Guidehouse
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C&I and Public Sector Gas Optimization Impact Evaluation Report

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

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) 2021 Gas Optimization Programs. 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 Gas Optimization Program provides a technical assessment service where energy advisors and contracted engineering firms review commercial, industrial, or public sector facilities for operation and maintenance issues that, if corrected, often provide short payback projects. In addition to identifying low-cost and no-cost measures that can be implemented by the customer, Gas Optimization studies also identify capital improvement projects. Incentives to complete recommended improvements include reimbursement for the cost of the technical assessment, rebates, and program implementation support. Projects identified through the Gas Optimization Program include steam pipe insulation, HVAC control optimization, heat recovery repair, process improvements, and other energy saving measures.

The PGL program had five participants in 2021 and completed five projects, as shown in Table 2-1.

Table 2-1. 2021 Volumetric Summary for PGL

Participation	Private	Public	Total
Participants *	4	1	5
Installed Projects †	4	1	5

* Participants are defined as unique account numbers
† Installed Projects are defined as unique project IDs
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

The NSG program had five participants in 2021 and completed five projects, as shown in Table 2-2.

Table 2-2. 2021 Volumetric Summary for NSG

Participation	Private	Public	Total
Participants *	2	3	5
Installed Projects †	2	3	5

* Participants are defined as unique account numbers
† Installed Projects are defined as unique project IDs
Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

3. Program Savings Detail

Table 3-1 summarizes the energy savings the PGL Gas Optimization 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)
Private	38,040	1.00	38,210	0.91	34,771
Public	37,849	1.00	38,018	0.91	34,596
Total or Weighted Average	**75,888**	**1.00**	**76,228**	**0.91**	**69,367**

* 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/ntg_2021.
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

Table 3-2 summarizes the energy savings the NSG Gas Optimization 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)
Private	605,260	1.00	607,968	0.91	553,251
Public	31,273	1.00	31,413	0.91	28,586
Total or Weighted Average	**636,533**	**1.00**	**639,381**	**0.91**	**581,837**

* 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/ntg_2021.
Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

4. Program Savings by Measure

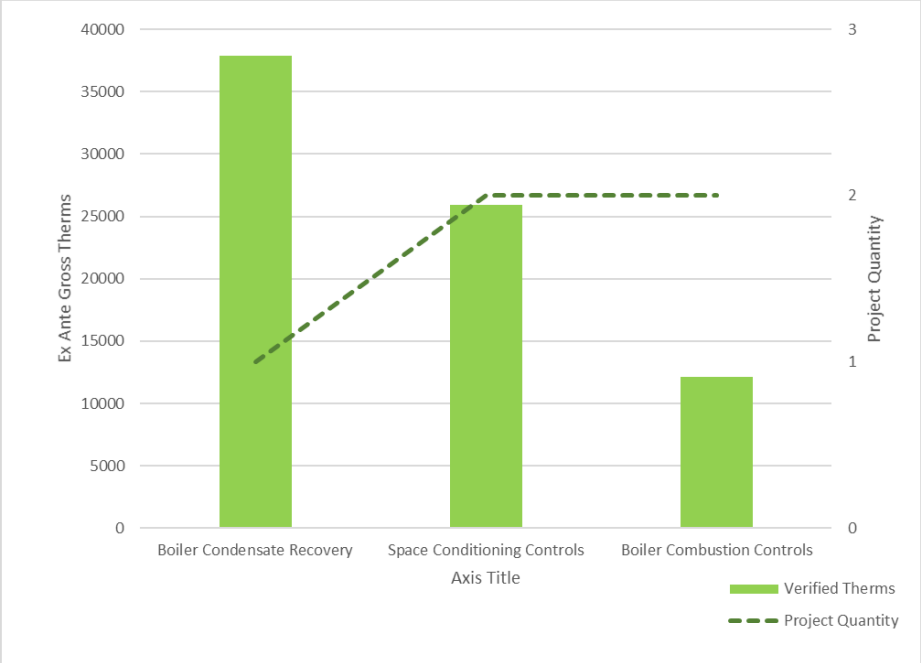
Savings for the PGL and NSG programs were verified through a sample design that had two strata. PGL project savings are shown in Table 4-1. The savings by measure type are provided in Figure 4-1, showing all projects are for either boilers or space conditioning controls.

