



Multi-Family Market Rate 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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1. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2023 Multi-Family Market Rate programs. It presents a summary of the energy impacts for the total program and broken out by relevant 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 Multi-Family Program is designed to provide a “one-stop-shop” to multi-family property owners and managers of buildings with three or more units to achieve comprehensive improvements in energy efficiency that previously would have required accessing multiple programs. The Multi-Family Program delivery approach consists of four paths, described below.

1. The **Direct Install (DI)** and **Energy Assessment “Jumpstart”** path provides free energy efficiency products in residential dwelling units (IU) and common areas (CA). The energy assessment identifies additional comprehensive efficiency upgrades that allow participants to implement deeper retrofit measures through other delivery paths.
2. The **Partner Trade Ally (PTA)** path provides standardized incentives for energy efficient equipment based on the size and efficiency of the equipment installed or on a per unit basis while providing higher incentives to a network of partner trade allies (PTAs) who are selected, screened, and registered with the Multi-Family Program. In turn, the PTAs offer larger rebates than the prescriptive rebates to their customers to install energy-efficient products.
3. The **Prescriptive Rebate** path provides standardized incentives for energy efficient equipment based on the size and efficiency of the equipment installed or on a per unit basis.
4. The **Custom** path provides technical services and custom rebates for non-standard building improvement upgrades as well as incentive opportunities for energy efficient new construction projects in multi-family buildings.

The PGL program had 147 participants in 2023 and completed 236 projects, as shown in the following table.

Table 2-1. 2023 Volumetric Summary for PGL

Participation	Direct Install	Partner Trade Ally	Prescriptive	Custom	Total
Participants *	9	126	11	1	147
Installed Projects †	78	146	11	1	236
Measure Types Installed	8	20	8	1	37

* Participants are defined as unique Gas Account Numbers.

† Installed Projects are defined as unique Work Order IDs.

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. The table distinguishes between projects installed in disadvantaged communities (DAC) zip codes and those not in disadvantaged communities.

Table 2-2. 2023 Installed Measure Quantities for PGL

Program Path	Measure	Quantity Unit	Installed Quantity
Direct Install	Assessment/No Savings	Unit	329
	Shower Timer (IU)	Unit	268
	Showerhead (IU)	Unit	230
	Faucet Aerator – Bathroom (IU)	Unit	200
	Faucet Aerator – Kitchen (IU)	Unit	119
	Programmable Thermostat	Unit	61
	Advanced Thermostat	Unit	12
	Assessment/No Savings - DAC	Unit	11
	Faucet Aerator - Bathroom (IU) - DAC	Unit	11
	Shower Timer (IU) - DAC	Unit	11
	Showerhead (IU) - DAC	Unit	11
	Faucet Aerator - Kitchen (IU) - DAC	Unit	6
Partner Trade Ally	Boiler Tune Up	MBH	183,784
	Pipe Insulation	Ln Ft	19,764
	Assessment/No Savings	Unit	7,791
	Draft Controls	MBH	4,408
	Steam Trap	Unit	2,365
	Boiler Reset Controls	MBH	900
	Advanced Thermostat	Unit	577
	On Demand DHW Controls	Unit	492
	Steam Pipe Averaging Controls	Unit	110
	Central Water Heater	Unit	55
	High Efficiency Boiler	Unit	21
	Boiler Tune Up - DAC	MBH	19,212
Prescriptive	Assessment/No Savings - DAC	Unit	1,750
	Steam Trap - DAC	Unit	502
	On Demand DHW Controls - DAC	Unit	22
	Boiler Tune Up	MBH	11,475
	Central Water Heater	Unit	610
	Steam Pipe Averaging Controls	Unit	460

Program Path	Measure	Quantity Unit	Installed Quantity
	Advanced Thermostat	Unit	427
	Pipe Insulation	Ln Ft	182
	On Demand DHW Controls	Unit	10
	High Efficiency Boiler	Unit	5
	High Efficiency Boiler - DAC	Unit	2
Custom	Custom	Unit	2

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

The NSG program had 22 participants in 2023 and completed 22 projects as shown in the following table.

