Guidehouse

ComEd Manufactured Housing Retrofit Impact Evaluation Report

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

Presented to
ComEd

FINAL

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ComEd Manufactured Housing Retrofit Impact Evaluation Report

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1. Introduction

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

2. Program Description

The MHR Program offers an evaluation of the mechanical system and envelope of the home and ductwork, and direct installation of energy efficient measures in manufactured homes. Eligible measures include lighting retrofits, thermostats, air and duct sealing, low-flow showerheads and aerators, pipe insulation, belly insulation, electronically commutated furnace blower motors, advanced power strips, efficient refrigerator installation and refrigerator recycling. The program was created to target underserved populations.,

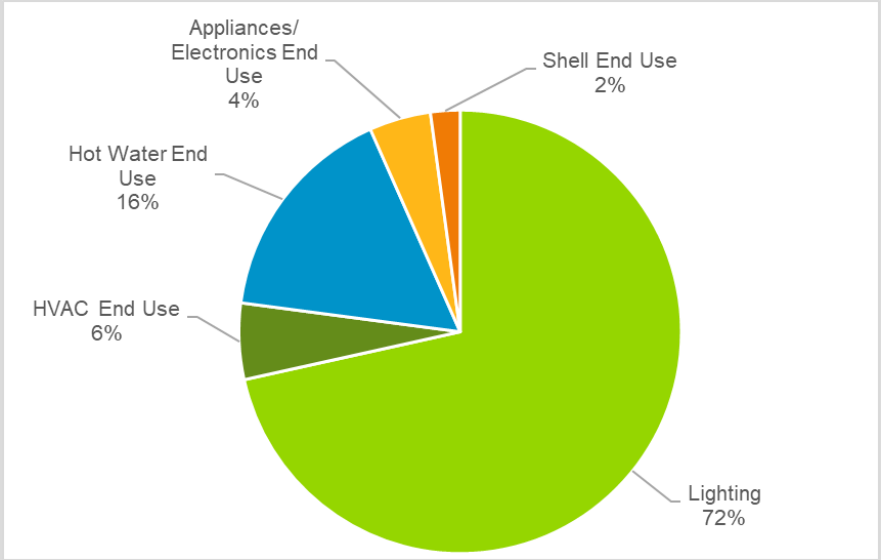
The MHR Program promotes electric and natural gas savings that are solely claimed by ComEd. The program was first offered in CY2019. The program served 318 participants and distributed 5,888 measures in its first year as shown in the following table and graph. Lighting measures made up most installed measures.

Table 2-1. CY2019 Volumetric Findings Detail

Participation	Quantity
Participants	318
Total Measures	5,888

Source: ComEd tracking data and evaluation team analysis

Figure 2-1. Number of Measures Installed by End Use



Source: ComEd tracking data and evaluation team analysis

3. Program Savings Detail

Table 3-1 summarizes the incremental energy and demand savings the MHR Program achieved in CY2019. The gas savings are only those that ComEd may be able to claim, which excludes savings the gas utilities claim, either via joint or non-joint programs.[1] The total verified energy savings were 903,336 kWh.

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

Table 3-1. CY2019 Total Annual Incremental Electric Savings

Savings Category	Energy Savings (kWh)	Non-Coincident Demand Savings (kW)	Summer Peak* Demand Savings (kW)
Electricity			
Ex Ante Gross Savings	336,477	NR	66
Program Gross Realization Rate	0.98	NA	0.88
Verified Gross Savings	330,700	787	58
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	330,700	787	58
Converted from Gas†			
Ex Ante Gross Savings	558,410	NA	NA
Program Gross Realization Rate	1.03	NA	NA
Verified Gross Savings	572,636	NA	NA
Program Net-to-Gross Ratio (NTG)	1.00	NA	NA
Verified Net Savings	572,636	NA	NA
Total Electric Plus Gas			
Ex Ante Gross Savings	894,887	NR	66
Program Gross Realization Rate	1.01	NA	0.88
Verified Gross Savings	903,336	787	58
Program Net-to-Gross Ratio (NTG)	1.00	1.00	1.00
Verified Net Savings	903,336	787	58

NR = Not reported
NA = Not applicable
* The coincident summer peak period is defined as 1:00-5:00 p.m. Central Prevailing Time on non-holiday weekdays, June through August.
† Gas savings converted to kWh by multiplying therms * 29.31 (which is based on 100,000 Btu/therm and 3,412 Btu/kWh). The evaluation will determine which gas savings will be converted to kWh and counted toward ComEd's electric savings goal while producing the portfolio-wide Summary Report. According to Section 8-103B(b-25) of the Illinois Public Utilities Act, "In no event shall more than 10% of each year's applicable annual incremental goal as defined in paragraph (7) of subsection (g) of this Section be met through savings of fuels other than electricity."
Source: ComEd tracking data and evaluation team analysis

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 MHR Program and the cumulative persisting annual savings (CPAS) for the measures installed in CY2019. The electric CPAS across all measures installed in 2019 is 330,700 kWh (Table **4-1**). The CY2019 gas contribution to CPAS (converted to equivalent electricity) is 572,636 kWh (Table **4-2**). Adding the gas and electric contributions produces 903,336 kWh of total CY2019 contribution to CPAS (Table **4-3**). The “historic” rows in each table are the CPAS contribution back to CY2018. The “Program Total Electric CPAS” and the “Program Total Gas CPAS” are the sum of the CY2019 contribution and the historic contribution.

All lighting measures received adjusted savings in the CPAS calculation as outlined by the Illinois Technical Reference Manual v7.0 (TRM). Duct Insulation and Sealing, Air Sealing, and Belly Insulation all received midlife adjustments to the efficiencies of HVAC equipment, creating less savings in the second half of their effective useful lives.

