Guidehouse

C&I and Public Custom Impact Evaluation Report

Energy Efficiency Plan: Program Year 2024 (1/1/2024-12/31/2024)

Prepared for:

Peoples Gas and North Shore Gas

FINAL

June 12, 2025

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2. List of Tables, Figures, and Equations

3. Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2024 Custom 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 2024 covers January 1, 2024 through December 31, 2024.

4. Program Description

The Custom program provides PGL and NSG private sector commercial and industrial (C&I) and public sector (PS) customers with rebates on a custom basis; these are applications for measures not covered under the Prescriptive Rebate path. Typical market sectors for this program include larger customers in light and heavy manufacturing, hospitals, hotels, public sector facilities, and other process heating intensive businesses.

Custom rebates are on a dollar per therm basis, subject to payback and project cost limitations. 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.

The PGL Custom program had 19 participants in 2024 and completed 27 projects, as shown in Table 1.

Table 1. 2024 Volumetric Summary for PGL

Participation	Private	Public	Total
Participants *	12	7	19
Installed Projects †	19	8	27
Measure Types Installed ‡	5	4	6

* Participants are defined as unique work order IDs
† Installed Projects are defined as unique retrofit for each participant
‡ Total Measure Types Installed is less than the sum of private and public due to the same Measure Types in different building sectors.
Source: Peoples Gas tracking data and Guidehouse evaluation team analysis.

The NSG program had 4 participants in 2024 and completed 5 projects, as shown in Table 2

Table 2. 2024 Volumetric Summary for NSG

Participation	Private	Public	Total
Participants *	2	2	4
Installed Projects †	3	2	5
Measure Types Installed	2	1	3

* Participants are defined as unique work order IDs
† Installed Projects are defined as unique retrofit for each participant
Source: North Shore Gas tracking data and Guidehouse evaluation team analysis.

5. Program Savings Detail

Table 3 summarizes the energy savings the PGL Custom program achieved in 2024.

Table 3. 2024 Annual Energy Savings Summary for PGL

Program Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private, Non-Disadvantaged Communities	200,683	101%	202,355	0.74	149,742
Private, Disadvantaged Communities	97,967	101%	98,895	1.00	98,895
Public, Non-Disadvantaged Communities	21,058	101%	21,243	0.92	19,544
Public, Disadvantaged Communities	127,049	101%	127,786	1.00	127,786
Total or Weighted Average	**446,756**	**101%**	**450,279**		**395,967**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† NTG, Net to Gross is the deemed value available on the Illinois Stakeholder Advisory Group (SAG) website: www.ilsag.info/evaluator-ntg-recommendations-for-2024/. Based on SAG Policy, participants in disadvantaged communities (DAC) based on their census tract and with consumption under 35,000 Therms are assigned a NTG of 1.00.
Source: Evaluation team analysis.

Table 4 summarizes the energy savings the NSG Custom program achieved in 2024.

Table 4. 2024 Annual Energy Savings Summary for NSG

Program Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private, Non-Disadvantaged Communities	15,109	101%	15,245	0.74	11,282
Private, Disadvantaged Communities	7,084	101%	7,148	1.00	7,148
Public, Non-Disadvantaged Communities	274	101%	276	0.92	254
Public, Disadvantaged Communities	543	101%	547	1.00	547
Total or Weighted Average	**23,010**	**101%**	**23,216**		**19,230**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† NTG, Net to Gross is the deemed value available on the SAG website: www.ilsag.info/evaluator-ntg-recommendations-for-2024/. Based on SAG Policy, participants in disadvantaged communities (DAC) based on their census tract and with consumption under 35,000 Therms are assigned a NTG of 1.00.
Source: Evaluation team analysis.

6. Program Savings by Measure

The Custom program does not offer prescribed measures. Table 5 and Table 6 present the custom measures processed through the Custom program in PY2024. 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 the Custom program projects. Realization rate findings for individual sampled projects are provided in 7.2Appendix A.

The PGL program includes 6 measures as shown in Table 5. Insulation and Boiler Condensate Recovery measures contributed the most savings.

