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Business New Construction Impact Evaluation Report

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

Prepared for:

Peoples Gas and North Shore Gas

FINAL

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Introduction

This report presents the results of the impact evaluation of the Peoples Gas (PGL) and North Shore Gas (NSG) 2024 Business New Construction (BNC) programs. The appendices present the impact analysis methodology, detailed engineering desk review results, and Illinois total resource cost (TRC) inputs. Program year 2024 covers January 1, 2024 through December 31, 2024.

Program Description

The BNC program is offered jointly to commercial and industrial (C&I) and public sector (PS) customers served by ComEd, Nicor Gas, PGL, and NSG. The program aims to capture immediate and long-term energy efficiency opportunities available during the design and construction of non-residential and multifamily buildings. The program covers new buildings, additions, and major renovations.

Slipstream (formerly Seventhwave) implements the program by reaching out to design professionals, commercial real estate developers, and customers at the beginning of the design process. The implementation team provides building design technical assistance to aid participants in reducing energy use beyond what is required by existing building codes and standards. The PGL and NSG BNC program coordinates with ComEd where their service areas overlap. PGL and NSG acquire therms savings from the program using a dollar per therm payment model on a project-by-project basis.

Overall, the program had 42 participants in 2024 and completed 42 projects. Of these projects, 33 included gas savings, 7 of which were served jointly by ComEd and Peoples Gas. Notably, ComEd tracking data identified 11 projects as jointly served; however, as seen in Table 1 Peoples Gas is not claiming savings for four of these projects that were initiated after they opted out of the BNC program in 2022.

Table 1. 2024 Volumetric Summary for PGL

Participation	ComEd (Overall with Gas Utilities)	Peoples Gas§	Total
Private Sector			
Participants *	27	7	N/A
Installed Projects †	27	7	N/A
Measure Types Installed ‡	Whole Building	Whole Building	
Public Sector			
Participants *	6	0	N/A
Installed Projects †	6	0	N/A
Measure Types Installed ‡	Whole Building	Whole Building	
Program 2024 Total			
Participants *	33	7	N/A
Installed Projects †	33	7	N/A
Measure Types Installed ‡	Whole Building	Whole Building	

* Participants are the distinct count of addresses
† Installed Projects are the distinct count of project ID
‡ Measure Types Installed are the distinct count of PGL measure names
§ Peoples Gas' participant and project counts exclude four projects completed in 2024 that were initiated after PGL opted out of the BNC program in 2022.
Source: Peoples Gas tracking data and evaluation team analysis.

No projects were served jointly by ComEd and North Shore Gas in 2024. Notably, ComEd tracking data identified two projects as jointly served; however, North Shore Gas is not claiming savings for these two projects as they were initiated after they opted out of the BNC program in 2022. The savings detailed in the report exclude the savings for these two projects but include savings for one project completed in 2023 that North Shore Gas is claiming in 2024, as seen in Table 2.

Table 2. 2024 Volumetric Summary for NSG

Participation	ComEd (Overall with Gas Utilities)	North Shore Gas§	Total
Private Sector			
Participants *	27	1	N/A
Installed Projects †	27	1	N/A
Measure Types Installed ‡	Whole Building	Whole Building	
Public Sector			
Participants *	6	0	N/A
Installed Projects †	6	0	N/A
Measure Types Installed ‡	Whole Building	Whole Building	
Program 2024 Total			
Participants *	33	1	N/A
Installed Projects †	33	1	N/A
Measure Types Installed ‡	Whole Building	Whole Building	

* Participants are the distinct count of addresses
† Installed Projects are the distinct count of project ID
‡ Measure Types Installed are the distinct count of NSG measure names
§ North Shore Gas' participant and project counts exclude two projects completed in 2024 that were initiated after NSG opted out of the BNC program in 2022.
Source: North Shore Gas tracking data and evaluation team analysis.

Program Savings Detail

Table 3 summarizes the energy savings the PGL BNC program achieved by path in 2024.