Table 4-1. Cumulative Persisting Annual Savings (CPAS) – Electric

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	LED - 9 W	10.0	98,158	1.00	409,121		98,158	98,158	26,601	26,601	26,601	26,601	26,601	26,601
HVAC	ECM Furnace Blower Motor	15.0	34,899	1.00	523,483		34,899	34,899	34,899	34,899	34,899	34,899	34,899	34,899
Hot Water	Showerhead 1.5 GPM	10.0	28,200	1.00	282,000		28,200	28,200	28,200	28,200	28,200	28,200	28,200	28,200
Electronics	Advanced Power Strip	7.0	24,308	1.00	170,156		24,308	24,308	24,308	24,308	24,308	24,308	24,308	
Hot Water	Kitchen Aerator	10.0	22,601	1.00	226,013		22,601	22,601	22,601	22,601	22,601	22,601	22,601	22,601
Lighting	LED - 4.7 W Candelabra	10.0	22,501	1.00	121,619		22,501	22,501	22,501	22,501	22,501	1,823	1,823	1,823
HVAC	Duct Insulation & Sealing	20.0	22,025	1.00	423,289		22,025	22,025	22,025	22,025	22,025	22,025	22,025	22,025
Appliances	Refrigerator + Recycling	17.0	14,953	1.00	103,849		14,953	14,953	14,953	14,953	14,953	14,953	1,285	1,285
Lighting	LED - 5 W Globe G25 Bulb	10.0	13,653	1.00	77,376		13,653	13,653	13,653	13,653	13,653	1,823	1,823	1,823
HVAC	Programmable Thermostat	8.0	11,244	1.00	89,948		11,244	11,244	11,244	11,244	11,244	11,244	11,244	11,244
HVAC	Smart Thermostat	11.0	9,243	1.00	101,674		9,243	9,243	9,243	9,243	9,243	9,243	9,243	9,243
Shell	Air Sealing	20.0	9,226	1.00	177,444		9,226	9,226	9,226	9,226	9,226	9,226	9,226	9,226
Hot Water	Bath Aerator	10.0	8,946	1.00	89,463		8,946	8,946	8,946	8,946	8,946	8,946	8,946	8,946
Lighting	LED - 13 W	10.0	5,620	1.00	25,986		5,620	5,620	1,843	1,843	1,843	1,843	1,843	1,843
Hot Water	Pipe Wrap Insulation	15.0	1,759	1.00	26,378		1,759	1,759	1,759	1,759	1,759	1,759	1,759	1,759
Lighting	LED - 16.2 W Flood Light PAR 30	6.1	1,269	1.00	6,541		1,269	1,269	1,269	1,269	1,269	178	18	
Lighting	LED - 16.2 W Dimmable	10.0	833	1.00	5,106		833	833	833	833	833	188	188	188
Lighting	LED - 15 W Flood Light PAR 38	6.1	504	1.00	2,603		504	504	504	504	504	77	8	
Lighting	LED - 15 W	10.0	363	1.00	1,678		363	363	119	119	119	119	119	119
Shell	Belly Insulation	20.0	315	1.00	6,239		315	315	315	315	315	315	315	315
Hot Water	Water Heater Temperature Setback	2.0	82	1.00	163		82	82						
CY2019 Program Total Electric Contribution to CPAS			330,700		2,870,129		330,700	330,700	255,041	255,041	255,041	220,370	206,472	182,139
Historic Program Total Electric Contribution to CPAS‡														
Program Total Electric CPAS						-	330,700	330,700	255,041	255,041	255,041	220,370	206,472	182,139
CY2019 Program Incremental Expiring Electric Savings§								-	75,659	-	-	34,671	13,897	24,333
Historic Program Incremental Expiring Electric Savings‡§							-	-	-	-	-	-	-	-
Program Total Incremental Expiring Electric Savings§							-	-	75,659	-	-	34,671	13,897	24,333

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Lighting	LED - 9 W	26,601	26,601												
HVAC	ECM Furnace Blower Motor	34,899	34,899	34,899	34,899	34,899	34,899	34,899							
Hot Water	Showerhead 1.5 GPM	28,200	28,200												
Electronics	Advanced Power Strip														
Hot Water	Kitchen Aerator	22,601	22,601												
Lighting	LED - 4.7 W Candelabra	1,823	1,823												
HVAC	Duct Insulation & Sealing	22,025	22,025	20,304	20,304	20,304	20,304	20,304	20,304	20,304	20,304	20,304	20,304		
Appliances	Refrigerator + Recycling	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285					
Lighting	LED - 5 W Globe G25 Bulb	1,823	1,823												
HVAC	Programmable Thermostat														
HVAC	Smart Thermostat	9,243	9,243	9,243											
Shell	Air Sealing	9,226	9,226	8,519	8,519	8,519	8,519	8,519	8,519	8,519	8,519	8,519	8,519		
Hot Water	Bath Aerator	8,946	8,946												
Lighting	LED - 13 W	1,843	1,843												
Hot Water	Pipe Wrap Insulation	1,759	1,759	1,759	1,759	1,759	1,759	1,759							
Lighting	LED - 16.2 W Flood Light PAR 30														
Lighting	LED - 16.2 W Dimmable	188	188												
Lighting	LED - 15 W Flood Light PAR 38														
Lighting	LED - 15 W	119	119												
Shell	Belly Insulation	315	315	309	309	309	309	309	309	309	309	309	309		
Hot Water	Water Heater Temperature Setback														
CY2019 Program Total Electric Contribution to CPAS		170,895	170,895	76,316	67,073	67,073	67,073	67,073	30,416	30,416	29,131	29,131	29,131	-	-
Historic Program Total Electric Contribution to CPAS‡															
Program Total Electric CPAS		170,895	170,895	76,316	67,073	67,073	67,073	67,073	30,416	30,416	29,131	29,131	29,131	-	-
CY2019 Program Incremental Expiring Electric Savings§		11,244	-	94,579	9,243	-	-	-	36,657	-	1,285	-	-	29,131	-
Historic Program Incremental Expiring Electric Savings‡§		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Electric Savings§		11,244	-	94,579	9,243	-	-	-	36,657	-	1,285	-	-	29,131	-

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

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

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

‡ Historical savings go back to CY2018

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

Source: Evaluation team analysis

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

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (Therms)	NTG*	Lifetime Net Savings (Therms)†	Verified Net Therms Savings 2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	LED - 9 W	10.0	-	1.00	-		-							
HVAC	ECM Furnace Blower Motor	15.0	-	1.00	-		-	-	-	-	-	-	-	-
Hot Water	Showerhead 1.5 GPM	10.0	1,394	1.00	13,942		1,394	1,394	1,394	1,394	1,394	1,394	1,394	1,394
Electronics	Advanced Power Strip	7.0	-	1.00	-		-							
Hot Water	Kitchen Aerator	10.0	910	1.00	9,100		910	910	910	910	910	910	910	910
Lighting	LED - 4.7 W Candelabra	10.0	-	1.00	-		-							
HVAC	Duct Insulation & Sealing	20.0	8,463	1.00	162,077		8,463	8,463	8,463	8,463	8,463	8,463	8,463	8,463
Appliances	Refrigerator + Recycling	17.0	-	1.00	-		-							
Lighting	LED - 5 W Globe G25 Bulb	10.0	-	1.00	-		-							
HVAC	Programmable Thermostat	8.0	4,086	1.00	32,685		4,086	4,086	4,086	4,086	4,086	4,086	4,086	4,086
HVAC	Smart Thermostat	11.0	1,537	1.00	16,902		1,537	1,537	1,537	1,537	1,537	1,537	1,537	1,537
Shell	Air Sealing	20.0	2,543	1.00	49,363		2,543	2,543	2,543	2,543	2,543	2,543	2,543	2,543
Hot Water	Bath Aerator	10.0	417	1.00	4,169		417	417	417	417	417	417	417	417
Lighting	LED - 13 W	10.0	-	1.00	-		-							
Hot Water	Pipe Wrap Insulation	15.0	88	1.00	1,315		88	88	88	88	88	88	88	88
Lighting	LED - 16.2 W Flood Light PAR 30	6.1	-	1.00	-		-							
Lighting	LED - 16.2 W Dimmable	10.0	-	1.00	-		-							
Lighting	LED - 15 W Flood Light PAR 38	6.1	-	1.00	-		-							
Lighting	LED - 15 W	10.0	-	1.00	-		-							
Shell	Belly Insulation	20.0	51	1.00	989		51	51	51	51	51	51	51	51
Hot Water	Water Heater Temperature Setback	2.0	49	1.00	98		49	49						
CY2019 Program Total Gas Contribution to CPAS (Therms)			19,537		290,641		19,537	19,537	19,488	19,488	19,488	19,488	19,488	19,488
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡					8,518,677		572,636	572,636	571,202	571,202	571,202	571,202	571,202	571,202
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§														
Program Total Gas CPAS (kWh Equivalent)‡						-	572,636	572,636	571,202	571,202	571,202	571,202	571,202	571,202
CY2019 Program Incremental Expiring Gas Savings (Therms)‖								-	49	-	-	-	-	-
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡‖								-	1,435	-	-	-	-	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§‖							-	-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡‖							-	-	1,435	-	-	-	-	-

