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Home Energy Rebates Program Impact Evaluation Report

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

Prepared for:

Peoples Gas and North Shore Gas

FINAL

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Prepared by:

Marisa Rudolph
Guidehouse

Robert Hodge
Guidehouse

Submitted to:

Peoples Gas
North Shore Gas
200 East Randolph Street
Chicago, IL 60601

Submitted by:

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

Contact:

Ed Balbis
Partner
561.644.9407
ebalbis@guidehouse.com

Stu Slote
Director
802.526.5113
stu.slote@guidehouse.com

Laura Agapay-Read
Associate Director
312.583.4178
laura.agapay.read@guidehouse.com

Charles Ampong
Associate Director
608.446.3172
charles.ampong@guidehouse.com

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1. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2023 Home Energy Rebates programs and a summary of the energy impacts for the total program, as well as measure and program structure details. The appendix presents the impact analysis methodology. Program year 2023 covers January 1, 2023 through December 31, 2023.

2. Program Description

The Home Energy Rebate Program provides rebates to PGL and NSG residential customers who make certain energy-saving improvements to their homes. The program is composed of two distinct offerings: 1) replacement of HVAC and other equipment, and 2) weatherization (Wx) improvements. The HVAC and other equipment offering incentivizes customer-installed or contractor-installed energy efficient furnaces, boilers, and water heaters, as well as customer-installed programmable thermostats. The weatherization offering incentivizes trade ally-installed home insulation measures, such as air sealing and duct sealing. In 2022 and beyond, ComEd processed rebates for advanced thermostats, and PGL and NSG reimbursed ComEd for the gas portion ("ComEd Marketplace"), removing the need for participants to complete separate rebate applications for natural gas and electricity.

The PGL program had 6,709 participants in 2023 and completed 6,744 projects, as shown in Table 2-1.

Table 2-1. 2023 Volumetric Summary for PGL

Participation	HVAC	Weatherization	ComEd Marketplace	Total
Participants *	1,038	166	5,507	**6,709**
Installed Projects †	1,060	168	5,516	**6,744**
Measure Types Installed	6	6	1	**12**

* Participants are defined as the number of distinct account numbers with realized gas savings. Some participants may have both HVAC and Wx measures.
† Installed Projects are defined as the number of distinct work order IDs with realized gas savings.
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

Table 2-2 summarizes the installed measure quantities that are the basis for verified energy savings.

Table 2-2. 2023 Installed Measure Quantities for PGL

Program Path	Measure	Quantity Unit	Installed Quantity
HVAC	Advanced Thermostats	Each	331
	Gas High Efficiency Boiler	MBH	4,157
	Gas High Efficiency Combination Boiler	Each	40
	Gas High Efficiency Furnace	Each	671
	Gas Water Heaters	Each	70
	Programmable Thermostats	Each	29
Weatherization	Air Sealing	CFM	9,197
	Air Sealing with Attic Insulation	CFM	158,287
	Ceiling/Attic Insulation	Sq. Ft	146,159
	Duct Insulation and Sealing	CFM	1,341
	Foundation Wall Insulation	Sq. Ft	170
	Wall Insulation	Sq. Ft	4,831
ComEd Marketplace	Advanced Thermostats	Each	5,516

Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

The NSG program had 2,087 participants in 2023 and completed 2,114 projects, as shown in Table 2-3.

Table 2-3. 2023 Volumetric Summary for NSG

Participation	HVAC	Weatherization	ComEd Marketplace	Total
Participants *	807	91	1,193	**2,087**
Installed Projects †	827	92	1,195	**2,114**
Measure Types Installed	6	6	1	**12**

* Participants are defined as the number of distinct account numbers with realized gas savings. Some participants may have both HVAC and Wx measures.
† Installed Projects are defined as the number of distinct work order IDs with realized gas savings.
Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

Table 2-4 summarizes the installed measure quantities that are the basis for verified energy savings.