Table 3. 2024 Annual Energy Savings Summary for PGL

Program Category	Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	NSPO	Verified Net Savings (Therms)
Private, Non-Disadvantaged Communities	Whole Building	72,214	101%	72,734	0.43	N/A	31,276
Private, Non-DAC Subtotal		72,214	101%	72,734	0.43	N/A	31,276
Private, Disadvantaged Communities	Whole Building	2,436	101%	2,454	1.00	N/A	2,454
Private, DAC Subtotal		2,436	101%	2,454	1.00	N/A	2,454
Total or Weighted Average		**74,650**	**101%**	**75,187**	**0.45**	**N/A**	**33,729**

* Verified Gross RR, the realization rate (RR) is the ratio of Verified Gross Savings to Ex Ante Savings
† NTG, Net to Gross is the deemed value available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/.
Note: The evaluation team applied a NTG ratio of 1.0 to the verified gross savings estimates of eligible projects, which included private projects in disadvantaged communities (ZIP codes) with square footage values under the area threshold for eligibility based on building type. The area threshold criteria acts as a proxy in the absence of reliable electric rate and annual gas consumption data. The second half of this policy assigns public sector projects in DAC municipalities qualified as general delivery service municipal, public school, or local government projects a NTG of 1.0.
Source: Peoples Gas tracking data and evaluation team analysis
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Table 4 summarizes the energy savings the NSG BNC Program achieved by path in 2024.

Table 4. 2024 Annual Energy Savings Summary for NSG

Program Category	Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	NSPO	Verified Net Savings (Therms)
Private, Non-Disadvantaged Communities	Whole Building	24,977	101%	25,157	0.43	N/A	10,817
Private, Non-DAC Subtotal		24,977	101%	25,157	0.43	N/A	10,817

Program Category	Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	NSPO	Verified Net Savings (Therms)
Total or Weighted Average		**24,977**	**101%**	**25,157**	**0.43**	**N/A**	**10,817**

* Verified Gross RR, the realization rate (RR) is the ratio of Verified Gross Savings to Ex Ante Savings
† NTG, Net to Gross is the deemed value available on the SAG website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/.
Note: The evaluation team applied a NTG ratio of 1.0 to the verified gross savings estimates of eligible projects, which included private projects in disadvantaged communities (ZIP codes) with square footage values under the area threshold for eligibility based on building type. The area threshold criteria acts as a proxy in the absence of reliable electric rate and annual gas consumption data. The second half of this policy assigns public sector projects in DAC municipalities qualified as general delivery service municipal, public school, or local government projects a NTG of 1.0.
Source: North Shore Gas tracking data and evaluation team analysis.

Program Savings by Measure

The BNC program claims savings at the whole building level, so this report does not present measure-level savings. Evaluation-verified savings for the program are based on a random sample of projects and reported at the project level (whole building analysis). Appendix B provides more information about sampled project-level savings.

Impact Analysis Findings and Recommendations

Impact Parameter Estimates

BNC program participants completed 42 projects (33 with gas savings) in 2024. The evaluation team used a stratified random sampling approach to select 30 projects to receive an engineering desk review. Of the 30 sampled projects, 26 projects had gas savings. Of the 26 projects with gas savings, six were served jointly by ComEd and PGL and none were served jointly by ComEd and NSG (see Appendix A for more detail on the sampling approach). For five of the six PGL projects, the desk reviews resulted in realization rates (RR) of 1.0 and, therefore, independently confirmed the ex-ante savings and required no adjustments.

The evaluation team calculated RRs with and without interactive effects (see Appendix A for more detail on interactive effects). The final RRs for projects with gas savings was 101% for therms without interactive effects and 107% for therms with interactive effects.

The evaluation team calculated verified gross and net energy savings using participant specific whole-building energy models developed by the implementation team for baseline and projected design scenarios. For each participant, the design energy model estimates the proposed building's annual whole-building energy consumption based on architecture; building envelope; heating, ventilation, and air conditioning (HVAC); lighting; and other parameters from the building design plans. The baseline energy model for a project estimates the counterfactual annual energy consumption the building would be expected to consume if it were built to meet the baseline energy performance standards. The estimated first-year savings are the difference in annual electric and gas consumption between the two models. Most of the models were developed in the Sketchbox program, which utilizes the DOE2.2 engine. The evaluation team reviewed the models using Sketchbox or eQuest, which also utilizes the DOE2.2 engine.

Table 5 shows the parameters used in the verified gross and net savings calculations and indicates which were calculated through evaluation activities and which were deemed. The following section provides findings and recommendations, including a discussion of all measures with RRs above or below 100%. Appendix A provides a description of the impact analysis methodology.

Table 5. Verified Gross Savings Parameters

Gross Savings Input Parameters	Deemed or Evaluated?	Source*
Program Model Inputs	Evaluated	Program-supplied building models and savings calculation spreadsheet
Evaluation Model Inputs	Mixture	Desk review of project documentation; IL-TRM v12.0
Evaluation Model Results	Evaluated	eQuest/DOE2.2/DOE2.1E/Project Calculations
Realization Rate - All Projects	Evaluated	Program savings and evaluated savings
NTG - Electric and Gas	Deemed	Illinois SAG Consensus
EUL	Mixture	IL-TRM v12.0 – Volume 4 Attachment B

*TRM is the Illinois Technical Reference Manual version 12.0 (IL-TRM v12.0): https://www.ilsag.info/illinois-statewide-technical-reference-manual-version-12-0/. The net-to-gross (NTG) values can be found on the Illinois Stakeholder Advisory Group (SAG) website: https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/.
Source: Evaluation team analysis.

