



# **ComEd Heat Pump Water Heater Pilot Program Impact Evaluation Report**

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

**Prepared for:**

**ComEd**

**FINAL**

**April 23, 2024**

Prepared by:  
Ryan Wall  
Guidehouse

[guidehouse.com](https://www.guidehouse.com)

**Submitted to:**

ComEd  
2011 Swift Drive  
Oak Brook, IL 60523

**Submitted by:**

Guidehouse Inc.  
150 N. Riverside Plaza, Suite 2100  
Chicago, IL 60606

**Contact:**

Charles Maglione, Partner  
703.431.1983  
[cmaglione@guidehouse.com](mailto:cmaglione@guidehouse.com)

Jeff Erickson, Director  
608.616.4962  
[jeff.erickson@guidehouse.com](mailto:jeff.erickson@guidehouse.com)

Ryan Wall, Senior Consultant  
518.318.3289  
[rwall@guidehouse.com](mailto:rwall@guidehouse.com)

This report was prepared by Guidehouse for ComEd. The work presented in this report represents Guidehouse's professional judgment based on the information available at the time this report was prepared. Use of this report by any other party for whatever purpose should not, and does not, absolve such party from using due diligence in verifying the report's contents. Neither Guidehouse nor any of its subsidiaries or affiliates assumes any liability or duty of care to such parties, and hereby disclaims any such liability.

## Table of Contents

<b>Introduction .....</b>	<b>1</b>
<b>Program Savings Detail .....</b>	<b>1</b>
<b>Cumulative Persisting Annual Savings .....</b>	<b>4</b>

## List of Tables and Figures

Table 1. Total Annual Incremental Electric Savings - Total.....	1
Table 2. CPAS – Electric.....	4
Table 3. CPAS – Other Fuel (Gas + Propane) .....	4
Table 4. CPAS – Total .....	5

## Introduction

This report presents the results of the impact evaluation of the Heat Pump Water Heater pilot from the program year from January 1 to December 31, 2023 (CY2023). The program was designed to examine heat pump water heater (HPWH) technology and market to better understand potential energy savings, customer experiences, and supply chain implications. The pilot looks to install 50 HPWHs across various income levels and fuel types for residential customers. Energy savings goals are not the main focus of this pilot. ComEd seeks to understand the market actors and customer experience when installing HPWHs.

## Program Savings Detail

Table 1 summarizes the incremental energy and demand savings the Heat Pump Water Heater pilot 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, either via joint or non-joint programs.<sup>1</sup> The electrification savings are those resulting from electrification measures.<sup>2</sup>

**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	23,465	1.09	25,545	0.8			20,436
Electric Energy Savings - Converted from Other Fuels§	kWh			-631	0.8			-505
Electric Energy Savings - Electrification	kWh	117,356		110,386	0.8/1.0			90,682
Total Electric Energy Savings#	kWh	140,821	0.96	135,300	0.8			110,614
Total Electric Energy Savings Including Carryover#	kWh				0.8			
Summer Peak** Demand Savings	kW	7	0.16	1	0.8			1
Summer Peak** Demand Savings Including Carryover	kW				0.8			

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

\* 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 (excludes carryover savings as they don’t apply to this program).

‡ 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

<sup>1</sup> 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.”

<sup>2</sup> 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.”

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: Given the timing and small number of participants, it was not reasonable to complete independent primary research with pilot participants. By policy, programs without researched NTG values are assigned a NTG of 0.80. Therefore, the evaluation team assigned an NTG value of 0.80 for the pilot program in CY2023.

Source: *Evaluation team analysis*

## Cumulative Persisting Annual Savings

Table 2 to Table 4 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 2. The gas and other fuel contribution to CPAS (converted to equivalent electricity) are shown in Table 3. The combined savings are shown in Table 4.