Table 2-3. 2023 Volumetric Summary for NSG

Participation	Partner Trade Ally	Total
Participants *	22	22
Installed Projects †	22	22
Measure Types Installed	6	6

* Participants are defined as unique Gas Account Numbers.

† Installed Projects are defined as unique Work Order IDs.

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 Category	Program Path	Measure	Quantity Unit	Installed Quantity
Multi-Family	Partner Trade Ally	Boiler Tune Up	MBH	100,760
		Pipe Insulation	Ln Ft	3,054
		On Demand DHW Controls	MBH	70
		Steam Pipe Averaging Controls	MBH	9

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

3. Program Savings Detail

Table 3-1 summarizes the energy savings the PGL Multi-family Market Rate Program achieved by path in 2023.

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)
Multi-Family	Direct Install	1,690	100%	1,690	Varies	1,632
	Direct Install - DAC	39	99%	39	Varies	39
	Partner Trade Ally	745,154	100%	743,996	0.87	647,277
	Partner Trade Ally - DAC	101,211	100%	101,211	1.00	101,211
	Prescriptive	87,366	100%	87,409	0.87	76,046
	Prescriptive - DAC	6,644	100%	6,644	1.00	6,644
	Custom	3,014	89%	2,694	0.87	2,343
Total		945,118	100%	943,683	0.89	835,192

* 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 web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>. DAC designated sites based on zip codes used a NTG of 1.0, but direct install water efficient measures with deemed NTG of 1.01 used the value 1.01.

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

Table 3-2 summarizes the energy savings the NSG Multi-family Market Rate Program achieved by 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)
Multi-Family	Partner Trade Ally	63,321	100%	63,292	0.87	55,064
Total		63,321	100%	63,292	0.87	55,064

* 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 web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>.

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

4. Program Savings by Measure

The PGL program includes 26 measures as shown in the following table. The Steam Trap and Pipe Insulation measures 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)	
Multi-Family	Direct Install	Showerhead (IU)	556	100%	556	1.01	562	
		Programmable Thermostat	405	100%	405	0.96	389	
		Advanced Thermostat	400	100%	400	0.90	360	
		Shower Timer (IU)	212	100%	212	0.96	204	
		Faucet Aerator - Bathroom (IU)	66	100%	66	1.01	67	
		Faucet Aerator - Kitchen (IU)	51	100%	51	1.01	51	
		Showerhead (IU) - DAC	25	100%	25	1.01	25	
		Shower Timer (IU) - DAC	8	100%	8	1.00	8	
		Faucet Aerator - Bathroom (IU) - DAC	3	100%	3	1.01	3	
		Faucet Aerator - Kitchen (IU) - DAC	3	100%	3	1.01	3	
	Direct Install Subtotal			1,729	100%	1,729		1,671
	Partner Trade Ally	Steam Trap		453,341	100%	453,341	0.87	394,407
		Pipe Insulation		108,023	100%	108,023	0.87	93,980
		Boiler Tune Up		86,148	100%	86,148	0.87	74,949
		Advanced Thermostat		34,744	97%	33,586	0.87	29,220
		On Demand DHW Controls		30,848	100%	30,848	0.87	26,838
		Steam Pipe Averaging Controls		6,720	100%	6,720	0.87	5,846
		Draft Controls		732	100%	732	0.87	637
		Boiler Reset Controls		1,196	100%	1,196	0.87	1,040
Central Water Heater			522	100%	522	0.87	454	
High Efficiency Boiler			22,878	100%	22,879	0.87	19,904	
Steam Trap - DAC		90,826	100%	90,826	1.00	90,826		
Boiler Tune Up - DAC		9,006	100%	9,006	1.00	9,006		