Findings and Recommendations

The factors that had the largest effect on adjusting ex ante gross savings were inconsistencies between installed equipment specifications and performance characteristics, incorrect application of code requirements or baselines, and missing savings calculations. The evaluation team developed several recommendations based on findings from the PY2024 evaluation.

Finding 1. The ex ante savings for several projects were different from the verified savings due to installed equipment quantities or specifications being inconsistent with performance characteristics included in the building models or calculations. Adjustments included:

- Project CINC-1323. Lighting fixture wattages, lighting fixture quantities, and installed HVAC equipment efficiencies
- Project CINC-1420. Specification on installed apartment appliances
- Project CINC-1301. Dedicated outdoor air system fan system size, cubic feet per minute flow rates, and filter type for allowable horsepower calculations

  Recommendation 1. The evaluation team recommends that building simulations are kept up to date to accurately represent the final as-built building construction and installed equipment.

Finding 2. The evaluation team changed the savings for one project due to incorrect application of code requirements or baselines:

- Project CINC-1446 applied the solar heat gain coefficient values for south, east, and west windows to all windows and did not account for the higher allowable value for

north-facing windows. Making this correction increased the electric savings for this measure by 20% and increased the realization rate for the entire project by 11%. The final electric realization rate for this project was 1.10.

Recommendation 2. The evaluation team recommends that the program team ensure project documentation is complete and sufficient to verify claimed project savings to ensure evaluability. In cases where efficiency upgrades include the installation of more aggressive than code-required control sequences, it is pivotal to include verification of the control sequence or setpoint in addition to documentation detailing the installation of the equipment. Only documenting the installation of the equipment may not be sufficient.

Finding 3. Project CINC-1395 was missing project calculations. The evaluation team recreated the savings based on available information, but the resulting savings levels differed from ex ante savings values:

- Project CINC-1395 included a chiller, but the associated savings appeared to be calculated outside of the supplied building model. The claimed savings greatly exceeded the levels calculated in the supplied building model. Additionally, the installed chiller was larger than expected based on the size of the building addition, suggesting the chiller was serving additional non-modeled loads. The evaluation recalculated savings using the TRM approach. The final electric realization rate for this project was 0.69

  Recommendation 3. Ensure that calculations are retained for measures calculated outside of building simulations.

Appendix A. Impact Analysis Methodology

Engineering Methodology

Table 5-1 includes a description of the building energy models used in the measurement and verification (M&V) engineering analysis. The analysis included the following:

- Adjusting the model inputs in the executable files to match the as-built conditions identified in the evaluation team's review of the BNC program's project files and then rerunning the model

- Quantifying impacts by comparing two simulations representing the projected design and baseline scenarios

The baseline model is the Illinois Energy Conservation Code for Commercial Buildings, which references and incorporates the applicable International Energy Conservation Code (IECC). The Illinois Energy Conservation Code for Commercial Buildings explicitly allows for the use of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 as an alternate compliance method.

The program assumes the appropriate baseline based on the program application date. Projects designed through CY2019 used IECC 2015 (based on ASHRAE 90.1-2013) with more recent projects (2020 or sooner) using IECC 2018 (based on ASHRAE 90.1-2016). The evaluation team relied on the same software, methods, and approach to assigning baseline assumptions that the program implementers used to estimate the ex ante models.

The team also calculated interactive effects for each fuel type, where applicable. Interactive effects are the resulting changes to savings that occur when the installation of one measure has a positive or negative effect on the consumption of another fuel type. Interactive effects are calculated in the model. For utilities' goal tracking, the evaluation team provides the savings without the penalties from interactive effects. The implementation team calculated savings for joint projects including interactive effects. However, the evaluation team calculated savings with and without interactive effects for reporting purposes. Unless noted, the results in this report exclude penalties from cross-fuel interactive effects.