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

Program Management	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Private	Strata 2	38,040	100%	38,210	0.91	34,771
Public	Strata 2	37,848	100%	38,018	0.91	34,596
Total or Weighted Average		**75,888**	**100%**	**76,228**	**0.91**	**69,367**

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

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



* Dashed green line indicates installed project quantity defined as unique project IDs.
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

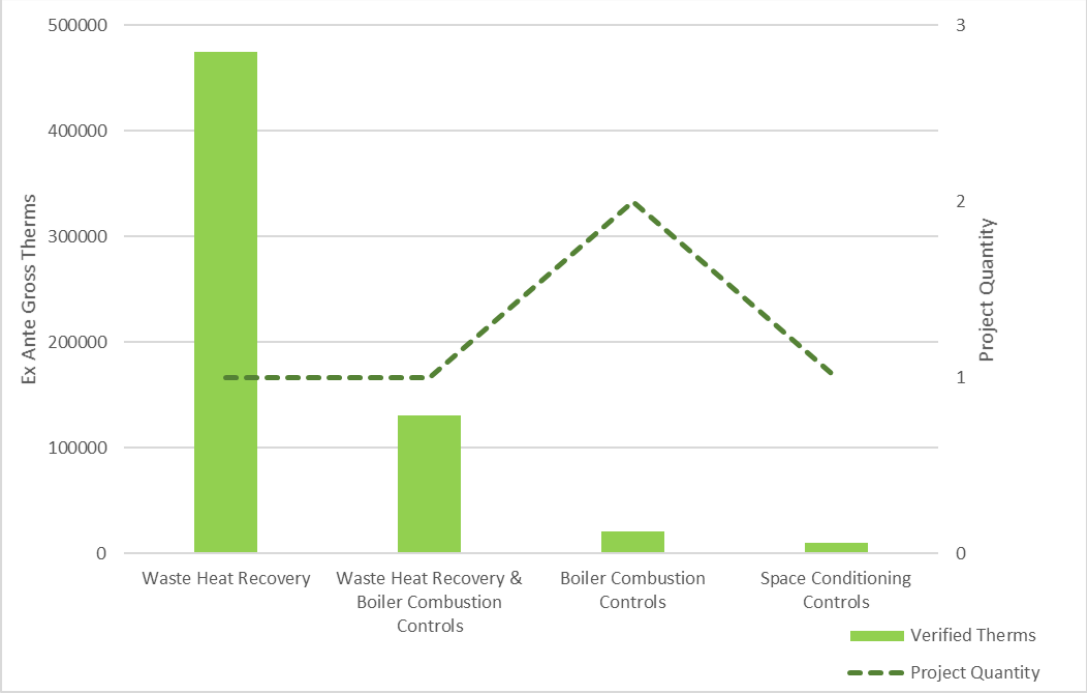
The savings for the NSG program are shown in Table 4-2able 4-2. The largest project in the program was evaluated in strata 1 as a certainty strata with 67% of total therm savings. The remaining projects were evaluated in Strata 2. The savings by measure type are provided in Figure 4-2.

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

Program Category	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Private	Strata 1	474,643	100%	476,767	0.91	433,858
Private	Strata 2	130,617	100%	131,201	0.91	119,393
Public	Strata 2	31,273	100%	31,413	0.91	28,586
Total or Weighted Average		**636,533**	**100%**	**639,381**	**0.91**	**581,837**

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

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



* Dashed green line indicates installed project quantity defined as unique project IDs.
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 ex ante savings. Following the table, we provide findings and recommendations, including discussion of measures with realization rates above or below 100 percent. Appendix A provides a description of the impact analysis methodology and sampling approach, and Appendix B provides the verification findings for each sampled project. Appendix C 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

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
Gas Optimization	Vary	Vary	Vary	100.45% (PGL and NSG)	Project File Review*, TRM v9†

* Program Tracking Data (PTD) provided by Peoples Gas and North Shore Gas; extracted February 2, 2022. Project files and monthly billing data provided by Peoples Gas and North Shore Gas. Site-specific data collected by Guidehouse.
† Source of inputs for some non-site-specific data. State of Illinois Technical Reference Manual version 9.0 from http://www.ilsag.info/technical-reference-manual.html.

5.2 Findings and Recommendations

The largest adjustments to savings came from one space conditioning project that was sampled in Strata 2. Four out of the six sampled projects received realization rates of 100% and the other two were 102% and 121%.

Finding 1. Ex ante savings for project ID 5630187 used weather TMY data from O'Hare airport. Guidehouse used TMY data from Midway, which is closer to the project site and better represents that climate.

> **Recommendation 1.** Use weather data that best reflects project location.

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

Table 5-2 shows the historical gross realization rates and NTG values for the Gas Optimization Program.

