



# C&I and Public Sector Custom 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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## 1. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2021 Custom 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 and Appendix B present the impact analysis methodology. Program year 2021 covers January 1, 2021 through December 31, 2021.

## 2. Program Description

The Custom Rebate path provides private sector commercial and industrial (C&I) and public sector (PS) customers with rebates on a custom basis; these are applications that include measures not covered under the Prescriptive Rebate path. For example, burner replacement measures may fall into the Custom Rebate category. New construction projects not participating through the coordinated Non-Residential New Construction program may be treated through the Custom Program<sup>1</sup>.

Custom rebates are based on a dollar per therm basis, subject to limits for payback and project cost. PGL and NSG may revise eligible measures and incentives as driven by current market conditions, changes to codes and standards, technology, evaluation results, and program management knowledge. Typical market sectors for this program include larger customers in light and heavy manufacturing, steel and metal working, plastics compounding and processing, hospitals, food processing, hotels, public sector facilities, commercial laundry and other process heating intensive businesses.

The PGL Custom Program had 18 participants in 2021 and completed 39 projects, as shown in Table 2-1.

**Table 2-1. 2021 Volumetric Summary for PGL**

Participation	Private	Public	Total
Participants *	11	7	18
Installed Projects †	14	25	39

\* Participants are defined as unique account numbers or names

† Installed Projects are defined as unique project IDs

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

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

<sup>1</sup> The net savings for Non-Residential New Construction projects coordinated with ComEd are tracked and reported separately, not in this Custom Program evaluation report.

**Table 2-2. 2021 Volumetric Summary for NSG**

<b>Participation</b>	<b>Private</b>	<b>Public</b>	<b>Total</b>
Participants *	2	1	3
Installed Projects †	3	2	5

\* Participants are defined as unique account numbers or names

† Installed Projects are defined as unique project IDs

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

### 3. Savings Summary

Table 3-1 summarizes the energy savings the PGL Custom Program achieved by the custom 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	326,772	1.00	327,744	0.74	242,530
Public	457,238	1.00	458,598	0.74	339,363
<b>Total or Weighted Average</b>	<b>784,010</b>	<b>1.00</b>	<b>786,342</b>	<b>0.74</b>	<b>581,893</b>

\* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings for a sample of Custom Program projects.

† A deemed value. Available on the SAG web site: [https://www.ilsag.info/ntg\\_2021](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 Custom Program achieved by the custom 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	38,875	1.00	38,991	0.74	28,853
Public	1,255	1.00	1,258	0.74	931
<b>Total or Weighted Average</b>	<b>40,130</b>	<b>1.00</b>	<b>40,249</b>	<b>0.74</b>	<b>29,784</b>

\* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings for a sample of Custom Program projects.

† A deemed value. Available on the SAG web site: [https://www.ilsag.info/ntg\\_2021](https://www.ilsag.info/ntg_2021).

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

## 4. Program Savings by Measure

The Custom Program does not offer prescribed measures. The measures included in Table 4-1 and Table 4-2 have been manually characterized by the evaluation team. These characterizations were based on the primary energy saving measure in a given project. The realization rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings for a sample of Custom Program projects. Realization rate findings for individual sampled projects are provided in Appendix B.

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

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Public	Pipe Insulation	296,655	1.00	297,538	0.74	220,178
Public	Process Custom	74,832	1.00	75,055	0.74	55,540
Public	Process Heat Recovery	71,826	1.00	72,039	0.74	53,309
Public	Space Conditioning Controls	8,970	1.00	8,997	0.74	6,658
Public	Boiler Condensate Recovery	3,702	1.00	3,713	0.74	2,745
Public	HVAC Custom	1,253	1.00	1,257	0.74	930
Private	Pipe Insulation	147,023	1.00	147,460	0.74	109,121
Private	Process Heat Recovery	82,970	1.00	83,216	0.74	61,580
Private	Boiler Economizer	71,954	1.00	72,168	0.74	53,404
Private	Boiler Condensate Recovery	14,913	1.00	14,958	0.74	11,069
Private	Space Conditioning Controls	6,740	1.00	6,760	0.74	5,002
Private	Boiler Combustion Controls	3,172	1.00	3,182	0.74	2,354
<b>Total or Weighted Average</b>		<b>784,010</b>	<b>1.00</b>	<b>789,342</b>	<b>0.74</b>	<b>581,893</b>

\* Realization rate shown is based on the full sample of projects, and is not measure-specific.

