



C&I and Public Sector Prescriptive Program Impact Evaluation Report

**Energy Efficiency Plan: Plan Year 2021
(1/1/2021-12/31/2021)**

Prepared for:

Peoples Gas and North Shore Gas

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Table of Contents

1. Introduction.....	1
2. Program Description.....	1
3. Program Savings Detail	4
4. Program Savings by Measure	5
5. Impact Analysis Findings and Recommendations	7
5.1 Impact Parameter Estimates	7
5.2 Findings and Recommendations.....	8
5.3 Historical Realization Rates and Net-To-Gross (NTG) Values.....	9
Appendix A. Impact Analysis Methodology	10
Appendix B. Program Specific Inputs for the Illinois TRC	11

List of Tables, Figures, and Equations

Table 2-1. 2021 Volumetric Summary for PGL	1
Table 2-2. 2021 Installed Measure Quantities for PGL.....	2
Table 2-3. 2021 Volumetric Summary for NSG.....	3
Table 2-4. 2021 Installed Measure Quantities for NSG	3
Table 3-1. 2021 Annual Energy Savings Summary for PGL	4
Table 3-2. 2021 Annual Energy Savings Summary for NSG.....	4
Table 4-1. 2021 Annual Energy Savings by Measure for PGL	5
Table 4-2. 2021 Annual Energy Savings by Measure for NSG	6
Table 5-1. Verified Gross Savings Parameters.....	7
Table 5-2. EUL Discrepancy.....	9
Table 5-3. Historical Realization Rates and NTG Values – C&I.....	9
Table 5-4. Historical Realization Rate and NTG Values – Public Sector	9
Table B-1. Verified Cost Effectiveness Inputs – PGL	11
Table B-2. Verified Cost Effectiveness Inputs – NSG.....	12

1. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2021 Prescriptive Program for commercial and industrial (C&I) and public sector customers. It presents a summary of the energy impacts for the total program and broken out by relevant measure and program structure details. Appendix A presents the impact analysis methodology. Program year 2021 covers January 1, 2021 through December 31, 2021.

2. Program Description

The PGL and NSG comprehensive business programs bundle offerings into program paths and allow eligible C&I and public sector customers access to any of the paths¹ based on the needs of each customer. This report covers evaluation activities for measures installed and natural gas savings realized through the Prescriptive Rebate path, referred to as the Prescriptive Program in this report. This path provides standardized incentives to cover part of measure costs for existing commercial, industrial, and public sector buildings. The incentives focus on energy efficient measures such as heating systems, water heating systems, pipe and storage tank insulation, steam traps, and food service equipment.

The PGL program had 43 participants in 2021 (28 C&I and 15 public sector participants) and completed 427 projects (39 C&I and 388 public projects), as shown in Table 2-1.

Table 2-1. 2021 Volumetric Summary for PGL

Participation	Total
C&I Sector	
Participants *	28
Installed Projects †	39
Measure Types Installed	16
Public Sector	
Participants *	15
Installed Projects †	388
Measure Types Installed	14
Program 2021 Total	
Participants *	43
Installed Projects †	427
Measure Types Installed	18

* Participants are defined as the unique number of Account Names

† Installed Projects are defined as the unique number of Project IDs with non-zero therms 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.

¹ The comprehensive non-residential sector program paths include – Energy Jumpstart (direct installation of free energy saving products), Engineering Studies and staffing assistance, Prescriptive Rebates, Custom Rebates, and Gas Optimization. Only measures that received prescriptive rebates were implemented in 2021; the 2021 program did not realize savings from the Energy Jumpstart path, which as a direct installation offering was affected by COVID-19 restrictions. The custom and gas optimization projects are evaluated and reported separately.