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Lighting	LED - 9 W														
HVAC	ECM Furnace Blower Motor	-	-												
Hot Water	Showerhead 1.5 GPM	1,394	1,394												
Electronics	Advanced Power Strip														
Hot Water	Kitchen Aerator	910	910												
Lighting	LED - 4.7 W Candelabra														
HVAC	Duct Insulation & Sealing	8,463	8,463	7,744	7,744	7,744	7,744	7,744	7,744	7,744	7,744	7,744	7,744		
Appliances	Refrigerator + Recycling														
Lighting	LED - 5 W Globe G25 Bulb														
HVAC	Programmable Thermostat														
HVAC	Smart Thermostat	1,537	1,537	1,537											
Shell	Air Sealing	2,543	2,543	2,393	2,393	2,393	2,393	2,393	2,393	2,393	2,393	2,393	2,393		
Hot Water	Bath Aerator	417	417												
Lighting	LED - 13 W														
Hot Water	Pipe Wrap Insulation	88	88	88	88	88	88	88							
Lighting	LED - 16.2 W Flood Light PAR 30														
Lighting	LED - 16.2 W Dimmable														
Lighting	LED - 15 W Flood Light PAR 38														
Lighting	LED - 15 W														
Shell	Belly Insulation	51	51	48	48	48	48	48	48	48	48	48	48		
Hot Water	Water Heater Temperature Setback														
CY2019 Program Total Gas Contribution to CPAS (Therms)		15,403	15,403	11,810	10,273	10,273	10,273	10,273	10,186	10,186	10,186	10,186	10,186	-	-
CY2019 Program Total Gas Contribution to CPAS (kWh Equivalent)‡		451,451	451,451	346,146	301,111	301,111	301,111	301,111	298,541	298,541	298,541	298,541	298,541	-	-
Historic Program Total Gas Contribution to CPAS (kWh Equivalent)‡§															
Program Total Gas CPAS (kWh Equivalent)‡		451,451	451,451	346,146	301,111	301,111	301,111	301,111	298,541	298,541	298,541	298,541	298,541	-	-
CY2019 Program Incremental Expiring Gas Savings (Therms)||		4,086	-	3,593	1,537	-	-	-	88	-	-	-	-	10,186	-
CY2019 Program Incremental Expiring Gas Savings (kWh Equivalent)‡||		119,751	-	105,305	45,035	-	-	-	2,570	-	-	-	-	298,541	-
Historic Program Incremental Expiring Gas Savings (kWh Equivalent)‡§||		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Gas Savings (kWh Equivalent)‡||		119,751	-	105,305	45,035	-	-	-	2,570	-	-	-	-	298,541	-

Note: The green highlighted cell shows program total first year gas savings in kWh equivalents. The gray cells are blank, indicating no values or do not contribute to calculating CPAS in CY2019.
* A deemed value. Source: is to be found on the Illinois SAG web site here: https://www.ilsag.info/ntg_2019.
† Lifetime savings are the sum of CPAS savings through the EUL.
‡ kWh equivalent savings are calculated by multiplying therm savings by 29.31.
§ Historic savings go back to CY2018.
|| Incremental expiring savings are equal to CPAS Yn-1 - CPAS Y_n.
Source: Evaluation team analysis

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

End Use Type	Research Category	EUL	CY2019 Verified Gross Savings (kWh)	NTG*	Lifetime Net Savings (kWh)†	Verified Net kWh Savings (Including Those Converted from Gas Savings)								
						2018	2019	2020	2021	2022	2023	2024	2025	2026
Lighting	LED - 9 W	10.0	98,158	1.00	409,121		98,158	98,158	26,601	26,601	26,601	26,601	26,601	26,601
HVAC	ECM Furnace Blower Motor	15.0	34,899	1.00	523,483		34,899	34,899	34,899	34,899	34,899	34,899	34,899	34,899
Hot Water	Showerhead 1.5 GPM	10.0	69,065	1.00	690,648		69,065	69,065	69,065	69,065	69,065	69,065	69,065	69,065
Electronics	Advanced Power Strip	7.0	24,308	1.00	170,156		24,308	24,308	24,308	24,308	24,308	24,308	24,308	-
Hot Water	Kitchen Aerator	10.0	49,273	1.00	492,727		49,273	49,273	49,273	49,273	49,273	49,273	49,273	49,273
Lighting	LED - 4.7 W Candelabra	10.0	22,501	1.00	121,619		22,501	22,501	22,501	22,501	22,501	1,823	1,823	1,823
HVAC	Duct Insulation & Sealing	20.0	270,088	1.00	5,173,772		270,088	270,088	270,088	270,088	270,088	270,088	270,088	270,088
Appliances	Refrigerator + Recycling	17.0	14,953	1.00	103,849		14,953	14,953	14,953	14,953	14,953	14,953	1,285	1,285
Lighting	LED - 5 W Globe G25 Bulb	10.0	13,653	1.00	77,376		13,653	13,653	13,653	13,653	13,653	1,823	1,823	1,823
HVAC	Programmable Thermostat	8.0	130,994	1.00	1,047,955		130,994	130,994	130,994	130,994	130,994	130,994	130,994	130,994
HVAC	Smart Thermostat	11.0	54,278	1.00	597,058		54,278	54,278	54,278	54,278	54,278	54,278	54,278	54,278
Shell	Air Sealing	20.0	83,760	1.00	1,624,282		83,760	83,760	83,760	83,760	83,760	83,760	83,760	83,760
Hot Water	Bath Aerator	10.0	21,166	1.00	211,658		21,166	21,166	21,166	21,166	21,166	21,166	21,166	21,166
Lighting	LED - 13 W	10.0	5,620	1.00	25,986		5,620	5,620	1,843	1,843	1,843	1,843	1,843	1,843
Hot Water	Pipe Wrap Insulation	15.0	4,328	1.00	64,924		4,328	4,328	4,328	4,328	4,328	4,328	4,328	4,328
Lighting	LED - 16.2 W Flood Light PAR 30	6.1	1,269	1.00	6,541		1,269	1,269	1,269	1,269	1,269	178	18	-
Lighting	LED - 16.2 W Dimmable	10.0	833	1.00	5,106		833	833	833	833	833	188	188	188
Lighting	LED - 15 W Flood Light PAR 38	6.1	504	1.00	2,603		504	504	504	504	504	77	8	-
Lighting	LED - 15 W	10.0	363	1.00	1,678		363	363	119	119	119	119	119	119
Shell	Belly Insulation	20.0	1,809	1.00	35,232		1,809	1,809	1,809	1,809	1,809	1,809	1,809	1,809
Hot Water	Water Heater Temperature Setbac	2.0	1,516	1.00	3,033		1,516	1,516	-	-	-	-	-	-
CY2019 Program Total Contribution to CPAS			903,336		11,388,807		903,336	903,336	826,243	826,243	826,243	791,571	777,674	753,340
Historic Program Total Contribution to CPAS‡						-	-	-	-	-	-	-	-	-
Program Total CPAS						-	903,336	903,336	826,243	826,243	826,243	791,571	777,674	753,340
CY2019 Program Incremental Expiring Savings§								-	77,094	-	-	34,671	13,897	24,333
Historic Program Incremental Expiring Savings‡§							-	-	-	-	-	-	-	-
Program Total Incremental Expiring Savings§							-	-	77,094	-	-	34,671	13,897	24,333