Program Category	Program Path	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG †	Verified Net Savings (Therms)
		On Demand DHW Controls - DAC	1,379	100%	1,379	1.00	1,379
		Partner Trade Ally Subtotal	846,365	100%	845,207		748,488
		Advanced Thermostat	28,452	100%	28,452	0.87	24,753
		Steam Pipe Averaging Controls	28,100	100%	28,100	0.87	24,447
		Pipe Insulation	10,449	100%	10,448	0.87	9,090
	Prescriptive	High Efficiency Boiler	8,568	101%	8,611	0.87	7,491
		Central Water Heater	5,792	100%	5,792	0.87	5,039
		Boiler Tune Up	5,379	100%	5,379	0.87	4,680
		On Demand DHW Controls	627	100%	627	0.87	545
		High Efficiency Boiler - DAC	6,644	100%	6,644	1.00	6,644
		Prescriptive Subtotal	94,010	100%	94,053		82,690
	Custom	Custom	3,014	89%	2,694	0.87	2,343
Total			945,118	100%	943,683		835,192

* 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 web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>. DAC designated sites based on zip codes used a NTG of 1.0, but direct install water efficient measures with deemed NTG of 1.01 used the value 1.01.

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

The NSG program includes 4 measures as shown in the following table. The Boiler Tune Up and Pipe Insulation measures 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)
Multi-Family	Partner Trade Ally	Boiler Tune Up	47,231	100%	47,231	0.87	41,091
		Pipe Insulation	11,122	100%	11,122	0.87	9,676
		On Demand DHW Controls	4,389	100%	4,389	0.87	3,818
		Steam Pipe Averaging Controls	578	95%	550	0.87	478
Total			63,321	100%	63,292	0.87	55,064

* 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 web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2023/>.

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 therm savings and realization rate findings by measure. The realization rate is the ratio of the verified savings to the 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. Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	RR	Data Source(s)
Advanced Thermostat	Unit	Varies	Varies	97%	Illinois TRM† Section 5.3.16, PTD*
Boiler Reset Controls		1.33	1.33	100%	Illinois TRM Section 4.4.4, PTD
Boiler Tune Up	MBH	0.47	0.47	100%	Illinois TRM Section 4.4.2, PTD
Central Water Heater	Unit	9.49	9.49	100%	Illinois TRM Section 4.3.7, PTD
Custom	Unit	Varies	Varies	89%	Project File Review, Monthly Billing Data‡
Draft Controls	MBH	0.17	0.17	100%	Illinois TRM Section 4.4.21, PTD
Faucet Aerator - Bathroom (IU)	Unit	1.69	1.69	100%	Illinois TRM Section 5.4.4, PTD
Faucet Aerator - Kitchen (IU)	Unit	2.82	2.82	100%	Illinois TRM Section 5.4.4, PTD
High Efficiency Boiler	Unit	Varies	Varies	100%	Illinois TRM Section 4.4.10, PTD
On Demand DHW Controls	Unit	62.70	62.70	100%	Illinois TRM Section 4.3.8, PTD
Pipe Insulation	Ln Ft	Varies	Varies	100%	Illinois TRM Section 4.4.14, PTD
Programmable Thermostat	Unit	40.50	40.50	100%	Illinois TRM Section 5.3.11, PTD
Shower Timer (IU)	Unit	3.79	3.79	100%	Illinois TRM Section 5.4.9, PTD
Showerhead (IU)	Unit	12.36	12.36	100%	Illinois TRM Section 5.4.5, PTD
Steam Pipe Averaging Controls	Unit	Varies	61.09	100%	Illinois TRM Section 4.4.36, PTD
Steam Trap	Unit	Varies	Varies	100%	Illinois TRM Section 4.4.16, PTD

* Program Tracking Data (PTD) provided by Peoples Gas and North Shore Gas; extract dated January 30, 2024.

† 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.

5.2 Findings and Recommendations

The evaluation team developed several findings and recommendations based on the 2023 evaluation. The findings and recommendations are organized by path type in the following sections. The overall impact of these findings on the program is very small, as the program achieved a 100% realization rate.