Table 5. 2024 Annual Energy Savings by Measure for PGL

Program Category	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private, Non-DAC	Insulation	140,982	101%	142,078	0.74	105,138
	Waste Heat Recovery	34,714	101%	35,064	0.74	25,948
	Other	24,987	101%	25,212	0.74	18,657
Private, Non-DAC Subtotal		***200,683***	***101%***	***202,355***	***0.74***	***149,742***
Private, DAC	Boiler Condensate Recovery	17,971	101%	18,133	1.00	18,133
	Insulation	56,478	101%	57,032	1.00	57,032
	Boiler Combustion Controls	23,517	101%	23,729	1.00	23,729
Private, Non-DAC Subtotal		***97,967***	***101%***	***98,895***	***1.00***	***98,895***
Public, Non-DAC	Boiler Condensate Recovery	6,949	101%	7,011	0.92	6,450
	Insulation	5,334	101%	5,381	0.92	4,950
	Other	2,420	101%	2,439	0.92	2,244
	Space Conditioning Controls	6,356	101%	6,413	0.92	5,900
Public, Non-DAC Subtotal		***21,058***	***101%***	***21,243***	***0.92***	***19,544***
Public, DAC	Boiler Condensate Recovery	127,049	101%	127,786	1.00	127,786
Public, DAC Subtotal		***127,049***	***101%***	***127,786***	***1.00***	***127,786***
Total or Weighted Average		**446,756**	**101%**	**450,279**		**395,967**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† NTG is the deemed value available on the SAG website: www.ilsag.info/evaluator-ntg-recommendations-for-2024/. Based on SAG Policy, DAC participants with consumption under 35,000 Therms are assigned a NTG of 1.00.
‡ This verified gross RR of 100% is a rounded value. The verified gross savings is calculated to be slightly lower than the ex ante gross savings.
Source: Evaluation team analysis.

The NSG program includes 3 measures, as shown in Table 6. The Insulation measure contributed the most savings.

Table 6. 2024 Annual Energy Savings by Measure for NSG

Program Category	Savings Category	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private, Non-DAC	Insulation	15,109	101%	15,245	0.74	11,282
Private, Non-DAC Subtotal		***15,109***	***101%***	***15,245***	***0.74***	***11,282***
Private, DAC	Other	7,084	101%	7,148	1.00	7,148
Private, Non-DAC Subtotal		***7,084***	***101%***	***7,148***	***1.00***	***7,148***
Public, Non-DAC	Boiler Economizer	274	101%	276	0.92	254
Public, Non-DAC Subtotal		***274***	***101%***	***276***	***0.92***	***254***
Public, DAC	Boiler Economizer	543	101%	547	1.00	547
Public, DAC Subtotal		***543***	***101%***	***547***	***1.00***	***547***
Total or Weighted Average		**23,010**	**101%**	**23,216**		**19,230**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† NTG is the deemed value available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/. Based on SAG Policy, DAC participants with consumption under 35,000 Therms are assigned a NTG of 1.00.
Source: Evaluation team analysis

7. Impact Analysis Findings and Recommendations

7.1 *Impact Parameter Estimates*

Table 7 shows the realization rate and data source 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 a discussion of measures with realization rates above or below 100 percent. Appendix A provides a description of the impact analysis methodology.

Table 7. Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (therms/unit)	Verified Gross (therms/unit)	Realization Rate	Data Source(s)
PGL Custom	Project	Vary	Vary	101%	PGL Program Tracking Data*, Illinois Technical Reference Manual (IL-TRM) v12.0†, Project File, Utility Data, Site Specific Verification‡
NSG Custom	Project	Vary	Vary	101%	NSG Program Tracking Data*, Illinois Technical Reference Manual (IL-TRM) v12.0†, Project File, Utility Data, Site Specific Verification‡

* Program Tracking Data provided by Peoples Gas and North Shore Gas; extract dated January 30, 2025.
† State of Illinois Technical Reference Manual version 12.0 from 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.

7.2 *Findings and Recommendations*

General findings and recommendations are presented below. The detailed realization rates and evaluation findings for individual sampled projects are provided in Appendix A.

Finding 1a. For Commercial Dishwasher project WO-5099912, the evaluator communicated with the site contact to confirm the operating conditions of the dishwashers. We verified that the dishwashers operate 345 days per year instead of 306 days of operation used in the ex-ante calculation. The verified gross savings realization rate for this project is 109%.