End Use Type	Research Category	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Lighting	LED - 9 W	26,601	26,601	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	ECM Furnace Blower Motor	34,899	34,899	34,899	34,899	34,899	34,899	34,899	-	-	-	-	-	-	-
Hot Water	Showerhead 1.5 GPM	69,065	69,065	-	-	-	-	-	-	-	-	-	-	-	-
Electronics	Advanced Power Strip	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Kitchen Aerator	49,273	49,273	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED - 4.7 W Candelabra	1,823	1,823	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Duct Insulation & Sealing	270,088	270,088	247,289	247,289	247,289	247,289	247,289	247,289	247,289	247,289	247,289	247,289	-	-
Appliances	Refrigerator + Recycling	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	1,285	-	-	-	-	-
Lighting	LED - 5 W Globe G25 Bulb	1,823	1,823	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Programmable Thermostat	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HVAC	Smart Thermostat	54,278	54,278	54,278	-	-	-	-	-	-	-	-	-	-	-
Shell	Air Sealing	83,760	83,760	78,668	78,668	78,668	78,668	78,668	78,668	78,668	78,668	78,668	78,668	-	-
Hot Water	Bath Aerator	21,166	21,166	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED - 13 W	1,843	1,843	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	Pipe Wrap Insulation	4,328	4,328	4,328	4,328	4,328	4,328	4,328	-	-	-	-	-	-	-
Lighting	LED - 16.2 W Flood Light PAR 30	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED - 16.2 W Dimmable	188	188	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED - 15 W Flood Light PAR 38	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lighting	LED - 15 W	119	119	-	-	-	-	-	-	-	-	-	-	-	-
Shell	Belly Insulation	1,809	1,809	1,715	1,715	1,715	1,715	1,715	1,715	1,715	1,715	1,715	1,715	-	-
Hot Water	Water Heater Temperature Setbac	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CY2019 Program Total Contribution to CPAS		622,346	622,346	422,462	368,184	368,184	368,184	368,184	328,957	328,957	327,672	327,672	327,672	-	-
Historic Program Total Contribution to CPAS‡		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Program Total CPAS		622,346	622,346	422,462	368,184	368,184	368,184	368,184	328,957	328,957	327,672	327,672	327,672	-	-
CY2019 Program Incremental Expiring Savings§		130,994	-	199,884	54,278	-	-	-	39,227	-	1,285	-	-	327,672	-
Historic Program Incremental Expiring Savings‡§		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Program Total Incremental Expiring Savings§		130,994	-	199,884	54,278	-	-	-	39,227	-	1,285	-	-	327,672	-

Note: The green highlighted cell shows program total first year electric savings (including direct electric savings and those converted from gas). The gray cells are blank, indicating no values or do not contribute to calculating CPAS in CY2019.

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

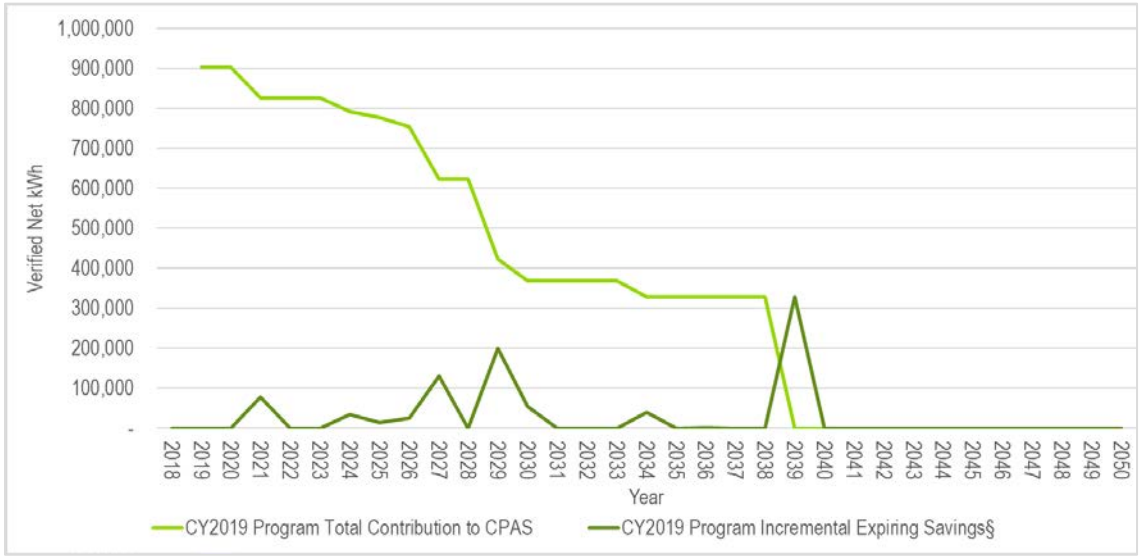
† Lifetime savings are the sum of CPAS savings through the EUL.

‡ Historic savings go back to CY2018.