Table 2-2. 2021 Installed Measure Quantities for PGL

Program Category	Measure	Quantity Unit	Installed Quantity
C&I	Boiler Reset Controls	MBH	6,000
	Boiler Tune Up - Process	MBH	134,727
	Boiler Tune Up - Space Heating	MBH	73,060
	Demand Control Ventilation (DCV) - Kitchen	HP	87
	High Efficiency Boiler	MBH	6,000
	Prescriptive Change Other*	Projects	1
	Prescriptive Change Steam Trap	Projects	7
	Steam Traps - High Pressure Space Heating	Each	134
	Steam Traps - HVAC Repair/Replace	Each	49
	Steam Traps - Industrial Replace	Projects	62
Public	Boiler Reset Controls	MBH	25,160
	Boiler Tune Up – Process	MBH	242,831
	Boiler Tune Up - Space Heating	MBH	2,304,456
	DCV – Kitchen	HP	95
	Prescriptive Change Other†	Projects	6
	Prescriptive Change Steam Trap	Projects	9
	Small Commercial Thermostat	Each	43
	Steam Traps - High Pressure Space Heating	Each	6
	Steam Traps - HVAC Repair/Replace	Each	1,658
	Steam Traps - Industrial Replace	Projects	6
Wireless Pneumatic Thermostat	Sq Ft	72,632	

* Program documents show this measure was a steam trap.

† Program documents show these measures are steam traps, boiler reset controls, boiler tune-up, and thermostats.
 Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

The NSG program had 25 participants in 2021 (5 C&I and 20 public sector participants) and completed 61 projects (6 C&I and 55 public projects), as shown in Table 2-3.

Table 2-3. 2021 Volumetric Summary for NSG

Participation	Total
C&I Sector	
Participants *	5
Installed Projects †	6
Measure Types Installed	6
Public Sector	
Participants *	20
Installed Projects †	55
Measure Types Installed	15
Program 2021 Total	
Participants *	25
Installed Projects †	61
Measure Types Installed	19

* Participants are defined as the unique number of Account Names

† Installed Projects are defined as the unique number of Project IDs with non-zero therms 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. 2021 Installed Measure Quantities for NSG

Program Category	Measure	Quantity Unit	Installed Quantity
C&I	High Efficiency Boiler	MBH	4,257
	Prescriptive Change Steam Trap	Projects	1
	Steam Traps - HVAC Repair/Replace	Each	356
	Steam Traps - Industrial Replace	Projects	5
Public	Boiler Tune Up – Process	MBH	2,250
	Boiler Tune Up - Space Heating	MBH	307,082
	DCV – Kitchen	HP	10
	Demand Controlled Ventilation	Sq Ft	44,250
	High Efficiency Boiler	MBH	700
	Pipe Insulation	Ln Ft.	4,098
	Prescriptive Change Steam Trap	Projects	1
	Steam Traps - High Pressure Space Heating	Each	3
	Steam Traps - HVAC Repair/Replace	Each	117
	Wireless Pneumatic Thermostat	Sq Ft	44,250

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

3. Program Savings Detail

Table 3-1 summarizes the energy savings the PGL program achieved by path in 2021.

Table 3-1. 2021 Annual Energy Savings Summary for PGL

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
C&I	1,183,243	100%	1,186,475	0.91	1,079,692
Public	2,251,980	100%	2,252,235	0.91	2,049,534
Total or Weighted Average	3,435,223	100%	3,438,710	0.91	3,129,226

* 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 Illinois SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/>.

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

Table 3-2 summarizes the energy savings the NSG program achieved by path in 2021.

Table 3-2. 2021 Annual Energy Savings Summary for NSG

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
C&I	259,238	100%	259,239	0.91	235,907
Public	253,826	100%	253,909	0.91	231,057
Total or Weighted Average	513,064	100%	513,148	0.91	466,964

* 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 Illinois SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/>.

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

4. Program Savings by Measure

The PGL program includes 12 unique research categories across the C&I and public sector program paths, as shown in Table 4-1. The Boiler Tune Up and Steam Trap measures contributed the most savings.