Table 2-4. 2023 Installed Measure Quantities for NSG

Program Path	Measure	Quantity Unit	Installed Quantity
HVAC	Advanced Thermostats	Each	220
	Gas High Efficiency Boiler	MBH	1,602
	Gas High Efficiency Combination Boiler	Each	4
	Gas High Efficiency Furnace	Each	681
	Gas Water Heaters	Each	27
	Programmable Thermostats	Each	12
Weatherization	Air Sealing	CFM	13,730
	Air Sealing with Attic Insulation	CFM	75,903
	Ceiling/Attic Insulation	Sq. Ft.	105,763
	Duct Insulation and Sealing	CFM	3,828
	Foundation Wall Insulation	Sq. Ft.	60
	Wall Insulation	Sq. Ft.	600
ComEd Marketplace	Advanced Thermostats	Each	1,195

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

3. Program Savings Detail

Table 3-1 summarizes the energy savings the PGL Home Energy Rebates Program achieved by community and path in 2023. Projects in disadvantaged communities (DAC) designated sites have a verified net-to-gross ratio (NTG) of 1.00.

Table 3-1. 2023 Annual Energy Savings Summary for PGL

Program Category	Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms	NTG†	Verified Net Savings (Therms)
DAC						
	HVAC	43,966	94%	41,110	1.00	41,110
	Weatherization	6,686	113%	7,580	1.00	7,580
	ComEd Marketplace	150,161	100%	150,160	1.00	150,160
DAC Subtotal		***200,812***	***99%***	***198,850***		***198,850***
Non-DAC						
	HVAC	158,672	94%	149,034	0.74	113,316
	Weatherization	21,010	114%	23,964	0.77	21,135
	ComEd Marketplace	276,345	100%	276,344	0.90	248,709
Non-DAC Subtotal		***456,027***	***99%***	***449,342***		***383,161***
Total or Weighted Average		**656,839**	**99%**	**648,192**		**582,011**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† A deemed value. Available on the SAG website: **https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/**. DAC designated sites based on census track used a NTG of 1.0.
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

Table 3-2 summarizes the energy savings the NSG Home Energy Rebates Program achieved by community and path in 2023.

Table 3-2. 2023 Annual Energy Savings Summary for NSG

Program Category	Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms	NTG	Verified Net Savings (Therms)
DAC						
	HVAC	6,308	89%	5,593	1.00	5,593
	ComEd Marketplace	10,708	100%	10,708	1.00	10,708
DAC Subtotal		***17,016***	***96%***	***16,301***		***16,301***
Non-DAC						
	HVAC	172,629	94%	162,516	0.74	122,730
	Weatherization	20,757	111%	23,033	0.77	20,215
	ComEd Marketplace	87,065	100%	87,064	0.90	78,358
Non-DAC Subtotal		***280,451***	***97%***	***272,613***		***221,309***
Total or Weighted Average		**297,467**	**97%**	**288,914**		**237,603**

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

4. Program Savings by Measure

The PGL program includes 18 measures in both DAC and non-DAC designated sites, as shown in Table 4-1. Advanced Thermostats and Furnaces contributed the most savings.

Table 4-1. 2023 Annual Energy Savings by Measure for PGL

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
DAC	HVAC	Advanced Thermostat - Base Manual (Condo)	466	100%	466	1.00	466
		Advanced Thermostat - Base Manual (Single Family)	2,153	90%	1,948	1.00	1,948
		Advanced Thermostat - Base Programmable (Condo)	649	93%	603	1.00	603
		Advanced Thermostat - Base Programmable (Single Family)	1,142	94%	1,070	1.00	1,070
		Gas High Efficiency Boiler - HW	1,553	78%	1,211	1.00	1,211
		Gas High Efficiency Boiler - Steam	39	165%	64	1.00	64
		Gas High Efficiency Boiler - Two-in-One	2,891	90%	2,608	1.00	2,608
		Gas High Efficiency Furnace	33,457	94%	31,527	1.00	31,527
		Programmable Thermostat - Boiler	217	99%	215	1.00	215
		Programmable Thermostat - Furnace	312	100%	312	1.00	312
		Tankless Water Heater	1,087	100%	1,087	1.00	1,087
	Weatherization	Air Sealing	115	100%	115	1.00	115