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

Source: Evaluation team analysis

Figure 4-1. Cumulative Persisting Annual Savings

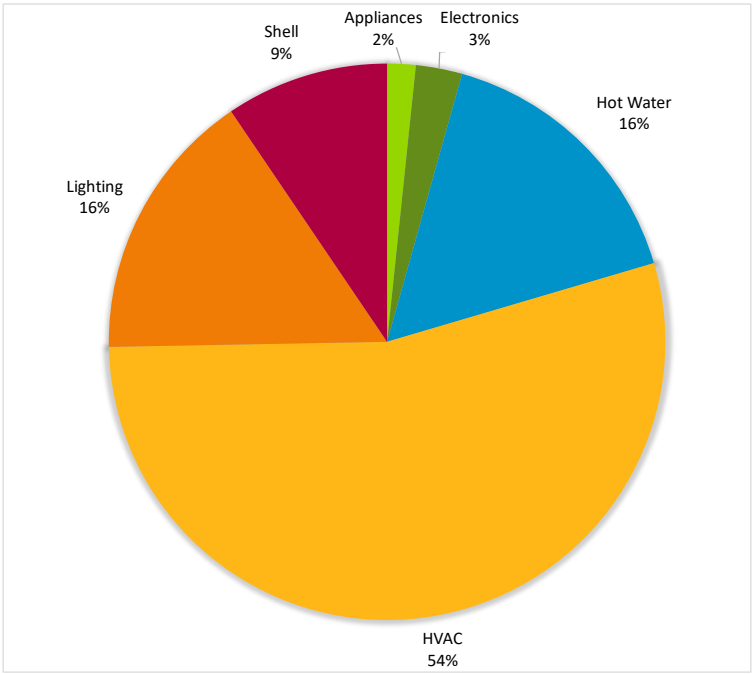


* Expiring savings are equal to CPAS Y_{n-1} - CPAS Y_n.
Source: Evaluation team analysis

5. Program Savings by Measure

The program includes 21 unique measures as shown in the following tables. Measure-level savings are grouped by end use type. The HVAC measures contribute the most savings (see Figure 5-1).

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



Source: ComEd tracking data and evaluation team analysis

Table 5-1. CY2019 Energy Savings by Measure – Electric

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)	EUL (years)
Lighting	LED - 9 W	101,885	0.96	98,158	1.00	98,158	10.0
HVAC	ECM Furnace Blower Motor	35,292	0.99	34,899	1.00	34,899	15.0
Hot Water	Showerhead 1.5 GPM	28,200	1.00	28,200	1.00	28,200	10.0
Electronics	Advanced Power Strip	24,308	1.00	24,308	1.00	24,308	7.0
Hot Water	Kitchen Aerator	22,601	1.00	22,601	1.00	22,601	10.0
Lighting	LED - 4.7 W Candelabra	23,128	0.97	22,501	1.00	22,501	10.0
HVAC	Duct Insulation & Sealing	21,733	1.01	22,025	1.00	22,025	20.0
Appliances	Refrigerator + Recycling	16,226	0.92	14,953	1.00	14,953	17.0
Lighting	LED - 5 W Globe G25 Bulb	14,401	0.95	13,653	1.00	13,653	10.0
HVAC	Programmable Thermostat	11,243	1.00	11,244	1.00	11,244	8.0
HVAC	Smart Thermostat	8,367	1.10	9,243	1.00	9,243	11.0
Shell	Air Sealing	9,226	1.00	9,226	1.00	9,226	20.0
Hot Water	Bath Aerator	8,946	1.00	8,946	1.00	8,946	10.0
Lighting	LED - 13 W	5,951	0.94	5,620	1.00	5,620	10.0
Hot Water	Pipe Wrap Insulation	1,759	1.00	1,759	1.00	1,759	15.0
Lighting	LED - 16.2 W Flood Light PAR 30	1,269	1.00	1,269	1.00	1,269	6.1
Lighting	LED - 16.2 W Dimmable	876	0.95	833	1.00	833	10.0
Lighting	LED - 15 W Flood Light PAR 38	504	1.00	504	1.00	504	6.1
Lighting	LED - 15 W	383	0.95	363	1.00	363	10.0
Shell	Belly Insulation	99	3.18	315	1.00	315	20.0
Hot Water	Water Heater Temperature Setback	82	1.00	82	1.00	82	2.0
	Total	336,477	0.98	330,700	NA	330,700	11.5

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

Table 5-2. CY2019 Non-Coincident Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Non-Coincident Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Non-Coincident Demand Reduction (kW)	NTG*	Verified Net Non-Coincident Demand Reduction (kW)
Lighting	LED - 9 W	NR	NA	97.97	1.00	97.97
HVAC	ECM Furnace Blower Motor	NR	NA	9.14	1.00	9.14
Hot Water	Showerhead 1.5 GPM	NR	NA	100.80	1.00	100.80
Electronics	Advanced Power Strip	NR	NA	3.41	1.00	3.41
Hot Water	Kitchen Aerator	NR	NA	199.83	1.00	199.83
Lighting	LED - 4.7 W Candelabra	NR	NA	31.74	1.00	31.74
HVAC	Duct Insulation & Sealing	NR	NA	12.97	1.00	12.97
Appliances	Refrigerator + Recycling	NR	NA	2.25	1.00	2.25
Lighting	LED - 5 W Globe G25 Bulb	NR	NA	19.76	1.00	19.76
HVAC	Programmable Thermostat	NR	NA	0.00	1.00	0.00
HVAC	Smart Thermostat	NR	NA	7.13	1.00	7.13
Shell	Air Sealing	NR	NA	6.57	1.00	6.57
Hot Water	Bath Aerator	NR	NA	286.99	1.00	286.99
Lighting	LED - 13 W	NR	NA	5.72	1.00	5.72
Hot Water	Pipe Wrap Insulation	NR	NA	0.20	1.00	0.20
Lighting	LED - 16.2 W Flood Light PAR 30	NR	NA	0.51	1.00	0.51
Lighting	LED - 16.2 W Dimmable	NR	NA	1.20	1.00	1.20
Lighting	LED - 15 W Flood Light PAR 38	NR	NA	0.20	1.00	0.20
Lighting	LED - 15 W	NR	NA	0.37	1.00	0.37
Shell	Belly Insulation	NR	NA	0.05	1.00	0.05
Hot Water	Water Heater Temperature Setback	NR	NA	0.01	1.00	0.01
	Total	NR	NA	786.83	NA	786.83