Table 4-1. 2021 Annual Energy Savings by Measure for PGL

Program Management	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
C&I	Boiler Reset Controls	8,057	100%	8,054	0.91	7,330
	Boiler Tune Up - Process	137,792	100%	137,790	0.91	125,389
	Boiler Tune Up - Space Heating	34,595	100%	34,597	0.91	31,484
	DCV - Kitchen	66,947	100%	66,951	0.91	60,925
	High Efficiency Boiler	10,068	100%	10,068	0.91	9,162
	Prescriptive Change Other	3,021	100%	3,021	0.91	2,749
	Prescriptive Change Steam Trap	36,366	100%	36,366	0.91	33,093
	Steam Traps - High Pressure Space Heating	49,418	107%	52,684	0.91	47,943
	Steam Traps - HVAC Repair/Rep.	17,683	100%	17,684	0.91	16,092
	Steam Traps - Industrial Replace	819,296	100%	819,259	0.91	745,526
Public	Boiler Reset Controls	33,786	100%	33,775	0.91	30,735
	Boiler Tune Up - Process	248,355	100%	248,352	0.91	226,000
	Boiler Tune Up - Space Heating	1,091,198	100%	1,091,266	0.91	993,052
	DCV - Kitchen	73,526	100%	73,530	0.91	66,912
	Prescriptive Change Other	42,121	100%	42,121	0.91	38,330
	Prescriptive Change Steam Trap	71,546	100%	71,546	0.91	65,107
	Small Commercial Thermostat	8,609	100%	8,612	0.91	7,837
	Steam Traps - High Pressure Space Heating	2,213	107%	2,359	0.91	2,147
	Steam Traps - HVAC Repair/Rep.	630,632	100%	630,683	0.91	573,922
	Steam Traps - Industrial Replace	42,819	100%	42,818	0.91	38,964
Wireless Pneumatic Thermostat	7,175	100%	7,174	0.91	6,529	
Total or Weighted Average		3,435,223	100%	3,438,710	0.91	3,129,226

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

The NSG program includes 11 unique measures across the C&I and public sector program paths, as shown in Table 4-2. The Boiler Tune Up and Steam Trap measures contributed the most savings.

Table 4-2. 2021 Annual Energy Savings by Measure for NSG

Program Management	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
C&I	High Efficiency Boiler	2,713	100%	2,713	0.91	2,468
	Prescriptive Change Steam Trap	1,183	100%	1,183	0.91	1,077
	Steam Traps - HVAC Repair/Replace	136,610	100%	136,621	0.91	124,325
	Steam Traps - Industrial Replace	118,731	100%	118,722	0.91	108,037
Public	Boiler Tune Up – Process	2,301	100%	2,301	0.91	2,094
	Boiler Tune Up - Space Heating	145,408	100%	145,417	0.91	132,330
	DCV – Kitchen	7,740	100%	7,740	0.91	7,043
	Demand Controlled Ventilation	3,009	100%	3,009	0.91	2,738
	High Efficiency Boiler	1,175	100%	1,175	0.91	1,069
	Pipe Insulation	29,018	100%	29,015	0.91	26,403
	Prescriptive Change Steam Trap	14,621	100%	14,621	0.91	13,305
	Steam Traps - High Pressure Space Heating	1,106	107%	1,179	0.91	1,073
	Steam Traps - HVAC Repair/Replace	44,897	100%	44,901	0.91	40,860
	Wireless Pneumatic Thermostat	4,551	100%	4,551	0.91	4,141
Total or Weighted Average		513,064	100%	513,148	0.91	466,964

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 the evaluation team's review. 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 other than 100%. Appendix A provides a description of the impact analysis methodology. Appendix B provides the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report.

Table 5-1. Verified Gross Savings Parameters

Program Path	Research Category	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
C&I	Boiler Reset Controls	MBH	1.34	1.34	1.00	IL TRM v9.0†, Section 4.4.10
	Boiler Tune Up - Process	MBH	1.02	1.02	1.00	IL TRM v9.0, Section 4.4.3
	Boiler Tune Up - Space Heating	MBH	0.47	0.47	1.00	IL TRM v9.0, Section 4.4.2
	DCV - Kitchen	HP	773.96	774.00	1.00	IL TRM v9.0, Section 4.2.16
	High Efficiency Boiler	MBH	1.42	1.42	1.00	IL TRM v9.0, Section 4.4.10
	Prescriptive Change Other	Each	Custom Calculation	Custom Calculation	1.00	PTD*
	Prescriptive Change Steam Trap	Projects	Custom Calculation	Custom Calculation	1.00	PTD
	Steam Traps - High Pressure Space Heating	Each	368.79	393.17	1.07	IL TRM v9.0, Section 4.4.16
	Steam Traps - HVAC Repair/Rep	Each	367.26	367.29	1.00	IL TRM v9.0, Section 4.4.16
Steam Traps - Industrial Rep	Projects	3,362.99	3,362.82	1.00	IL TRM v9.0, Section 4.4.16	
Public	Boiler Reset Controls	MBH	1.34	1.34	1.00	IL TRM v9.0, Section 4.4.10
	Boiler Tune Up - Process	MBH	1.02	1.02	1.00	IL TRM v9.0, Section 4.4.3
	Boiler Tune Up - Space Heating	MBH	0.47	0.47	1.00	IL TRM v9.0, Section 4.4.2
	DCV - Kitchen	HP	773.96	774.00	1.00	IL TRM v9.0, Section 4.2.16
	Demand Controlled Ventilation	Sq Ft	0.07	0.07	1.00	IL TRM v9.0, Section 4.4.19
	High Efficiency Boiler	MBH	1.68	1.68	1.00	IL TRM v9.0, Section 4.4.10