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
		Air Sealing with Attic Insulation	2,486	100%	2,486	1.00	2,486
		Ceiling/Attic Insulation	3,933	122%	4,795	1.00	4,795
		Foundation Wall Insulation	4	884%	36	1.00	36
		Wall Insulation	149	100%	149	1.00	149
	ComEd Marketplace	Advanced Thermostat - Base Manual (Condo)	16,458	100%	16,458	1.00	16,458
		Advanced Thermostat - Base Manual (Single Family)	69,810	100%	69,809	1.00	69,809
		Advanced Thermostat - Base Programmable (Condo)	8,951	100%	8,951	1.00	8,951
		Advanced Thermostat - Base Programmable (Single Family)	47,523	100%	47,522	1.00	47,522
		Advanced Thermostat - Base Unknown (Single Family)	5,809	100%	5,809	1.00	5,809
		Advanced Thermostat - Base Unknown (Condo)	1,610	100%	1,610	1.00	1,610
DAC Total			***200,812***	***99%***	***198,850***		***198,850***
Non-DAC	HVAC	Advanced Thermostat - Base Manual (Condo)	3,398	96%	3,265	0.90	2,938
		Advanced Thermostat - Base Manual (Single Family)	6,356	97%	6,151	0.90	5,536
		Advanced Thermostat - Base Programmable (Condo)	2,644	96%	2,551	0.90	2,296
		Advanced Thermostat - Base Programmable (Single Family)	6,208	93%	5,780	0.90	5,202
		Gas High Efficiency Boiler - HW	3,252	129%	4,549	0.74	3,367
		Gas High Efficiency Boiler - Steam	44	100%	44	0.74	32
		Gas High Efficiency Boiler - Two-in-One	9,844	92%	8,996	0.74	6,657
		Gas High Efficiency Furnace	121,605	92%	112,380	0.74	83,161
		Indirect Water Heater	261	100%	261	0.74	193
		Programmable Thermostat - Boiler	493	100%	491	0.88	432
		Programmable Thermostat - Furnace	872	100%	872	0.88	768
		Tankless Water Heater	3,695	100%	3,695	0.74	2,734
	Weatherization	Air Sealing	688	100%	688	0.77	530
		Air Sealing with Attic Insulation	7,456	100%	7,456	0.88	6,561
		Ceiling/Attic Insulation	10,846	127%	13,745	0.89	12,233
		Duct Insulation and Sealing	1,789	98%	1,752	0.87	1,525
		Foundation Wall Insulation	11	799%	88	0.89	78
		Wall Insulation	221	106%	235	0.89	209
	ComEd Marketplace	Advanced Thermostat - Base Manual (Condo)	36,648	100%	36,647	0.90	32,983
		Advanced Thermostat - Base Manual (Single Family)	112,352	100%	112,351	0.90	101,116
		Advanced Thermostat - Base Programmable (Condo)	27,827	100%	27,828	0.90	25,046

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
		Advanced Thermostat - Base Programmable (Single Family)	90,907	100%	90,906	0.90	81,816
		Advanced Thermostat - Base Unknown (Single Family)	6,834	100%	6,834	0.90	6,151
		Advanced Thermostat - Base Unknown (Condo)	1,776	100%	1,777	0.90	1,599
Non-DAC Total			***456,026***	***99%***	***449,342***		***383,161***
Total or Weighted Average			**656,838**	**99%**	**648,192**		**582,011**

Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

The NSG program includes 16 measures, as shown in Table 4-2. Advanced Thermostats and Furnaces contributed the most savings.