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

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

Program Path	Research Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG	Verified Net Savings (Therms)
Public	Pipe Insulation	1,255	1.00	1,258	0.74	931
Private	Turbidity Controls	30,359	1.00	30,499	0.74	22,533
Private	Pipe Insulation	7,023	1.00	7,044	0.74	5,212
Private	Door Seal	1,493	1.00	1,497	0.74	1,108
<b>Total or Weighted Average</b>		<b>40,129</b>	<b>1.00</b>	<b>40,249</b>	<b>0.74</b>	<b>29,784</b>

\* Realization rate shown is based on the full sample of projects, and is not measure-specific.

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 Table 5-1, we provide findings and recommendations, including discussion of measures with realization rates above or below 100%. Appendix A provides a description of the impact analysis methodology. Realization rate findings for individual sampled projects are provided in Appendix B. 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)
Custom	Vary	Vary	Vary	100.3% (PGL and NSG)	Project File Review, Monthly Billing Data, On-Site or Telephone Verification of Site Specific Data*; 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

Guidehouse found the largest deviation from ex ante savings in pipe insulation projects and one project that installed an efficient garage door.

**Finding 1.** Ex ante savings for pipe insulation measures used boiler efficiencies between 82%-85%. Guidehouse used boiler efficiencies of 80.7%, per the TRM v9.

**Recommendation 1.** Adjust boiler efficiencies for pipe insulation projects to reflect the TRM if actual efficiencies are not available.

**Finding 2.** Ex ante savings for pipe insulation project 7323118 used an average from two of the three combustion readings for the boiler efficiency. Verified savings used the average of all three combustion boilers for the efficiency.

**Recommendation 2.** Include all boiler efficiencies in ex ante calculations.

**Finding 3.** A parking structure (ID 6788935) installed a new, efficient garage door and was claiming the traffic flowed in two directions. The door was verified to only be a one-way door and therefore received 50% of the savings.



**Recommendation 3.** Ensure the usage of door seal measures matches the installed measure.

### 5.3 Historical Realization Rates and NTG Values

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

**Table 5-2. Historical Realization Rates and NTG Values**

Program Year*	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
GPY1 (2011-12)	102%	102%	0.68	0.68
GPY2 (2012-13)	81%	81%	0.78	0.78
GPY3 (2013-14)	96%	96%	0.78	0.78
GPY4 (2014-15)	100%	102%	0.68	0.68
GPY5 (2015-16)	100%	96%	0.78	0.78
GPY6 (2016-17)	97%	108%	0.69	0.69
2018	104%	109%	0.69	0.69
2019	99%	63%	0.69	0.69
2020	99%	94%	0.74	0.74
2021	100%	100%	0.74	0.74

\* Program years GPY1 through GPY5 began June 1 and ended May 31. GPY6 began June 1, 2016 and ended December 31, 2017. Beginning January 1, 2018, program year (PY) coincides with calendar year (CY).

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 TRM. The PGL projects were initially planned to be reviewed as a census, however, the last portion of the year saw increased participation and we relied upon a sample. The sampled projects represent 63% of the PGL Custom Program population gross therm savings. NSG Custom projects were only in strata three, and two projects represented 80% of NSG population savings.

Table A-1 shows a profile of the PGL sample selection and Table A-2 shows the NSG sample selection. Table A-3 provides the sample precision for PGL and NSG combined.

**Table A-1 Profile of Gross Impact Sample for PGL Custom 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)
PGL Custom	1	3	260,927	3	260,927	100%
	2	7	275,109	4	153,412	56%
	3	29	247,974	9	76,838	31%
<b>Total</b>		<b>39</b>	<b>784,010</b>	<b>16</b>	<b>491,177</b>	<b>63%</b>

Source: Guidehouse evaluation team analysis

**Table A-2. Profile of Gross Impact Sample for NSG Custom 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)
NSG Custom	3	5	40,129	2	32,270	80%
<b>Total</b>	<b>3</b>	<b>5</b>	<b>40,129</b>	<b>2</b>	<b>32,270</b>	<b>80%</b>

Source: Guidehouse evaluation team analysis

**Table A-3. Gross Realization Rates and Relative Precision at 90% Confidence Level**

Program	Strata	Relative Precision + or - %	Mean RR	Standard Error
PGL & NSG Custom	1	0%	1.00	-
	2	1%	1.02	0.00
	3	5%	0.99	0.03
<b>Custom Total RR (90/10)</b>		<b>2%</b>	<b>1.00</b>	<b>0.01</b>

Source: Guidehouse evaluation team analysis

## **A.1 Engineering Review of Project Files**

For each selected project, an in-depth application review is performed to assess the engineering methods, parameters and assumptions used to generate all ex ante impact estimates. For each measure in the sampled project, the evaluation team estimated verified (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 due to Covid-19 safety restrictions.