Finding 1b. Project WO-4297942 is a Boiler Condensate Recovery project, which had a key input of city make-up water temperature. Ex ante project file uses a temperature of 55F for this input, but has no reference file to support this input. The evaluation team found an available deemed temperature of 50.7F and enthalpy of 18.8 Btu/lbm in IL-TRM Section 4.4.57 for Condensate Recovery System. With this adjustment, the project verified savings are 104% of the ex ante savings.

> **Recommendation 1.** Collect documentation, including equipment spec sheet, mechanical schedules, performance testing results, customer feedback, trend data, and/or contractor invoices to support key inputs and assumptions used in custom project calculations. Submit the documentation along with the project application and calculator for evaluation.

Finding 2. Project WO-5732120 included tank insulation and pipe insulation scopes. IL-TRM algorithm was used in the ex ante calculation to quantify the tank insulation savings. Evaluation identified a Load Factor of 70% was missing in the algorithm, which will reduce the savings for the project. In addition, the pipe insulation calculation claims a Thermal Regain Factor (TRF) of 0.84. Due to the installation area being the boiler room, the TRF should be updated to 0.7. With these findings corrected, the realization rate for this project is 82%.

> **Recommendation 2.** When utilizing IL-TRM as the reference for the calculation algorithm and key inputs, conduct a review to ensure the algorithm is applied fully consistent with the IL-TRM and the correct key inputs are selected for use based on project installation and operation details.

Finding 3. For Pipe Insulation projects WO-4325118 and WO-4982193, Tank Insulation project WO-5732120, and Boiler Condensate Recovery project WO-4297942, evaluation team found one of the following two scenarios relevant to the boiler efficiencies used in the calculators: (1) no reference documentation provided to support the boiler efficiency in the ex ante calculations, and (2) the boiler efficiency in the ex ante calculations was not consistent with available documentation. Evaluation team updated the boiler efficiency according to either available project documentation or IL-TRM in the verified savings calculation, resulting in realization rates ranging from 99% to 104%.

> **Recommendation 3.** For custom heating projects, including but not limited to Pipe Insulation, Tank Insulation, and Boiler Condensate Recovery projects, provide the references and/or data sources for boiler efficiency to better support the calculation.

Finding 4a. For Insulation project WO-6654154, the ambient temperature of 75F was not consistent with the project energy survey file provided by the installation contractor documentation, which was 70F. The evaluation adjustment resulted in verified gross realization rate of 102%.

Finding 4b. For Insulation project WO-4648111, the evaluation found that a portion of the affected areas are indoor semi-conditioned. A TRF of 0.84 was used for these areas in the ex ante calculator and should be 0.7 based on the area type according to IL-TRM Section 4.4.14 for Pipe Insulation measure. The evaluator updated the TRF and the operating hours.

> **Recommendation 4.** Through review and quality check of the savings calculators, ensure the key inputs and parameters utilized are consistent with the provided project supporting file, data analysis results, and reference documentation.

Appendix A. Impact Analysis Methodology

Twelve out of 23 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 one-third of program-level savings into each stratum. Table A-1 shows a profile of the sample selection.

Table A-1. Profile of Gross Impact Sample for 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 NSG Custom	1	2	197,549	2	197,549	100%
	2	3	126,368	3	126,368	100%
	3	12	138,938	7	76,671	55%
	4	6	6,910	0	-	0%
TOTAL		**23**	**469,765**	**12**	**400,588**	**85%**

Source: Evaluation team analysis.

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, engineers estimated verified gross savings based on their review of documentation and engineering analysis. During the 2024 evaluation, we completed on-site visits for three of the twelve sampled projects.

The implementation contractor provided project documentation in electronic format for each sampled project. Documentation included 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, calculation spreadsheets, and utility history data. Some project documentation were not sufficient as mentioned in the findings and recommendations section of this report.

Table A-2 shows the sample and the roll up gross realization rates and the mean precision estimates at a 90% confidence level.