Table 4-2. 2023 Annual Energy Savings by Measure for NSG

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
DAC	HVAC	Advanced Thermostat - Base Manual (Condo)	67	100%	67	1.00	67
		Advanced Thermostat - Base Manual (Single Family)	103	100%	103	1.00	103
		Advanced Thermostat - Base Programmable (Single Family)	285	75%	214	1.00	214
		Gas High Efficiency Furnace	5,791	89%	5,147	1.00	5,147
		Programmable Thermostat - Furnace	62	100%	62	1.00	62
	ComEd Marketplace	Advanced Thermostat - Base Manual (Condo)	200	100%	200	1.00	200
		Advanced Thermostat - Base Manual (Single Family)	5,741	100%	5,741	1.00	5,741
		Advanced Thermostat - Base Programmable (Condo)	46	100%	46	1.00	46
		Advanced Thermostat - Base Programmable (Single Family)	3,782	100%	3,782	1.00	3,782
		Advanced Thermostat - Base Unknown (Single Family)	940	100%	940	1.00	940
DAC Total			***17,016***	***96%***	***16,301***		***16,301***
Non-DAC	HVAC	Advanced Thermostat - Base Manual (Condo)	333	100%	333	0.90	300
		Advanced Thermostat - Base Manual (Single Family)	6,663	94%	6,253	0.90	5,628
		Advanced Thermostat - Base Programmable (Condo)	232	100%	232	0.90	209
		Advanced Thermostat - Base Programmable (Single Family)	8,634	93%	8,063	0.90	7,257
		Gas High Efficiency Boiler - HW	2,198	110%	2,574	0.74	1,905

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
		Gas High Efficiency Boiler - Two-in-One	1,446	80%	1,163	0.74	860
		Gas High Efficiency Furnace	150,559	94%	141,333	0.74	104,586
		Indirect Water Heater	130	100%	130	0.74	96
		Programmable Thermostat - Furnace	623	100%	623	0.88	548
		Tankless Water Heater	1,811	100%	1,811	0.74	1,340
	Weatherization	Air Sealing	1,198	100%	1,198	0.77	922
		Air Sealing with Attic Insulation	4,856	98%	4,767	0.88	4,195
		Ceiling/Attic Insulation	9,896	125%	12,340	0.89	10,983
		Duct Insulation and Sealing	4,790	98%	4,680	0.87	4,071
		Foundation Wall Insulation	5	278%	14	0.89	12
		Wall Insulation	12	292%	35	0.89	31
	ComEd Marketplace	Advanced Thermostat - Base Manual (Condo)	3,065	100%	3,065	0.90	2,759
		Advanced Thermostat - Base Manual (Single Family)	38,544	100%	38,544	0.90	34,689
		Advanced Thermostat - Base Programmable (Condo)	2,226	100%	2,226	0.90	2,004
		Advanced Thermostat - Base Programmable (Single Family)	40,530	100%	40,530	0.90	36,477
		Advanced Thermostat - Base Unknown (Single Family)	2,477	100%	2,477	0.90	2,230
		Advanced Thermostat - Base Unknown (Condo)	222	100%	222	0.90	200
Non-DAC Total			***280,451***	***97%***	***272,613***		***221,302***
Total or Weighted Average			**297,467**	**97%**	**288,914**		**237,603**

Source: North Shore Gas tracking data and Guidehouse team analysis.

5. Impact Analysis Findings and Recommendations

5.1 Impact Parameter Estimates

Table 5-1 shows the unit therm savings and realization rate findings by measure from our review. The realization rate is the ratio of the verified savings to the gross ex ante savings. Following the table, we provide findings and recommendations, including discussion of all measures with realization rates above or below 100 percent. Appendix 1 provides a description of the impact analysis methodology.

Table 5-1. 2023 Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	RR	Data Source(s)
Advanced Thermostat - Base Unknown (Condo)	Each	55.53	55.52	100%	Illinois TRM† Section 5.3.16, PTD*, MMDB