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

Table 5-3. CY2019 Summer Peak Demand Savings by Measure

End Use Type	Research Category	Ex Ante Gross Peak Demand Reduction (kW)	Verified Gross Realization Rate	Verified Gross Peak Demand Reduction (kW)	NTG*	Verified Net Peak Demand Reduction (kW)
Lighting	LED - 9 W	12.54	0.99	12.54	1.00	12.54
HVAC	ECM Furnace Blower Motor	8.99	1.02	9.14	1.00	9.14
Hot Water	Showerhead 1.5 GPM	3.09	0.91	2.80	1.00	2.80
Electronics	Advanced Power Strip	2.73	1.00	2.73	1.00	2.73
Hot Water	Kitchen Aerator	4.86	0.90	4.40	1.00	4.40
Lighting	LED - 4.7 W Candelabra	3.46	1.00	3.46	1.00	3.46
HVAC	Duct Insulation & Sealing	5.93	1.02	6.04	1.00	6.04
Appliances	Refrigerator + Recycling	2.45	0.92	2.25	1.00	2.25
Lighting	LED - 5 W Globe G25 Bulb	2.15	1.00	2.15	1.00	2.15
HVAC	Programmable Thermostat	0.00	NA	0.00	1.00	0.00
HVAC	Smart Thermostat	1.67	0.99	1.66	1.00	1.66
Shell	Air Sealing	3.06	1.00	3.06	1.00	3.06
Hot Water	Bath Aerator	13.59	0.46	6.31	1.00	6.31
Lighting	LED - 13 W	0.73	1.00	0.73	1.00	0.73
Hot Water	Pipe Wrap Insulation	0.20	1.00	0.20	1.00	0.20
Lighting	LED - 16.2 W Flood Light PAR 30	0.14	1.00	0.14	1.00	0.14
Lighting	LED - 16.2 W Dimmable	0.13	1.00	0.13	1.00	0.13
Lighting	LED - 15 W Flood Light PAR 38	0.04	1.37	0.06	1.00	0.06
Lighting	LED - 15 W	0.03	1.80	0.05	1.00	0.05
Shell	Belly Insulation	0.01	1.65	0.02	1.00	0.02
Hot Water	Water Heater Temperature Setback	0.01	1.00	0.01	1.00	0.01
	Total	65.81	0.88	57.89	NA	57.89

NA = Not applicable

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

Source: ComEd tracking data and evaluation team analysis

Table 5-4. CY2019 Energy Savings by Measure – Gas

End Use Type	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross Realization Rate	Verified Gross Savings (Therms)	NTG*	Verified Net Savings (Therms)	EUL (years)
Lighting	LED - 9 W	0	NA	0	1.00	0	10.0
HVAC	ECM Furnace Blower Motor	-381	NA	0	1.00	0	15.0
Hot Water	Showerhead 1.5 GPM	1,394	1.00	1,394	1.00	1,394	10.0
Electronics	Advanced Power Strip	0	NA	0	1.00	0	7.0
Hot Water	Kitchen Aerator	910	1.00	910	1.00	910	10.0
Lighting	LED - 4.7 W Candelabra	0	NA	0	1.00	0	10.0
HVAC	Duct Insulation & Sealing	8,336	1.02	8,463	1.00	8,463	20.0
Appliances	Refrigerator + Recycling	0	NA	0	1.00	0	17.0
Lighting	LED - 5 W Globe G25 Bulb	0	NA	0	1.00	0	10.0
HVAC	Programmable Thermostat	4,086	1.00	4,086	1.00	4,086	8.0
HVAC	Smart Thermostat	1,577	0.97	1,537	1.00	1,537	11.0
Shell	Air Sealing	2,543	1.00	2,543	1.00	2,543	20.0
Hot Water	Bath Aerator	417	1.00	417	1.00	417	10.0
Lighting	LED - 13 W	0	NA	0	1.00	0	10.0
Hot Water	Pipe Wrap Insulation	88	1.00	88	1.00	88	15.0
Lighting	LED - 16.2 W Flood Light PAR 30	0	NA	0	1.00	0	6.1
Lighting	LED - 16.2 W Dimmable	0	NA	0	1.00	0	10.0
Lighting	LED - 15 W Flood Light PAR 38	0	NA	0	1.00	0	6.1
Lighting	LED - 15 W	0	NA	0	1.00	0	10.0
Shell	Belly Insulation	34	1.51	51	1.00	51	20.0
Hot Water	Water Heater Temperature Setback	49	1.00	49	1.00	49	2.0
	Total Therms	19,052	1.03	19,537	NA	19,537	NA
	Total kWh Converted From Therms†	558,410	1.03	572,636	NA	572,636	NA

NA = Not applicable

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

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

Source: ComEd tracking data and evaluation team analysis

Table 5-5. CY2019 Energy Savings by Measure – Total Combining Electricity and Gas

End Use Type	Research Category	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Lighting	LED - 9 W	101,885	0.96	98,158	1.00	98,158
HVAC	ECM Furnace Blower Motor	24,118	1.45	34,899	1.00	34,899
Hot Water	Showerhead 1.5 GPM	69,065	1.00	69,065	1.00	69,065
Electronics	Advanced Power Strip	24,308	1.00	24,308	1.00	24,308
Hot Water	Kitchen Aerator	49,274	1.00	49,273	1.00	49,273
Lighting	LED - 4.7 W Candelabra	23,128	0.97	22,501	1.00	22,501
HVAC	Duct Insulation & Sealing	266,071	1.02	270,088	1.00	270,088
Appliances	Refrigerator + Recycling	16,226	0.92	14,953	1.00	14,953
Lighting	LED - 5 W Globe G25 Bulb	14,401	0.95	13,653	1.00	13,653
HVAC	Programmable Thermostat	130,993	1.00	130,994	1.00	130,994
HVAC	Smart Thermostat	54,576	0.99	54,278	1.00	54,278
Shell	Air Sealing	83,760	1.00	83,760	1.00	83,760
Hot Water	Bath Aerator	21,166	1.00	21,166	1.00	21,166
Lighting	LED - 13 W	5,951	0.94	5,620	1.00	5,620
Hot Water	Pipe Wrap Insulation	4,329	1.00	4,328	1.00	4,328
Lighting	LED - 16.2 W Flood Light PAR 30	1,269	1.00	1,269	1.00	1,269
Lighting	LED - 16.2 W Dimmable	876	0.95	833	1.00	833
Lighting	LED - 15 W Flood Light PAR 38	504	1.00	504	1.00	504
Lighting	LED - 15 W	383	0.95	363	1.00	363
Shell	Belly Insulation	1,091	1.66	1,809	1.00	1,809
Hot Water	Water Heater Temperature Setback	1,517	1.00	1,516	1.00	1,516
	Total†	894,887	1.01	903,336	NA	903,336

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

The MHR Program includes water-saving measures that produce secondary kWh savings from water supply and wastewater treatment. Table **5-6** shows the secondary measure level savings. The savings in this table are included within Table 5-1 and Table **5-5** in this section.