**Table 2. CPAS – Electric**

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) <sup>†</sup>	CPAS Verified Net kWh Savings											
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
CY2023 Program Total Contribution to CPAS	135,931	1,666,781							111,119	111,119	111,119	111,119	111,119	111,119
Historic Program Total Contribution to CPAS <sup>‡</sup>								24,782	24,782	24,782	24,782	24,782	24,782	24,782
Program Total CPAS	135,931	1,666,781	0	0	0	0	24,782	135,901	135,901	135,901	135,901	135,901	135,901	135,901
CY2023 Program Incremental Expiring Savings <sup>§</sup>										0	0	0	0	0
Historic Program Incremental Expiring Savings <sup>  </sup>									0	0	0	0	0	0
Program Total Incremental Expiring Savings <sup>#</sup>									0	0	0	0	0	0

  

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) <sup>†</sup>	CPAS Verified Net kWh Savings											
			2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
CY2023 Program Total Contribution to CPAS	135,931	1,666,781	111,119	111,119	111,119	111,119	111,119	111,119	111,119	111,119	111,119	111,119	0	0
Historic Program Total Contribution to CPAS <sup>‡</sup>			24,782	24,782	24,782	24,782	24,782	24,782	24,782	24,782	24,782	24,782		
Program Total CPAS	135,931	1,666,781	135,901	135,901	135,901	135,901	135,901	135,901	135,901	135,901	135,901	111,119	0	0
CY2023 Program Incremental Expiring Savings <sup>§</sup>			0	0	0	0	0	0	0	0	0	0	111,119	0
Historic Program Incremental Expiring Savings <sup>  </sup>			0	0	0	0	0	0	0	0	0	24,782	0	0
Program Total Incremental Expiring Savings <sup>#</sup>			0	0	0	0	0	0	0	0	0	24,782	111,119	0

<sup>†</sup> Lifetime savings are the sum of CPAS savings through the EUL.

<sup>‡</sup> Historical savings go back to CY2018.

<sup>§</sup> Incremental expiring savings are equal to CPAS Y<sub>n-1</sub> - CPAS Y<sub>n</sub>.

<sup>||</sup> Historic incremental expiring savings are equal to Historic CPAS Y<sub>n-1</sub> – Historic CPAS Y<sub>n</sub>.

<sup>#</sup> 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 3. CPAS – Other Fuel (Gas + Propane)**

Savings Category	Verified Gross Savings (Therms)	Lifetime Net Savings <sup>†</sup>	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)	-22	-258									-17	-17	-17	-17
CY2023 Program Total Other Fuel Contribution to CPAS (kWh Equivalent) <sup>‡</sup>	-631	-7,576									-505	-505	-505	-505
Historic Program Total Other Fuel Contribution to CPAS (kWh Equivalent) <sup>§</sup>									-204	-204	-204	-204	-204	-204
Program Total Other Fuel CPAS (kWh Equivalent)	-631	-7,576	0	0	0	0	0	-204	-709	-709	-709	-709	-709	-709
CY2023 Program Incremental Expiring Other Fuel Savings (Therms)										0	0	0	0	0
CY2023 Program Incremental Expiring Other Fuel Savings (kWh Equivalent) <sup>  </sup>										0	0	0	0	0
Historic Program Incremental Expiring Other Fuel Savings (kWh Equivalent) <sup>#</sup>									0	0	0	0	0	0
Program Total Incremental Expiring Other Fuel Savings (kWh Equivalent) <sup>*†</sup>									0	0	0	0	0	0