## Appendix B. Impact Analysis Supplemental Information

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

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

Project ID	Measure	Program	Realization Rate	Comments
7315939	Pipe Insulation	PGL	100%	OK
5986578	Process - Other	PGL	100%	OK
3881623	Boiler Economizer	PGL	100%	OK
6446367	Pipe Insulation	PGL	102%	Adjusted boiler efficiency from 82.5% to 80.7%, per the TRM v9.
5935599	Pipe Insulation	PGL	102%	Adjusted boiler efficiency from 83.3% to 80.7%, per the TRM v9.
7803182	Pipe Insulation	PGL	100%	OK
7598039	Waste Heat Recovery	PGL	104%	Adjusted boiler efficiency from 83.3% to 80%, per the TRM v9.
7571958	Process - Other	NSG	100%	OK
8186487	Pipe Insulation	PGL	105%	Adjusted the steam boiler efficiency from 85% to 80.7%, per the TRM v9
4237072	Pipe Insulation	PGL	100%	OK
6490318	Pipe Insulation	PGL	104%	Adjusted boiler efficiency from 85.7% to 80.7%, per the TRM v9.
6011397	Pipe Insulation	PGL	100%	OK
6788935	Space Conditioning Controls	PGL	49%	Efficient garage door was installed on one commercial garage door with traffic flowing through in one direction. Ex ante savings estimated energy consumption assuming the door was two directions (entry and exit) and doubled savings.
6762460	Boiler Condensate Recovery	PGL	100%	OK
6930275	Boiler Combustion Controls	PGL	100%	OK
7323118	Pipe Insulation	PGL	126%	Ex ante used an average of two combustion readings for the boiler efficiency. Verified savings used the average of all three combustion boilers for the efficiency.
6004220	Pipe Insulation	PGL	102%	Adjusted the steam boiler efficiency from 82.0% to 80.7%, per the TRM v9
6733842	Bottom Door Seals	NSG	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**

PGL	Research Category	Units	Quantity	EUL	Ex Ante Gross Therms	Verified Gross Therms	Verified Net Therms
Private	Pipe Insulation	Project	8	15.0	147,023	147,460	109,121
	Process Heat Recovery	Project	1	15.0	82,970	83,216	61,580
	Boiler Economizer	Project	1	15.0	71,954	72,168	53,404
	Boiler Condensate Recovery	Project	2	10.0	14,913	14,958	11,069
	Space Conditioning Controls	Project	1	20.0	6,740	6,760	5,002
	Boiler Combustion Controls	Project	1	16.0	3,172	3,182	2,354
Public	Pipe Insulation	Project	14	15.0	296,655	297,538	220,178
	Process Custom	Project	5	16.0	74,832	75,055	55,540
	Process Heat Recovery	Project	3	15.0	71,826	72,039	53,309
	Space Conditioning Controls	Project	1	15.0	8,970	8,997	6,658
	Boiler Condensate Recovery	Project	1	10.0	3,702	3,713	2,748
	HVAC Custom	Project	1	15.0	1,253	1,257	930
<b>Total or Weighted Average</b>			<b>39</b>	<b>15.0</b>	<b>784,010</b>	<b>789,342</b>	<b>581,893</b>

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

**Table C-2. Verified Cost Effectiveness Inputs – NSG**

NSG	Research Category	Units	Quantity	EUL	Ex Ante Gross Therms	Verified Gross Therms	Verified Net Therms
Private	Process Insulation	Project	1	15.0	7,023	7,044	5,212
	Door Seal	Project	1	20.0	1,493	1,497	1,108
	Process - Other	Project	1	15.0	30,359	30,449	22,533
Public	Process Insulation	Project	2	15.0	1,255	1,258	931
<b>Total or Weighted Average</b>			<b>5</b>	<b>15.2</b>	<b>40,129</b>	<b>40,249</b>	<b>29,784</b>

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