The evaluation team calculated verified net energy savings by multiplying the verified gross savings estimates by a net to gross (NTG) ratio. In CY2024, the NTG values used to calculate the net verified savings were based on past evaluation research and approved by the Illinois SAG. The evaluation team applied a NTG ratio of 1.0 to verified gross savings estimates corresponding to eligible projects under the Net to Gross Policy for Disadvantaged Areas. Eligible projects consisted of public and private projects in disadvantaged communities ([DACs] ZIP codes) with square footage values under the area threshold for eligibility based on building type. The last of these criteria acts as a proxy in the absence of reliable electric rate and annual gas consumption data.

The evaluation team selected a stratified random sample for the BNC program to support the engineering desk reviews. The team designed the sample to provide 90/10 confidence and precision for evaluated therms savings estimates.

Sampling Approach

Consistent with previous evaluations, the evaluation team developed a MMBtu stratified random sample of projects to support the engineering desk reviews. This approach focused on electric and gas savings. The team designed the sample to provide 90/10 precision for evaluated kW, kWh, and therms savings, considering savings with and without interactive effects. This approach also targeted 90/10 precision at the MMBtu level.

The team sampled CY2024 projects in two waves. The Wave 1 sample frame contained all 14 projects with electricity or gas savings completed as of June 30, 2024. The Wave 2 sample frame contained the remaining 28 projects completed between July 1, 2024, and December 31, 2024. For each wave, the evaluation team divided the sample frame into strata based on the overall MMBtu savings of each project and randomly selected projects within those strata. After completing the desk reviews and calculating project-specific realization rates (RRs), the team developed case weights to extrapolate the results to similar projects, ensuring the engineering results represent the population of 2024 participants. Table A-1 shows the MMBtu profile of the sample selection. Table A-2 shows the profile of the sample for therms savings and roll up gross realization rate and precision estimate.

Table A-1. 2024 BNC Program Profile of Gross Impact Sample for Projects (MMBtu)

	Population Summary*			Sample Summary*		
Program	Sampling Strata	Number of Projects (N)	Ex Ante Gross Savings (MMBtu)	n	Ex Ante Gross Savings (MMBtu)	Sampled % of Population (% MMBtu)
Coordinated Non-Residential New Construction	1	21	9,422	11	4,860	52%
	2	10	16,199	8	13,638	84%
	3	10	42,354	10	42,354	100%
	Certainty	1	6,653	1	6,653	100%
Total		**42**	**74,627**	**30**	**67,504**	**90%**

*The gross impact population and sample include MMBtu savings for Peoples Gas, North Shore Gas, Nicor Gas, and ComEd.
Source: Evaluation team analysis.

Table A-2. 2024 BNC Program Profile of Gross Impact Sample for Projects and Realization Rate

Population Summary*				Sample Summary*			Statistical Verification Results	
Program	Sampling Strata	Number of Projects (N)	Ex Ante Gross Savings (Therms)	n	Ex Ante Gross Savings (Therms)	Sampled % of Population (% Therms)	Realization Rate (Therms)	Precision
Coordinated Non-Residential New Construction	1	14	30,166	9	15,611	52%		
	2	8	86,607	6	74,918	87%		
	3	10	231,253	10	231,253	100%		
	Certainty	1	33,509	1	33,509	100%		
Total		**33**	**381,535**	**26**	**355,291**	**93%**	**1.01**	**0.5%**

*The gross impact population and sample include therms savings for Peoples Gas, North Shore Gas, Nicor Gas, and ComEd.
Source: Evaluation team analysis.

Appendix B. Impact Analysis Supplemental Information

Engineering Desk Review Results

Impact Analysis Supplemental Information

Table B-1 shows the results of the engineering desk review for PGL projects, including the ex ante savings, verified savings, and the resulting RR for each project in the desk review sample. The table also includes, where applicable, a narrative describing the reasons for any discrepancies between ex ante and verified savings. A RR less than 1.00 indicates that a project received a downward adjustment to energy savings while a RR more than 1.00 indicates that a project received an upward adjustment to energy savings. All energy savings exclude interactive effects.