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	RR	Data Source(s)
Advanced Thermostat - Base Manual (Condo)	Each	66.63	66.63 133.27	100%	Illinois TRM Section 5.3.16, PTD, MMDB
Advanced Thermostat - Base Manual (Single Family)	Each	102.51	102.51 205.02	100%	Illinois TRM Section 5.3.16, PTD, MMDB
Advanced Thermostat - Base Programmable (Condo)	Each	46.38	46.38 92.76	100%	Illinois TRM Section 5.3.16, PTD, MMDB
Advanced Thermostat - Base Programmable (Single Family)	Each	71.35	71.35 144.71	99%	Illinois TRM Section 5.3.16, PTD, MMDB
Advanced Thermostat - Base Unknown (Single Family)	Each	85.42	85.42	100%	Illinois TRM Section 5.3.16, PTD, MMDB
Air Sealing	CFM	0.09	0.09	100%	Illinois TRM Section 5.6.1, PTD, MMDB
Air Sealing with Attic Insulation	CFM	0.06	0.06 0.06 0.14	99%	Illinois TRM Section 5.6.1, PTD, MMDB
Ceiling/Attic Insulation	Sq. Ft.	Varies	Varies	125%	Illinois TRM Section 5.6.5, PTD, MMDB
Duct Insulation and Sealing	CFM	0.68 1.71	Varies	98%	Illinois TRM Section 5.3.4, PTD, MMDB
Foundation Wall Insulation	Sq. Ft.	Varies	Varies	689%	Illinois TRM Section 5.6.2, PTD, MMDB
Gas High Efficiency Boiler - HW	MBH	1.51	Varies	112%	Illinois TRM Section 5.3.6, PTD, MMDB
Gas High Efficiency Boiler - Steam	MBH	0.18	0.11 0.18	131%	Illinois TRM Section 5.3.6, PTD, MMDB
Gas High Efficiency Boiler - Two-in-One	Each	282.97 290.68	282.97 290.68 573.66	90%	Illinois TRM Section 5.3.17, PTD, MMDB
Gas High Efficiency Furnace	Each	214.47	214.47 428.93	93%	Illinois TRM Section 5.3.5, PTD, MMDB
Indirect Water Heater	Each	65.17	65.18	100%	Illinois TRM Section 5.4.2, PTD, MMDB
Programmable Thermostat - Boiler	Each	92.21 122.57	92.21 124.62	99%	Illinois TRM Section 5.3.11, PTD, MMDB
Programmable Thermostat - Furnace	Each	62.31	62.31	100%	Illinois TRM Section 5.3.11, PTD, MMDB
Tankless Water Heater	Each	72.45	72.45	100%	Illinois TRM Section 5.4.2, PTD, MMDB
Wall Insulation	Sq. Ft.	Varies	Varies	98%	Illinois TRM Section 5.3.11, PTD, MMDB

* Program Tracking Data (PTD) provided by Peoples Gas and North Shore Gas; extract dated January 30, 2024. MMDD means Master Measure Database, which is a PGL-NSG measure calculator.
† State of Illinois Technical Reference Manual version 11.0 from **http://www.ilsag.info/technical-reference-manual.html**.
‡ Project files and monthly billing data provided by Peoples Gas and North Shore Gas. When conducted, on-site and telephone interview data collected by Guidehouse.

5.2 Findings and Recommendations

Finding 1. Three instances of Gas High Efficiency Combination Boilers (WO-4418226, WO-4484085, and WO-4443134) used TRM v10.0 (2022) EUF_base and EUF_eff values for the ex ante savings calculation rather than the TRM v11.0 values.

Recommendation 1. Update EUF_base and EUF_eff from TRM v10.0 (2022) values (0.58 and 0.933) to TRM v11.0 (2023) values (0.563 and 0.954).

Finding 2. Five instances of Gas High Efficiency Combination Boilers (WO-5776480, WO-5735918, WO-5671429, WO-5726270, WO-5741850) reported ex ante savings values that were much higher than what is provided in the MMDB. Guidehouse could not isolate a cause for this discrepancy.

Recommendation 2. Ensure ex ante savings inputs match values provided in the MMDB: AFUE_base = 82%, AFUE_eff = 95%, AFUE_exist = 61.6%, Capacity Input = 119,666.7, EFLH = 976, EUF_base = 0.563, EUF_eff = 0.954, HF = 2.56. Report any actual values in the tracking data.

Finding 3. Three instances of Gas High Efficiency Boiler – HW (WO-5776649, WO-5771282, WO-5743690) report a quantity of one in the tracking data, but ex ante gross savings reflect a quantity of two. The evaluation team used a quantity of one for verified savings.