Table 5-6. Secondary Energy Savings from Water Reduction by Measure – Electric

End Use Type	Research Category	Ex Ante Annual Water Savings (gallons)	Ex Ante Gross Savings (kWh)	Verified Gross Realization Rate (RR_{water})	Verified Gross Savings (kWh)	NTG*	Verified Net Savings (kWh)
Lighting	LED - 9 W	0	NR	NA	0	1.00	0
HVAC	ECM Furnace Blower Motor	0	NR	NA	0	1.00	0
Hot Water	Showerhead 1.5 GPM	497,990	NR	NA	2,495	1.00	2,495
Electronics	Advanced Power Strip	0	NR	NA	0	1.00	0
Hot Water	Kitchen Aerator	430,269	NR	NA	2,156	1.00	2,156
Lighting	LED - 4.7 W Candelabra	0	NR	NA	0	1.00	0
HVAC	Duct Insulation & Sealing	0	NR	NA	0	1.00	0
Appliances	Refrigerator + Recycling	0	NR	NA	0	1.00	0
Lighting	LED - 5 W Globe G25 Bulb	0	NR	NA	0	1.00	0
HVAC	Programmable Thermostat	0	NR	NA	0	1.00	0
HVAC	Smart Thermostat	0	NR	NA	0	1.00	0
Shell	Air Sealing	0	NR	NA	0	1.00	0
Hot Water	Bath Aerator	220,872	NR	NA	1,107	1.00	1,107
Lighting	LED - 13 W	0	NR	NA	0	1.00	0
Hot Water	Pipe Wrap Insulation	0	NR	NA	0	1.00	0
Lighting	LED - 16.2 W Flood Light PAR 30	0	NR	NA	0	1.00	0
Lighting	LED - 16.2 W Dimmable	0	NR	NA	0	1.00	0
Lighting	LED - 15 W Flood Light PAR 38	0	NR	NA	0	1.00	0
Lighting	LED - 15 W	0	NR	NA	0	1.00	0
Shell	Belly Insulation	0	NR	NA	0	1.00	0
Hot Water	Water Heater Temperature Setback	0	NR	NA	0	1.00	0
	Total	1,149,131	NR	NA	5,757	NA	5,757

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

6. Impact Analysis Findings and Recommendations

6.1 Impact Parameter Estimates

The MHR Program uses TRM algorithm inputs along with tracking data to calculate savings. Table 6-1 shows all algorithm inputs.

Table 6-1. Savings Parameters

Measure	Custom Input Parameters	Deemed Input Parameters	Deemed Input Data Source *
Advanced Power Strip	None	kWh, ISR, Hours, CF	TRM v7.0 – 5.2.1
Aerator	None	%ElectricDHW, GPM_base, L_base, GPM_low, L_low, Household, DF, FPH, EPG_electric, ISR, ΔWater, E_water_total, Hours, CF, %FossilDHW, EPG_gas	TRM v7.0 – 5.4.4
Air Sealing	CFM_existing, CFM_new	N_cool, CDD, DUA, ηCool, LM, $ADJ_{AirSealingCool}$, $IE_{NetCorrection}$, %Cool, HDD, ηHeat, %ElectricHeat, Fe, $ADJ_{AirSealingHeatFan}$, FLH_cooling, CF, $ADJ_{AirSealingGasHeat}$, N_heat	TRM v7.0 – 5.6.1
Belly Insulation	R_added, Area	R_old, Framing_Factor, CDD, DUA, ηCool, $ADJ_{FloorCool}$, %Cool, HDD, ηHeat, $ADJ_{FloorHeat}$, %ElectricHeat, Fe, FLH_cooling, CF, %GasHeat	TRM v7.0 – 5.6.3
Duct Insulation and Sealing	$\Delta CFM25_{DL}$, CapacityCool, OutputCapacityHeat, InputCapacityHeat, DE_{after}, DE_{before},	FLHcool, TRFcool, %Cool, ηCool, Fe, FLHheat, TRFheat, %ElectricHeat, ηHeat, CF, %GasHeat, ηEquipment, ηSystem	TRM v7.0 – 5.3.4
ECM Furnace Blower Motor	Capacity_cooling, AFUE	kWhSavingsPerTon, kWSavingsPerTon, HeatingkWhSavings	TRM v7.0 – 5.3.5
LED Lighting	$Watts_{base}$, $Watts_{EE}$	ISR, Leakage, Hours, WHFe, WHFd, CF, HF	TRM v7.0 – 5.5.8 & 5.5.6
Pipe Wrap Insulation	L	C_{exist}, R_{exist}, C_{new}, R_{new}, ΔT, ηDHW	TRM v7.0 – 5.4.1
Programmable Thermostat	None	%ELectricHeat, Elec_Heating_Consumption, Heating_Reduction, HF, Eff_ISR, Fe, %FossilHeat, Gas_Heating_Consumption	TRM v7.0 – 5.3.11
Refrigerator and Recycling	Age, Pre-1990, Size, Side-by-side	UEC_{EE}, Proportion of Primary Appliances, CDD, HDD, unconditioned, HDD, Part Use Factor, CF	TRM v7.0 5.1.6 & 5.1.8
Showerhead	None	%ElectricDHW, GPM_base, L_base, GPM_low, L_low, Household, SPCD, SPH, EPG_electric, ISR, ΔWater, E_water_total, Hours, CF, EPG_gas	TRM v7.0 – 5.4.5
Smart Thermostat	Check with analysis file	%ElectricHeat, Elec_Heating_Consumption, Heating_Reduction, HF, Eff_ISR, Fe, %AC, FLH, Capacity, SEER, Cooling_Reduction, Eff_ISR, EER, CF, %FossilHeat, Gas_Heating_Consumption, Heating Reduction, Eff_ISR	TRM v7.0 – 5.3.16
Water Heater Temperature Setback	None	U, A, Tpre, Tpost, Hours, ISR, RE_electric, Hours, CF, Re_gas	TRM v7.0 – 5.4.6

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

6.2 Other Impact Findings and Recommendations

The evaluation team developed several recommendations based on findings from the CY2019 evaluation.

Finding 1. Ex ante savings does not account for a heating penalty for lighting measures in homes with electric heat.
Recommendation 1. Guidehouse recommends that a heating penalty for homes with electric heat be incorporated to create a more accurate savings estimate.

Finding 2. For all water-saving measures, the implementer used secondary water savings to calculate demand savings.
Recommendation 2. Guidehouse recommends that the implementer not use energy savings that results from secondary water savings in demand savings calculations in accordance with the TRM v7.0 errata.[2]

Finding 3. Ex ante savings for smart thermostats is calculated using an unknown baseline.
Recommendation 3. Given that the baseline thermostat is tracked in the data, Guidehouse recommends using the appropriate baseline thermostat type.

Finding 4. For some projects, ex ante savings for the refrigerator measure does not correspond to inputs outlined in implementer calculator.
Recommendation 4. Guidehouse recommends that variable inputs for this measure be tracked explicitly in the tracking data. For example, in the baseline case the side-by-side input is not tracked, but the model number is. The evaluation team looked up various model numbers to verify whether or not the refrigerator was a side-by-side. There are other inputs within the algorithm that may be variable, but there is nothing in the tracking data to support this.