Table B-1. 2024 Researched Gross Savings for Sampled Projects for PGL

		Ex Ante		Verified		Realization Rate	
Project ID	Gas Utility	Electric Savings (kWh/yr)	Gas Savings (therm/yr)	Electric Savings (kWh/yr)	Gas Savings (therm/yr)	Electric (kWh) Savings Realization Rate	Gas (therm) Savings Realization Rate
CINC-1323	Peoples Gas	133,518	9,849	126,130	10,325	0.94	1.05
	The evaluation team changed the achieved corridor LPD from 0.41 W/sf to 0.519 W/sf. This change was a result of using slightly different fixture counts, updating the wattages to match the spec sheets, and using different measured areas than the implementation team used to calculate the ex ante savings. It is not clear why the measured areas were different. The evaluation team adjusted the garage LPD to reflect updated fixture wattages. The evaluation team also tweaked the achieved efficiencies of the air source VRF units, with the EER changing from 11.2 to 11.3 and the COP changing from 3.46 to 3.5. The implementation team completed low-flow fixture calculations on a per-fixture basis; however, the residential TRM calculations operate on assumptions of people per apartment and usage per person per day. The evaluation team adjusted the account for the assumed number of people per apartment and to reflect the number of apartments instead of the number of fixtures.						
CINC-1446	Peoples Gas	197,722	12,676	218,181	12,724	1.10	1.00
	The most significant change for this project was adjustments to the curtainwall solar heat gain measure. The evaluation team changed the baseline from 0.38 to 0.4, which is a weighted average of south, east, west, and north SHGC baselines.						
CINC-1301	Peoples Gas	173,847	2,436	142,409	2,436	0.82	1.00
	The evaluation team updated fan savings based on information from the implementation team. The ex ante savings were based on a 7200 CFM DOAS system with a MERV-12 filter. This was inconsistent with the drawings, which described a 3500 CFM DOAS unit with a MERV-8 filter. This reduced the savings for this measure by 75%.						
CINC-1395	Peoples Gas	255,090	4,499	175,863	4,499	0.69	1.00
	The claimed savings were much larger than shown in the provided model. The installed chiller likely served more spaces than the modeled spaces; therefore, the evaluation team recalculated the savings using an IL-TRM approach.						

		Ex Ante		Verified		Realization Rate	
Project ID	Gas Utility	Electric Savings (kWh/yr)	Gas Savings (therm/yr)	Electric Savings (kWh/yr)	Gas Savings (therm/yr)	Electric (kWh) Savings Realization Rate	Gas (therm) Savings Realization Rate
CINC-1413	Peoples Gas	452,502	23,854	452,502	23,854	1.00	1.00
	No changes.						
CINC-1420	Peoples Gas	167,145	18,783	168,951	18,849	1.01	1.00
	The evaluation team slightly adjusted the electric savings by updating the specifications for the appliances to reflect the provided specifications.						

CFM – Cubic Feet per Minute
COP – Coefficient Of Performance
DOAS – Dedicated Outdoor Air System
EER – Energy Efficiency Ratio
MERV – Minimum Efficiency Reporting Value
SHGC – Solar Heat Gain Coefficient
Source: Peoples Gas tracking data and evaluation team analysis

Appendix C. Program Specific Inputs for the Illinois TRC

Table C-1and Table C-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 C-1. Verified Cost Effectiveness Inputs – PGL

Program Category	Program Path	Savings Category	DAC Project	Units	Quantity	Effective Useful Life	Early Replacement Flag†	Verified Gross Annual Water Savings (Gallons)	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Whole Building	DAC Eligible Projects	TRUE	Project	1	20.6	NO	N/A	2,436	2,454	2,454
Private	Whole Building	DAC Ineligible Projects	FALSE	Project	6	20.6	NO	N/A	72,214	72,734	31,276
Total or Weighted Average						**20.6**		**N/A**	**74,650**	**75,187**	**33,729**

Note: The evaluation team applied a NTG ratio of 1.0 to the verified gross savings estimates of eligible projects, which included private projects in disadvantaged communities (ZIP codes) with square footage values under the area threshold for eligibility based on building type. The area threshold criteria acts as a proxy in the absence of reliable electric rate and annual gas consumption data. The second half of this policy assigns public sector projects in DAC municipalities qualified as general delivery service municipal, public school, or local government projects a NTG of 1.0.

Source: Peoples Gas tracking data and evaluation team analysis.

Table C-2. Verified Cost Effectiveness Inputs – NSG

Program Category	Program Path	Savings Category	DAC Project	Units	Quantity	Effective Useful Life	Early Replacement Flag†	Verified Gross Annual Water Savings (Gallons)	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private	Whole Building	DAC Ineligible Projects	FALSE	Project	1	20.6	NO	N/A	24,977	25,157	10,817
Total or Weighted Average						**20.6**		**N/A**	**24,977**	**25,157**	**10,817**

Note: The evaluation team applied a NTG ratio of 1.0 to the verified gross savings estimates of eligible projects, which included private projects in disadvantaged communities (ZIP codes) with square footage values under the area threshold for eligibility based on building type. The area threshold criteria acts as a proxy in the absence of reliable electric rate and annual gas consumption data. The second half of this policy assigns public sector projects in DAC municipalities qualified as general delivery service municipal, public school, or local government projects a NTG of 1.0.

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