Recommendation 3. Ensure quantities provided in tracking data are accurate and reflect what is used to calculate ex ante totals.

Finding 4. Thirty-eight (38) instances of Gas High Efficiency Boiler – HW (e.g. WO-5462591, WO-4660392, WO-5221238, WO-5078731, WO-4473752, etc.) report different per unit savings values than what were provided in the MMDB. Guidehouse could not find a singular cause for the discrepancy.

Recommendation 4. Ensure ex ante savings inputs use the Early Replacement method and that inputs match values provided in the MMDB: AFUE_base = 84%, AFUE_exist = 62%, AFUE_eff = 95%, Cap Input = 1000, EFLH = 976. Provide any actual or custom values in the tracking data.

Finding 5. Two Gas High Efficiency Boilers – Steam (WO-4355660 and WO-4329545) report lower per unit savings values than what is provided in the MMDB.

Recommendation 5. Ensure ex ante savings inputs use the Early Replacement method and that inputs match values provided in the MMDB: AFUE_base = 82%, AFUE_exist = 75%, AFUE_eff = 83%, Cap Input = 1000, EFLH = 976. Provide any actual or custom values in the tracking data.

Finding 6. Ninety-Nine (99) instances of Gas High Efficiency Furnace (e.g. WO-5765046, WO-5775974, WO-5776424, WO-5745230, WO-5745168, WO-5735798, etc.) report a quantity of one in the tracking data, but ex ante gross savings reflect a quantity of two. One Furnace (WO-4680087) showed a quantity of negative one. The evaluation team used a quantity of positive 1 for these verified savings to align with what is provided in the tracking data and to calculate positive energy savings.

Recommendation 6. Ensure quantities provided in tracking data are accurate and reflect what is used to calculate ex ante totals.

Finding 7. Twenty-nine (29) instances of Advanced Thermostats from the HVAC program path (e.g. WO-5746032, WO-5727642, WO-5728047, WO-5744365, WO-5765532, etc.) report a quantity of one in the tracking data, but ex ante gross savings reflect a quantity two. The

evaluation team used a quantity of one for these verified savings to match the provided values from the tracking data.

Recommendation 7. Ensure quantities provided in tracking data are accurate and reflect what is used to calculate ex ante totals.

Finding 8. Two instances of Programmable Thermostat – Boiler (WO-5777704 and WO-5777705) report higher per unit savings values than what is provided in the MMDB.

Recommendation 8. Ensure ex ante savings inputs match values provided in the MMDB: Gas_Heating_Consumption = 1977 and Heating_Reduction = 6.2%. Provide any actual or custom values in the tracking data.

Finding 9. Two instances of Air Sealing with Attic Insulation (WO-5263034 and WO-5776542) report lower per unit savings values than what is provided in the MMDB. The evaluation team could not find a singular cause for this discrepancy.

Recommendation 9. Ensure ex ante savings inputs match values provided in the MMDB: CFM50_existing = 1, CFM50_new = 0, N_Heat = 21.1, HDD = 5,113, ηHeat = 72%, ADJ = 72%. Provide any actual or custom values in the tracking data.

Finding 10. Two-hundred and twelve (212) instances of Attic Insulation (e.g. WO-4813517, WO-4407900, WO-5262468, etc.) and six instances of Wall Insulation (WO-4391305, WO-4369837, WO-4455923, WO-4337467, WO-4678254, WO-4353806) yielded verified savings values that differed from ex ante savings. Guidehouse used actual R values provided in the tracking data to calculate verified savings, and used the TRM minimum R-values as needed. The evaluation team could not find a singular cause for this discrepancy.

Recommendation 10. Ensure ex ante savings inputs match values provided in the TRM and MMDB: Framing_Factor_Wall = 25%, Framing_Factor_Attic = 7%, HDD = 5,113, ηHeat = 72%, ADJ_Wall = 60%, ADJ_Attic = 72%. Provide any actual or custom values in the tracking data. When the existing R value is less than the minimum defined in the TRM (R-3 for Attic Insulation, R-5 for Wall Insulation), add the minimum to both the existing and efficient R-values.