5.2.1 Direct Install

The realization rate for the Direct Install path was 100%. The finding included has no impact on gross savings, but instead will aid PGL-NSG in tracking net therms.

Finding 1. The ex ante calculations used a Net-to-Gross (NTG) ratio of 1.01 to calculate net therms savings for the shower timer measure. The NTG ratio of 1.01 is used for faucet aerators and showerheads. The evaluation team used a NTG ratio of 0.96 for all direct install measures, including shower timers, except aerators and showerheads. This is applicable to People's Gas only.

Recommendation 1. Review the NTG ratio used in the net savings calculation and ensure that it matches with the 2023 Illinois Energy Efficiency Stakeholder Advisory Group (IL SAG) NTG ratios.

5.2.2 Partner Trade Ally

Finding 2. For Common Areas (CA) 1-Pipe Steam Averaging Controls measure, the ex ante savings were calculated using a boiler efficiency of 61.6%, consistent with In-Unit existing Boilers. The evaluation team updated the efficiency to 64.8%, consistent with multi-family low pressure boilers. Increasing the efficiency led to a realization rate of 95% for this measure. This is applicable to North Shore Gas only.

Recommendation 2. Use appropriate boiler efficiency for the multi-family program consistent with the Illinois Statewide Technical Reference Manual v11.0 (IL-TRM)¹ (Section 4.4.36).

Finding 3. For In-Unit (IU) Smart Thermostat measure, the ex ante savings assumed 97% heating savings to be natural gas (%FossilHeat). This value is used for programs where the type of space heating is unknown. The evaluation team used 100%, consistent with the program utility. This is applicable to People's Gas only.

Recommendation 3. Ensure that the %FossilHeat used is 100% for natural gas programs, consistent with the IL-TRM (Section 5.3.11).

5.2.3 Prescriptive

The realization rate for the Prescriptive path was 100%.

¹ In this report, unless stated otherwise, IL-TRM refers to version 11.0 (v11.0)

5.2.4 Custom

Finding 4. The ex ante calculations referred to the Industrial Air Curtain measure (section 4.4.33) of the IL-TRM for algorithms and inputs. The ex ante savings were based on a balance point temperature of 55°F, and an average outdoor temperature during heating season for Chicago (T_{oh}) of 34°F. Based on the assumption of 55°F Balance Point temperature, the ex ante calculation used 192 heating days per year (total days in year above balance point temperature). Finally, the post retrofit garage door closing-speed was 23 in/s in the ex ante calculation.

The evaluation team used historical gas consumption of the building to determine the actual balance point of 63.7°F. Based on the calculated balance point temperature, the evaluation team determined T_{oh} to be 39.13°F and heating days per year to be 241.32 days. The evaluation team also used 20in/s as the post retrofit garage door closing-speed, consistent with the technical specification sheet. These updates led to a realization rate of 89% for the custom path. This is applicable to People's Gas only.

Recommendation 4. Whenever possible, leverage historical data to determine actual building balance points, and technical specifications for algorithm input parameters for custom projects.

Appendix A. Impact Analysis Methodology

The evaluation team used the same impact methodology for each component. Verified gross savings were determined for each program measure by:

- Reviewing the savings algorithm inputs in the measure workbook for agreement with the IL-TRM and IL-TRM Errata, where applicable.
- Validating the savings algorithm was applied correctly.
- Cross-checking per-unit savings values in the program tracking data with the verified values in the measure workbook or in Guidehouse’s calculations if the workbook did not agree with the IL-TRM.
- Multiplying the verified per-unit savings value by the quantity reported in the tracking data. The team calculated verified net savings by multiplying the verified gross savings estimates by a NTG ratio. In Program Year 2023, NTG estimates used to calculate the net verified savings were based on past evaluation research and defined by a consensus process through the IL SAG.
- For DAC postal codes, a NTG ratio of 1.0 is used.
- Guidehouse sourced methodologies and assumptions from the IL-TRM and the final 2023 tracking data.

