program Total Other Fuel Contribution to CPAS (Therms)	1,495,081	26,450,820	1,158,773	1,158,773	1,158,773	5,319	5,319	5,319	5,319	5,319	0	0	0
CY2023 Program Total Other Fuel Contribution to CPAS (kWh Equivalent)‡	43,820,836	775,273,522	33,963,648	33,963,648	33,963,648	155,910	155,910	155,910	155,910	155,910	0	0	0
Historic Program Total Other Fuel Contribution to CPAS (kWh Equivalent)§			29,143,940	19,277,890	630,389	242,093	220,432	213,055	206,238	0	0	0	0
Program Total Other Fuel CPAS (kWh Equivalent)	43,820,836	775,273,522	63,107,588	53,241,538	34,594,037	398,003	376,342	368,964	362,148	155,910	0	0	0
CY2023 Program Incremental Expiring Other Fuel Savings (Therms)			0	0	0	1,153,454	0	0	0	0	5,319	0	0
CY2023 Program Incremental Expiring Other Fuel Savings (kWh Equivalent)			0	0	0	33,807,738	0	0	0	0	155,910	0	0
Historic Program Incremental Expiring Other Fuel Savings (kWh Equivalent)#			7,425,830	9,866,050	18,647,501	388,296	21,661	7,377	6,817	206,238	0	0	0
Program Total Incremental Expiring Other Fuel Savings (kWh Equivalent)*†			7,425,830	9,866,050	18,647,501	34,196,034	21,661	7,377	6,817	206,238	155,910	0	0

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

‡ Fossil fuel savings (from natural gas, propane, etc.) are reported in therms. kWh equivalent savings are calculated by multiplying therms savings by 29.31.

§ Historical savings go back to CY2018.

|| Incremental expiring savings are equal to CPAS Yn-1 - CPAS Yn.

Historic incremental expiring savings are equal to Historic CPAS Yn-1 – Historic CPAS Yn.

*† Program total incremental expiring savings are equal to current year total incremental expiring savings plus historic total incremental expiring savings.

Source: Evaluation team analysis

Table 6. CPAS – Total

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) [†]	CPAS Verified Net kWh Savings											
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
CY2023 Program Total Contribution to CPAS	57,926,728	939,129,134							57,716,094	57,696,069	57,696,069	56,781,005	56,709,303	56,013,517
Historic Program Total Contribution to CPAS [‡]			28,650,038	61,134,814	83,924,204	101,407,062	153,133,815	151,631,961	132,520,904	119,968,859	114,336,025	111,755,032	91,767,948	
Program Total CPAS	57,926,728	939,129,134	28,650,038	61,134,814	83,924,204	101,407,062	153,133,815	209,348,055	190,216,972	177,664,928	171,117,030	168,464,336	147,781,464	
CY2023 Program Incremental Expiring Savings [§]									20,026	0	915,064	71,702	695,787	
Historic Program Incremental Expiring Savings								1,501,854	19,111,057	12,552,045	5,632,834	2,580,993	19,987,084	
Program Total Incremental Expiring Savings [#]								1,501,854	19,131,083	12,552,045	6,547,897	2,652,695	20,682,871	

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) [†]	CPAS Verified Net kWh Savings										
			2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
CY2023 Program Total Contribution to CPAS	57,926,728	939,129,134	55,457,451	54,443,633	48,898,366	48,878,512	43,419,804	40,437,119	40,426,171	39,862,261	39,838,969	38,674,462	36,511,757
Historic Program Total Contribution to CPAS [‡]			83,763,141	75,735,919	68,186,628	53,305,750	48,605,027	47,684,955	46,550,508	46,448,556	45,019,068	43,710,298	41,503,654
Program Total CPAS	57,926,728	939,129,134	139,220,592	130,179,552	117,084,994	102,184,262	92,024,832	88,122,074	86,976,679	86,310,816	84,858,037	82,384,760	78,015,411
CY2023 Program Incremental Expiring Savings [§]			556,066	1,013,818	5,545,267	19,854	5,458,708	2,982,685	10,948	563,910	23,292	1,164,507	2,162,705
Historic Program Incremental Expiring Savings			8,004,806	8,027,222	7,549,291	14,880,878	4,700,722	920,072	1,134,447	101,952	1,429,487	1,308,771	2,206,644
Program Total Incremental Expiring Savings [#]			8,560,872	9,041,040	13,094,558	14,900,732	10,159,431	3,902,757	1,145,395	665,863	1,452,779	2,473,277	4,369,349

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) [†]	CPAS Verified Net kWh Savings										
			2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
CY2023 Program Total Contribution to CPAS	57,926,728	939,129,134	36,511,757	36,366,226	36,010,785	156,165	155,910	155,910	155,910	155,910	0	0	0
Historic Program Total Contribution to CPAS [‡]			33,311,579	21,509,955	1,244,834	242,592	220,432	213,055	206,238	0	0	0	0
Program Total CPAS	57,926,728	939,129,134	69,823,336	57,876,181	37,255,619	398,756	376,342	368,964	362,148	155,910	0	0	0
CY2023 Program Incremental Expiring Savings [§]			0	145,531	355,441	35,854,620	255	0	0	0	155,910	0	0
Historic Program Incremental Expiring Savings			8,192,075	11,801,624	20,265,121	1,002,242	22,160	7,377	6,817	206,238	0	0	0
Program Total Incremental Expiring Savings [#]			8,192,075	11,947,155	20,620,562	36,856,863	22,414	7,377	6,817	206,238	155,910	0	0

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

[‡] Historical savings go back to CY2018.

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

^{||} Historic incremental expiring savings are equal to Historic CPAS Y_{n-1} – Historic CPAS Y_n.

[#] Program total incremental expiring savings are equal to current year total incremental expiring savings plus historic total incremental expiring savings.

Source: Evaluation team analysis