Finding 11. Nine instances of Duct Insulation and Sealing (e.g. WO-5355401, WO-5336741, WO-5773196, etc.) yielded verified savings values that differed from ex ante savings. Guidehouse used actual R values provided in the tracking data to calculate verified savings. The evaluation team could not find a singular cause for this discrepancy.

Recommendation 11. Ensure ex ante savings inputs match values provided in the TRM and MMDB: Framing_Factor_Wall = 25%, Framing_Factor_Attic = 7%, HDD = 5,113, ηHeat = 72%, ADJ_Wall = 60%, ADJ_Attic = 72%. Provide any actual or custom values in the tracking data. Ensure reported R values are accurate.

Finding 12. Guidehouse could not reconcile the ex ante savings for the three Foundation Insulation measures. The evaluation team used the R_existing and R_new values from the tracking data to reference the savings ranges from the MMDB “Basement Insulation – New” tab.

Recommendation 12. Ensure ex ante savings inputs match values provided in the MMDB. Provide H_basement_wall_AG, H_basement_wall_total, L_basement_wall_total, R_old_AG, R_added, R_old_BG in tracking data to replicate exact savings rather than the MMDB ranges.

Finding 13. In the tracking data, Guidehouse found that capacities for Gas High Efficiency Boilers were being reported using two different methodologies, one where the total MBh was a quantity of boiler and the other was quantity multiplied by MBh capacity.

Recommendation 13. Provide quantity and MBh capacity as separate fields going forward in the tracking data.

Appendix A. Impact Analysis Methodology

Guidehouse verified unit savings by using the impact algorithms in IL-TRM v11.0.[1] and reviewed the ex ante savings calculation approach from the MMDB file.[2] In most cases, the TRM algorithms were correctly applied in the MMDB, but where the evaluation found the need to make adjustments, those were done according to the TRM guidelines.

Guidehouse calculated the verified net energy savings by multiplying the verified gross savings estimates by the NTG ratio. In 2023, the NTG estimates used to calculate the net verified savings were based on past evaluation research and defined by a consensus process through the Illinois Stakeholder Advisory Group (SAG). Economically disadvantaged areas (DAC) were identified by 2022 census track and evaluation used NTG of 1.0 for DAC projects, based on Illinois Policy Manual 3.0.[3]

[1] Illinois Statewide Technical Reference Manual (IL-TRM) version 11.0 from **http://www.ilsag.info/technical-reference-manual.html**

[2] Franklin Energy Master Measure Database, Excel file 2023 MMDB - Res and MF, provided February 08, 2023.

[3] https://www.ilsag.info/wp-content/uploads/IL_EE_Policy_Manual_Version_3.0_Final_11-3-2023.pdf

Appendix B. Program Specific Inputs for the Illinois TRC

Table B-1 and Table B-2 show the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report. Currently, additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in Table B-1 and Table B-2 and will be provided to the evaluation team later. Guidehouse will include annual and lifetime water savings and greenhouse gas reductions in the end of year summary report.