Table 5-2. Historical Realization Rates and NTG Values

Program Year	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
GPY4 (2014-2015)	98%	109%	1.02	1.02
GPY5 (2015-2016)	91%	NA	1.02	1.02
GPY6 (2016-2017)	100%	102%	1.02	1.02
2018	95%	NA	1.02	1.02
2019	102%	100%	0.91	0.91
2020	100%	100%	0.91	0.91
2021	100%	100%	0.91	0.91

NA-not applicable, no completed projects.
Source: Guidehouse evaluation research.

Appendix A. Impact Analysis Methodology

The evaluation team conducted site-specific research to verify project savings that were not based on measures specified in the Illinois Technical Reference Manual (TRM). Projects were randomly selected through a stratified sample design at the tracking record level using the population gross therm savings determined from program tracking data. Strata were defined by project size, based on gross energy savings boundaries that placed about three-quarters of the savings in a large project stratum and the remaining savings in a small project stratum. Table A-1 shows a profile of the sample selection and Table A-2 shows the sample precision.

Table A-1. Profile of Gross Impact Sample for Gas Optimization Projects

Population Summary				Sample Summary		
Program	Sampling Strata	Number of Projects (N)	Ex Ante Gross Savings (Therms)	n	Ex Ante Gross Savings (Therms)	Sampled % of Population (% Therms)
Gas Optimization	Strata 1	1	474,643	1	474,643	100%
	Strata 2	9	237,778	5	168,656	71%
Total or Weighted Average		**10**	**712,421**	**6**	**643,299**	**90%**

Source: Guidehouse evaluation team analysis.

Table A-2. Relative Precision at 90% Confidence Level

Program	Strata	Relative Precision +or-%	Mean RR	Standard Error
Gas Optimization	1	0.00%	100%	0.00
	2	1.70%	101%	0.01
Total RR (90/10)		0.63%	100%	0.00

Source: Guidehouse evaluation team analysis.

A.1 Engineering Review of Project Files

For each selected project, an in-depth application review was performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, engineers estimated ex post gross savings based on their review of documentation and engineering analysis.

To support this review, the implementation contractor provided project documentation in electronic format for each sampled project. Documentation included some or all scanned files of hardcopy application forms and supporting documentation from the applicant (invoices, measure specification sheets, and vendor proposals), pre-inspection reports and photos, post inspection reports and photos, and calculation spreadsheets. There were no site visits in the 2021 evaluation.

Appendix B. Impact Analysis Supplemental Information

Table B-1 provides a summary of verification results and adjustments for the PGL sampled projects.

Table B-1. 2021 PGL Summary of Sample M&V Results

Project ID	Measure Description	Gross Realization Rate	Summary of Adjustment
3809865	Humidity Control	100%	Ok
6508575	Boiler Combustion Controls	102%	OK
5630187	Space Conditioning Controls	121%	Weather station was adjusted from O'Hare to Midway to better represent project location.
4044207	Boiler Combustion Controls	100%	OK

Source: Evaluation analysis of program data.

Table B-2 provides a summary of verification results and adjustments for the NSG sampled projects.

Table B-2. NSG Summary of Sample M&V Results

Project ID	Measure Description	Gross Realization Rate	Summary of Adjustment
1935047	Heat Recovery Steam Generator and Shell/Tube	100%	Ok
7660325	Boiler Combustion Controls & Waste Heat Recover	100%	OK

Source: Evaluation analysis of program data.

Appendix C. Program Specific Inputs for the Illinois TRC

Table C-1 and Table C-2 show the Total Resource Cost (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 C-1. Verified Cost Effectiveness Inputs – PGL

Program Path	Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Space Conditioning Controls	Project	2	15.0	25,922	26,038	23,694
Private	Boiler Combustion Controls	Project	2	16.0	12,118	12,172	11,077
Public	Boiler Condensate Recovery	Project	1	20.0	37,849	38,018	34,596
Total or Weighted Average			**5**	**17.7**	**75,888**	**76,228**	**69,367**

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

Table C-2. Verified Cost Effectiveness Inputs – NSG

Program Path	Research Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Heat Recovery Steam Generator and Shell/Tube	Project	1	24.0	474,643	476,767	433,858
Public	Boiler Combustion Controls	Project	2	16.0	21,095	21,189	19,282
Private	Boiler Combustion Controls and Waste Heat Recovery	Project	1	24.0	130,617	131,201	119,393
Public	Space Conditioning Controls	Project	1	15.0	10,179	10,224	9,304
Total or Weighted Average			**5**	**23.6**	**636,533**	**639,381**	**581,837**

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