Savings Category	Verified Gross Savings (Therms)	Lifetime Net Savings <sup>†</sup>	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)	-22	-258	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	-17	0
CY2023 Program Total Other Fuel Contribution to CPAS (kWh Equivalent) <sup>‡</sup>	-631	-7,576	-505	-505	-505	-505	-505	-505	-505	-505	-505	-505	-505	0
Historic Program Total Other Fuel Contribution to CPAS (kWh Equivalent) <sup>§</sup>			-204	-204	-204	-204	-204	-204	-204	-204	-204	-204		
Program Total Other Fuel CPAS (kWh Equivalent)	-631	-7,576	-709	-709	-709	-709	-709	-709	-709	-709	-709	-505	0	0
CY2023 Program Incremental Expiring Other Fuel Savings (Therms)			0	0	0	0	0	0	0	0	0	0	-17	0
CY2023 Program Incremental Expiring Other Fuel Savings (kWh Equivalent) <sup>  </sup>			0	0	0	0	0	0	0	0	0	0	-505	0
Historic Program Incremental Expiring Other Fuel Savings (kWh Equivalent) <sup>#</sup>			0	0	0	0	0	0	0	0	0	-204	0	0
Program Total Incremental Expiring Other Fuel Savings (kWh Equivalent) <sup>*†</sup>			0	0	0	0	0	0	0	0	0	-204	-505	0

<sup>†</sup> Lifetime savings are the sum of CPAS savings through the EUL.

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

<sup>§</sup> Historical savings go back to CY2018.

<sup>||</sup> Incremental expiring savings are equal to CPAS Y<sub>n-1</sub> - CPAS Y<sub>n</sub>.

<sup>#</sup> Historic incremental expiring savings are equal to Historic CPAS Y<sub>n-1</sub> – Historic CPAS Y<sub>n</sub>.

<sup>\*†</sup> 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 4. CPAS – Total**

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) <sup>†</sup>	CPAS Verified Net kWh Savings											
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
CY2023 Program Total Contribution to CPAS	135,300	1,659,205							110,614	110,614	110,614	110,614	110,614	110,614
Historic Program Total Contribution to CPAS <sup>‡</sup>								24,578	24,578	24,578	24,578	24,578	24,578	24,578
Program Total CPAS	135,300	1,659,205	0	0	0	0	24,578	135,192	135,192	135,192	135,192	135,192	135,192	135,192
CY2023 Program Incremental Expiring Savings <sup>§</sup>										0	0	0	0	0
Historic Program Incremental Expiring Savings <sup>  </sup>									0	0	0	0	0	0
Program Total Incremental Expiring Savings <sup>#</sup>									0	0	0	0	0	0

Savings Category	Verified Gross Savings (kWh)	Lifetime Net Savings (kWh) <sup>†</sup>	CPAS Verified Net kWh Savings											
			2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
CY2023 Program Total Contribution to CPAS	135,300	1,659,205	110,614	110,614	110,614	110,614	110,614	110,614	110,614	110,614	110,614	110,614	0	0
Historic Program Total Contribution to CPAS <sup>‡</sup>			24,578	24,578	24,578	24,578	24,578	24,578	24,578	24,578	24,578	24,578		
Program Total CPAS	135,300	1,659,205	135,192	135,192	135,192	135,192	135,192	135,192	135,192	135,192	135,192	110,614	0	0
CY2023 Program Incremental Expiring Savings <sup>§</sup>			0	0	0	0	0	0	0	0	0	0	110,614	0
Historic Program Incremental Expiring Savings <sup>  </sup>			0	0	0	0	0	0	0	0	0	24,578	0	0
Program Total Incremental Expiring Savings <sup>#</sup>			0	0	0	0	0	0	0	0	0	24,578	110,614	0

<sup>†</sup> Lifetime savings are the sum of CPAS savings through the EUL.

<sup>‡</sup> Historical savings go back to CY2018.

<sup>§</sup> Incremental expiring savings are equal to CPAS Y<sub>n-1</sub> - CPAS Y<sub>n</sub>.

<sup>||</sup> Historic incremental expiring savings are equal to Historic CPAS Y<sub>n-1</sub> – Historic CPAS Y<sub>n</sub>.

<sup>#</sup> Program total incremental expiring savings are equal to current year total incremental expiring savings plus historic total incremental expiring savings.

Source: Evaluation team analysis