Table B-1: 2023 Verified Cost Effectiveness Inputs – PGL

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
HVAC	Advanced Thermostat - Base Manual (Condo)	Each	56	11.0	3,865	3,731	3,405
	Advanced Thermostat - Base Manual (Single Family)	Each	79	11.0	8,508	8,098	7,483
	Advanced Thermostat - Base Programmable (Condo)	Each	68	11.0	3,293	3,154	2,899
	Advanced Thermostat - Base Programmable (Single Family)	Each	96	11.0	7,350	6,850	6,272
	Gas High Efficiency Boiler - HW	MBH	3,570	25.0	4,805	5,760	4,577
	Gas High Efficiency Boiler - Steam	MBH	587	25.0	82	108	96
	Gas High Efficiency Boiler - Two-in-One	Each	40	21.5	12,736	11,604	9,265
	Gas High Efficiency Furnace	Each	671	20.0	155,063	143,907	114,688
	Indirect Water Heater	Each	4	13.0	261	261	193
	Programmable Thermostat - Boiler	Each	7	16.0	710	706	647
	Programmable Thermostat - Furnace	Each	19	16.0	1,184	1,184	1,079
	Tankless Water Heater	Each	66	13.0	4,781	4,781	3,821
Wx	Air Sealing	CFM	9,197	20.0	802	802	644
	Air Sealing with Attic Insulation	CFM	158,287	20.0	9,942	9,942	9,047
	Ceiling/Attic Insulation	Sq. Ft.	146,159	20.0	14,778	18,539	17,027
	Duct Insulation and Sealing	CFM	1,341	20.0	1,789	1,752	1,525
	Foundation Wall Insulation	Sq. Ft.	170	20.0	15	124	114
	Wall Insulation	Sq. Ft.	4,831	20.0	369	384	358
ComEd Marketplace	Advanced Thermostat - Base Manual (Condo)	Each	797	11.0	53,107	53,105	49,441
	Advanced Thermostat - Base Manual (Single Family)	Each	1,777	11.0	182,162	182,160	170,925
	Advanced Thermostat - Base Programmable (Condo)	Each	793	11.0	36,778	36,780	33,997
	Advanced Thermostat - Base Programmable (Single Family)	Each	1,940	11.0	138,430	138,429	129,338

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
	Advanced Thermostat - Base Unknown (Single Family)	Each	148	11.0	12,642	12,643	11,960
	Advanced Thermostat - Base Unknown (Condo)	Each	61	11.0	3,387	3,387	3,209
Total or Weighted Average				**19.9**	**656,839**	**648,192**	**582,011**

Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

Table B-2. 2023 Verified Cost Effectiveness Inputs – NSG

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
HVAC	Advanced Thermostat - Base Manual (Condo)	Each	6	11.0	400	400	366
	Advanced Thermostat - Base Manual (Single Family)	Each	62	11.0	6,766	6,356	5,730
	Advanced Thermostat - Base Programmable (Condo)	Each	5	11.0	232	232	209
	Advanced Thermostat - Base Programmable (Single Family)	Each	116	11.0	8,919	8,277	7,471
	Gas High Efficiency Boiler - HW	MBH	1,602	25.0	2,198	2,574	1,905
	Gas High Efficiency Boiler - Two-in-One	MBH	4	21.5	1,446	1,163	860
	Gas High Efficiency Furnace	Each	681	20.0	156,350	146,480	109,734
	Indirect Water Heater	Each	2	13.0	130	130	96
	Programmable Thermostat - Furnace	Each	11	16.0	685	685	611
	Tankless Water Heater	Each	25	13.0	1,811	1,811	1,340
Wx	Air Sealing	CFM	13,730	20.0	1,198	1,198	922
	Air Sealing with Attic Insulation	CFM	75,903	20.0	4,856	4,767	4,195
	Ceiling/Attic Insulation	Sq. Ft.	105,763	20.0	9,896	12,340	10,983
	Duct Insulation and Sealing	CFM	3,828	20.0	4,790	4,680	4,071
	Foundation Wall Insulation	Sq. Ft.	60	20.0	5	14	12
	Wall Insulation	Sq. Ft.	600	20.0	12	35	31
ComEd Marketplace	Advanced Thermostat - Base Manual (Condo)	Each	49	11.0	3,265	3,265	2,958
	Advanced Thermostat - Base Manual (Single Family)	Each	432	11.0	44,285	44,284	40,430

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
	Advanced Thermostat - Base Programmable (Condo)	Each	49	11.0	2,273	2,273	2,050
	Advanced Thermostat - Base Programmable (Single Family)	Each	621	11.0	44,312	44,311	40,258
	Advanced Thermostat - Base Unknown (Single Family)	Each	40	11.0	3,417	3,417	3,169
	Advanced Thermostat - Base Unknown (Condo)	Each	4	11.0	222	222	200
Total or Weighted Average				**20.0**	**297,467**	**288,914**	**237,603**

Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.