Program Path	Research Category	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
	Pipe Insulation	Ln Ft.	16.22	16.22	1.00	IL TRM v9.0, Section 4.4.14
	Prescriptive Change Other	Each	Custom Calculation	Custom Calculation	1.00	PTD
	Prescriptive Change Steam Trap	Projects	Custom Calculation	Custom Calculation	1.00	PTD
	Small Commercial Thermostat	Each	200.22	200.27	1.00	IL TRM v9.0, Section 4.4.48
	Steam Traps - High Pressure Space Heating	Each	368.79	393.17	1.07	IL TRM v9.0, Section 4.4.16
	Steam Traps - HVAC Repair/Rep	Each	381.04	381.07	1.00	IL TRM v9.0, Section 4.4.16
	Steam Traps - Industrial Rep	Projects	2,624.10	2,623.99	1.00	IL TRM v9.0, Section 4.4.16
	Wireless Pneumatic Thermostat	Sq Ft	0.10	0.10	1.00	2021 MMDB‡

* Program Tracking Data (PTD) provided by Peoples Gas and North Shore Gas, extracted February 7, 2022.

† State of Illinois Technical Reference Manual version 9.0 from <https://www.ilsag.info/technical-reference-manual/il-trm-version-9/>.

‡ Custom calculation reviewed by Guidehouse, file name: 2021 MMDB - C&I and SB - 020821, from Franklin Energy, February 15, 2021.

Source: Program tracking data and Guidehouse team analysis.

5.2 Findings and Recommendations

5.2.1 Steam Traps – Non-LPS Space Heating

Guidehouse found during Wave 1 analysis that Project IDs #7121269 and #6664993 installed Non-LPS Space Heating Steam Trap measures. Guidehouse used the 2021 MMDB savings inputs associated with the file's steam trap – high pressure space heating measure (>15 psi) for the tracking data's steam traps – non-LPS space heating measure. The MMDB calculator and TRM v9 provide inputs that result in verified savings that differ from ex ante savings reported in the tracking data. The verified gross unit savings was 393 therms per trap which produce a realization rate of 107%.

Recommendation 1. Ex ante savings calculations should reflect the information provided in the 2021 MMDB including measure description and inputs assumptions.

5.2.2 Effective Useful Life

Guidehouse found the 2021 MMDB did not have effective useful live (EUL) values in line with the TRM v9.0 for kitchen demand controls, high efficiency boiler, and boiler reset controls measures. The 2021 MMDB values compared with the TRM v9.0 values for the measures in question can be seen in Table 5-2.

The Total Resource Cost (TRC) Table B-1 and Table B-2 reflect values seen in TRM v9.0, or 2021 MMDB for prescriptive change measures. The exception is the prescriptive change other measure that does not have an associated EUL value in the 2021 MMDB.

Recommendation 2. Ensure the MMDB values reflect the current version of the Illinois Technical Reference Manual for the given program year.

Table 5-2. EUL Discrepancy

Research Category	MMDB EUL	TRM v9.0 EUL
DCV - Kitchen	15.0	20.0
High Efficiency Boiler	20.0	25.0
Boiler Reset Controls	20.0	16.0

Source: TRM v9.0, 2021 MMDB, and Guidehouse team analysis.

5.3 Historical Realization Rates and Net-To-Gross (NTG) Values

Table 5-3 shows the historical gross realization rates and NTG values for the C&I Prescriptive Program, beginning in GYP1. Table 5-4 shows the historical gross realization rates and NTG values for the Public Sector Prescriptive Program that began in GPY6 when PGL and NSG assumed administration of the program.