Table A-2. Gross Realization Rates and Relative Precision at 90% Confidence Level

Program	Strata	Relative Precision + or -%	Mean RR	Standard Error
PGL NSG Custom	1	0%	101%	0.00
	2	0%	101%	0.00
	3	2%	101%	0.01
	4	NA	NA	NA
Custom Total RR (90/10)		**0.5%**	**101%**	**0.00**

Source: Evaluation team analysis

Table A-3 provides a summary of verification results and adjustments for the PGL and NSG sampled Custom projects.

Table A-3. PGL and NSG 2024 Summary of Sample M&V Results

Project ID	Measure	Program	Realization Rate	Comments
WO-4297350	Boiler Condensate Recovery	PG Public Custom	100%	-
WO-6654154	Insulation	PG C&I Custom	102%	Ambient temperature updated from 75F to 70F; annual hours updated from 8760 to 8766 hours per year
WO-4325118	Insulation	PG C&I Custom	102%	Heating efficiency updated from 81.7% to 80.7%; annual hours updated from 8760 to 8766 hours per year
WO-4982193	Insulation	PG C&I Custom	101%	Heating efficiency updated from 85% to 84.24%; annual hours updated from 8760 to 8766 hours per year
WO-5072971	Waste Heat Recovery	PG C&I Custom	100%	-
WO-5257647	Boiler Combustion Controls	PG C&I Custom	100%	-
WO-4297942	Boiler Condensate Recovery	PG C&I Custom	104%	City make-up water temperature updated from 55F to 50.7F; heating efficiency updated from 85% to 84.24%.
WO-4298209	Insulation	PG C&I Custom	99%	Annual hours updated from 8760 to 8766 hours per year. 3E Plus used in evaluation to calculate savings.
WO-5099912	Other	NSG C&I Custom	109%	Installed units annual operating days per year updated from 306 to 344.7 based on customer feedback; dishwasher racks washed per day updated to 1,708 based on data analysis.
WO-6111812	Insulation	PG C&I Custom	100%	-
WO-4648111	Insulation	PG Public Custom	105%	Updated indoor semi-conditioned areas Thermal Regain Factor (TRF) from 0.84 to 0.7.
WO-5732120	Insulation	PG C&I Custom	82%	Tank insulation measure heating efficiency updated from 80.7% to 79%; added a load factor of 70% for tank insulation measure; pipe insulation measure Thermal Regain Factor (TRF) updated from 0.84 to 0.7.

Source: Guidehouse 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	Savings Category	DAC Project	Units	Quantity	Effective Useful Life	Early Replacement Flag†	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Insulation	FALSE	Project	6	15.0	NO	140,982	142,078	105,138
Private	Waste Heat Recovery	FALSE	Project	1	15.0	NO	34,714	35,064	25,948
Private	Other	FALSE	Project	1	15.0	NO	24,987	25,212	18,657
Private	Boiler Condensate Recovery	TRUE	Project	1	15.0	NO	17,971	18,133	18,133
Private	Insulation	TRUE	Project	2	15.0	NO	56,478	57,032	57,032
Private	Boiler Combustion Controls	TRUE	Project	1	20.0	NO	23,517	23,729	23,729
Public	Boiler Condensate Recovery	FALSE	Project	2	15.0	NO	6,949	7,011	6,450
Public	Insulation	FALSE	Project	2	15.0	NO	5,334	5,381	4,950
Public	Other	FALSE	Project	1	15.0	NO	2,420	2,439	2,244
Public	Space Conditioning Controls	FALSE	Project	1	15.0	NO	6,356	6,413	5,900
Public	Boiler Condensate Recovery	TRUE	Project	1	15.0	NO	127,049	127,786	127,786
Total or Weighted Average					**15.3**		**446,756**	**450,279**	**395,967**

Source: Evaluation team analysis.

Table B-2. Verified Cost Effectiveness Inputs – NSG

Program Category	Savings Category	DAC Project	Units	Quantity	Effective Useful Life	Early Replacement Flag†	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Insulation	FALSE	Project	1	15.0	NO	15,109	15,245	11,282
Private	Other	TRUE	Project	1	15.0	NO	7,084	7,148	7,148
Public	Boiler Economizer	FALSE	Project	1	15.0	NO	274	276	254
Public	Boiler Economizer	TRUE	Project	1	15.0	NO	543	547	547
Total or Weighted Average					**15.0**		**23,010**	**23,216**	**19,230**

Source: Evaluation team analysis.