For the custom projects, an in-depth application review was performed by a Guidehouse engineer to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. The evaluator reviewed project documentation in application forms and supporting documentation from the applicant. Table A-1 provides a summary of M&V results for the custom projects reviewed by Guidehouse.

Table A-1. Custom Project Summary – PGL

Work Order IDs	Measure Description	Ex Ante Gross Savings (therms)	Verified Gross RR*	Verified Gross Savings (therms)	Summary of Adjustment
WO-4655068	Custom – Garage Door	3,014	89%	2,694	The balance point temperature is calculated using actual historical Therm consumption data. Based on this temperature, average outdoor temperature and number of heating days is selected. The actual door closing speed is considered as per specification sheet.

Source: Peoples Gas tracking data and evaluation team analysis

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 this table 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: Verified Cost Effectiveness Inputs – PGL

Program Category	Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Multi-Family	Direct Install	Showerhead (IU)	Unit	230	10	556	556	562
		Programmable Thermostat	Unit	61	16	405	405	389
		Advanced Thermostat	Unit	12	11	400	400	360
		Shower Timer (IU)	Unit	268	2	212	212	204
		Faucet Aerator - Bathroom (IU)	Unit	200	10	66	66	67
		Faucet Aerator - Kitchen (IU)	Unit	119	10	51	51	51
		Showerhead (IU) - DAC	Unit	11	10	25	25	25
		Shower Timer (IU) - DAC	Unit	11	2	8	8	8
		Faucet Aerator - Bathroom (IU) - DAC	Unit	11	10	3	3	3
	Faucet Aerator - Kitchen (IU) - DAC	Unit	6	10	3	3	3	
	Partner Trade Ally	Steam Trap	Unit	2,365	6	453,341	453,341	394,407
		Pipe Insulation	Ln Ft	19,764	15	108,023	108,023	93,980
		Boiler Tune Up	MBH	183,784	3	86,148	86,148	74,949
		Advanced Thermostat	Unit	577	11	34,744	33,586	29,220
On Demand DHW Controls		Unit	492	15	30,848	30,848	26,838	
		High Efficiency Boiler	Unit	21	20	22,878	22,879	19,904

Program Category	Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
		Steam Pipe Averaging Controls	Unit	110	20	6,720	6,720	5,846
		Draft Controls	MBH	4,408	16	732	732	732
		Boiler Reset Controls	MBH	900	15	1,196	1,196	1,040
		Central Water Heater	Unit	55	25	522	522	454
		Steam Trap - DAC	Unit	502	6	90,826	90,826	90,826
		Boiler Tune Up - DAC	MBH	19,212	3	9,006	9,006	9,006
		On Demand DHW Controls - DAC	Unit	22	15	1,379	1,379	1,379
	Prescriptive	Advanced Thermostat	Unit	427	11	28,452	28,452	24,753
		Steam Pipe Averaging Controls	Unit	460	20	28,100	28,100	24,447
		Pipe Insulation	Ln Ft	182	15	10,449	10,448	9,090
		High Efficiency Boiler	Unit	5	25	8,568	8,611	7,491
		Central Water Heater	Unit	610	15	5,792	5,792	5,039
		Boiler Tune Up	MBH	11,475	3	5,379	5,379	4,680
		On Demand DHW Controls	Unit	10	15	627	627	545
		High Efficiency Boiler - DAC	Unit	2	25	6,644	6,644	6,644
	Custom	Custom	Unit	2	20	3,014	2,694	2,343
Total or Weighted Average				256,195	8.8	945,118	943,683	835,192

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

Table B-2. Verified Cost Effectiveness Inputs – NSG

Program Category	Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Multi-Family	Partner Trade Ally	Boiler Tune Up	MBH	100,760	3	47,231	47,231	41,091
		Pipe Insulation	Ln Ft	3,054	15	11,122	11,122	9,676
		On Demand DHW Controls	MBH	70	15	4,389	4,389	3,818
		Steam Pipe Averaging Controls	MBH	9	20	578	550	478
Total or Weighted Average				103,893	6.1	63,321	63,292	55,064

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