Table 5-3. Historical Realization Rates and NTG Values – C&I

Program Year	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
GPY1 (2011-2012)	100%	100%	0.43	0.43
GPY2 (2012-2015)	100%	100%	0.63	0.63
GPY3 (2013-2014)	100%	100%	0.63	0.63
GPY4 (2014-2015)	100%	100%	0.58	0.58
GPY5 (2015-2016)	99%	100%	0.63	0.63
GPY6 (2016-2017)	100%	100%	0.79	0.79
2018	100%	100%	0.79	0.79
2019	100%	100%	0.79	0.79
2020	100%	100%	0.79	0.79
2021	100%	100%	0.91	0.91

Source: Guidehouse evaluation research and the Illinois SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/>.

Table 5-4. Historical Realization Rate and NTG Values – Public Sector

Program Year	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
GPY6 – Prescriptive (2017)	100%	100%	0.46	0.46
GPY6 – STEP (2017)	98%	98%	0.90	0.9
2018	100%	107%	0.79	0.79
2019	100%	101%	0.79	0.79
2020	100%	100%	0.79	0.79
2021	100%	100%	0.91	0.91

Source: Guidehouse evaluation research and the Illinois SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/>.

Appendix A. Impact Analysis Methodology

Guidehouse determined verified gross savings for each program measure by:

1. Reviewing the savings algorithm inputs in the 2021 MMDB for agreement with the TRM v9.0 or evaluation research for non-deemed measures or custom inputs.
2. Validating that the savings algorithm was applied correctly.
3. Cross-checking per-unit savings values in the tracking data with the verified values in the measure workbook or in Guidehouse's calculations if the workbook did not agree with the TRM.
4. Multiplying the verified per-unit savings value by the quantity reported in the program tracking data drawn from an extract dated February 7, 2022 to substantiate the type and quantity of measures installed.

Verified gross realization rates are calculated by dividing the verified gross savings by the ex ante gross savings. The evaluation team calculated verified net gas savings by multiplying the verified gross savings estimates by a net-to-gross (NTG) ratio of 0.91, the value deemed by a consensus process through the Illinois SAG.

Appendix B. Program Specific Inputs for the Illinois TRC

Table B-1 and Table B-2 show the TRC cost-effectiveness analysis inputs available at the time of producing 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. 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

Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Boiler Reset Controls	MBH	31,160	16.0	41,843	41,829	38,065
Boiler Tune Up - Process	MBH	377,558	3.0	386,146	386,142	351,389
Boiler Tune Up - Space Heating	MBH	2,377,516	3.0	1,125,793	1,125,863	1,024,536
DCV - Kitchen	HP	182	20.0	140,473	140,481	127,838
High Efficiency Boiler	MBH	6,000	25.0	10,068	10,068	9,162
Prescriptive Change Other	Projects	7	6.3	45,142	45,142	41,079
Prescriptive Change Steam Trap	Projects	16	6.0	107,912	107,912	98,200
Small Commercial Thermostat	Each	43	11.0	8,609	8,612	7,837
Steam Traps - High Pressure Space Heating	Each	140	6.0	51,631	55,043	50,089
Steam Traps - HVAC Repair/Rep	Each	1,707	6.0	648,315	648,367	590,014
Steam Traps - Industrial Rep	Projects	337	6.0	862,115	862,077	784,490
Wireless Pneumatic Thermostat	Sq Ft	72,632	10.0	7,175	7,174	6,529
Total or Weighted Average			5.5	3,435,223	3,438,710	3,129,226

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

Table B-2. Verified Cost Effectiveness Inputs – NSG

Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Boiler Tune Up - Process	MBH	2,250	3.0	2,301	2,301	2,094
Boiler Tune Up - Space Heating	MBH	307,082	3.0	145,408	145,417	132,330
DCV - Kitchen	HP	10	20.0	7,740	7,740	7,043
Demand Controlled Ventilation	Sq Ft	44,250	10.0	3,009	3,009	2,738
High Efficiency Boiler	MBH	4,957	25.0	3,887	3,887	3,537
Pipe Insulation	Ln Ft.	4,098	15.0	29,018	29,015	26,403
Prescriptive Change Steam Trap	Projects	2	6.0	15,804	15,804	14,382
Steam Traps - High Pressure Space Heating	Each	3	6.0	1,106	1,179	1,073
Steam Traps - HVAC Repair/Rep	Each	473	6.0	181,507	181,522	165,185
Steam Traps - Industrial Rep	Projects	38	6.0	118,731	118,722	108,037
Wireless Pneumatic Thermostat	Sq Ft	44,250	10.0	4,551	4,551	4,141
Total or Weighted Average			6.1	513,064	513,148	466,964

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