Finding 5. For some projects, ex ante savings for the ECM Furnace Blower Motor measure omitted a heating penalty when the home had electric heat or unnecessarily added a therm penalty for homes without natural gas heating.
Recommendation 5. Guidehouse recommends that the tracking data is checked and only homes with electric heating receive a kWh penalty and only homes with natural gas heating receive a therms penalty.

Finding 6. Some Duct Insulation & Sealing and Belly Insulation projects did not have claimed ex ante savings and it is unclear why.
Recommendation 6. Guidehouse recommends that any projects that were not implemented receive zero savings in the tracking data.

Finding 7. The verified savings accounted for heating penalty reduction from electric resistance heating interactive effects due to projects or measures installed in electrically heated buildings. This approach is consistent with the TRM v7.0 instructions.
Recommendation 7. Considering that the evaluation process is now reporting electric heating penalties, we recommend that the program tracks electric heating penalties for affected measures and account for those in ex ante gross and net savings.

7. Appendix 1. Impact Analysis Methodology

The evaluation team determined verified gross energy and demand savings for each measure using algorithms and inputs found in the TRM (outlined in Table 6-1). For some measures, Guidehouse relied on project-specific information provided in the tracking data to create a more accurate representation of energy savings.

[2] Memo titled "V7.0 Errata Measures Effective 01/01/2019"
https://s3.amazonaws.com/ilsag/v7.0_Errata_Measures_Memo_FINAL_09-12-2019.pdf

The evaluation team determined verified net energy and demand savings for each measure by multiplying verified gross energy and demand savings by the NTG value deemed by Illinois SAG.

8. Appendix 2. Total Resource Cost Detail

Table 8-1 shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of finalizing this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to the evaluation team later.

Table 8-1. Total Resource Cost Savings Summary

End Use Type	Research Category	Units	Quantity	EUL (years)*	ER Flag†	Verified Gross Electric Energy Savings (kWh)	Verified Gross Peak Demand Reduction (kW)	Verified Gross Gas Savings (Therms)	Gross Heating Penalty (kWh)	Gross Heating Penalty (Therms)	NTG (kWh)	NTG (kW)	NTG (Therms)	Verified Net Electric Energy Savings (kWh)	Verified Net Peak Demand Reduction (kW)	Verified Net Gas Savings (Therms)	Net Heating Penalty (kWh)	Net Heating Penalty (Therms)
Lighting‡	LED - 9 W	Lamp	2,679	10.0	Yes	98,158	12.54	0	0	2,113	1.00	1.00	1.00	98,158	12.54	0	0	2,113
HVAC	ECM Furnace Blower Motor	Project	61	15.0	No	34,899	9.14	0	0	288	1.00	1.00	1.00	34,899	9.14	0	0	288
Hot Water	Showerhead 1.5 GPM	Each	204	10.0	No	25,705	2.80	1,394	0	0	1.00	1.00	1.00	25,705	2.80	1,394	0	0
Electronics	Advanced Power Strip	Each	236	7.0	No	24,308	2.73	0	0	0	1.00	1.00	1.00	24,308	2.73	0	0	0
Hot Water	Kitchen Aerator	Each	208	10.0	No	20,446	4.40	910	0	0	1.00	1.00	1.00	20,446	4.40	910	0	0
Lighting‡	LED - 4.7 W Candelabra	Lamp	836	10.0	Yes	22,501	3.46	0	0	491	1.00	1.00	1.00	22,501	3.46	0	0	491
HVAC‡	Duct Insulation & Sealing	Project	150	20.0	No	22,025	6.04	8,463	0	0	1.00	1.00	1.00	22,025	6.04	8,463	0	0
Appliances‡	Refrigerator + Recycling	Each	29	17.0	Yes	14,953	2.25	0	0	0	1.00	1.00	1.00	14,953	2.25	0	0	0
Lighting‡	LED - 5 W Globe G25 Bulb	Lamp	525	10.0	Yes	13,653	2.15	0	0	286	1.00	1.00	1.00	13,653	2.15	0	0	286
HVAC	Programmable Thermostat	Each	87	8.0	No	11,244	0.00	4,086	0	0	1.00	1.00	1.00	11,244	0.00	4,086	0	0
HVAC	Smart Thermostat	Each	30	11.0	No	9,243	1.66	1,537	0	0	1.00	1.00	1.00	9,243	1.66	1,537	0	0
Shell‡	Air Sealing	Project	116	20.0	No	9,226	3.06	2,543	0	0	1.00	1.00	1.00	9,226	3.06	2,543	0	0
Hot Water	Bath Aerator	Each	439	10.0	No	7,840	6.31	417	0	0	1.00	1.00	1.00	7,840	6.31	417	0	0
Lighting‡	LED - 13 W	Lamp	133	10.0	Yes	5,620	0.73	0	0	118	1.00	1.00	1.00	5,620	0.73	0	0	118
Hot Water	Pipe Wrap Insulation	Linear Feet	491	15.0	No	1,759	0.20	88	0	0	1.00	1.00	1.00	1,759	0.20	88	0	0
Lighting‡	LED - 16.2 W Flood Light PAR 30	Lamp	9	6.1	Yes	1,269	0.14	0	0	0	1.00	1.00	1.00	1,269	0.14	0	0	0
Lighting‡	LED - 16.2 W Dimmable	Lamp	19	10.0	Yes	833	0.13	0	0	18	1.00	1.00	1.00	833	0.13	0	0	18
Lighting‡	LED - 15 W Flood Light PAR 38	Lamp	2	6.1	Yes	504	0.06	0	0	0	1.00	1.00	1.00	504	0.06	0	0	0
Lighting‡	LED - 15 W	Lamp	9	10.0	Yes	363	0.05	0	0	8	1.00	1.00	1.00	363	0.05	0	0	8
Shell‡	Belly Insulation	Project	11	20.0	No	315	0.02	51	0	0	1.00	1.00	1.00	315	0.02	51	0	0
Hot Water	Water Heater Temperature Setback	Project	16	2.0	No	82	0.01	49	0	0	1.00	1.00	1.00	82	0.01	49	0	0
	Total			11.5		324,943	58	19,537	0	3,320	NA	NA	NA	324,943	58	19,537	0	3,320

NA = Not appliocable

Note: To avoid double counting, the verified gross kWh and net kWh used in the TRC analysis excludes secondary energy savings from water reduction measures. Table 9-1 represents the kWh savings from Table 5-1 minus those shown in Table 5-6)

* 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.

‡ These measures incorporate a mid-life baseline shift. See the CPAS tables (Table 4-1 to Table 4-3).

Source: ComEd tracking data and evaluation team analysis