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Strategic Energy Management Program Impact Evaluation Report

Energy Efficiency Plan: Program Year 2022 (1/1/2022-12/31/2022)

Prepared for:

Peoples Gas & North Shore Gas Companies

FINAL

May 14, 2023

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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)[1] 2022 Strategic Energy Management (SEM) Program and a summary of the energy impacts for the total program broken out by relevant measure and program structure details. The appendix presents the impact analysis methodology and cost-effectiveness input summary. Program year 2022 covers January 1, 2022 through December 31, 2022.

2. Program Description

The goal of the SEM Program is to train personnel at participating sites to apply a process of continuous energy management improvements that result in natural gas and electric energy savings and electricity demand reductions. The program trains participants to identify low-cost and no-cost measures, improve process efficiency, and reduce energy usage and demand through behavioral changes. In 2022, PGL, NSG and ComEd continued to jointly administer the SEM Program for their customers.

The program achieves energy savings through operational and maintenance (O&M) improvements, incremental increases in capital energy efficiency projects, and the identification of additional capital projects that would not otherwise have been considered (e.g., process changes, consideration of energy efficiency in all capital efforts). The program provides training and implementer support to identify O&M improvements, which usually lasts for one year and occurs monthly or bimonthly.

SEM Program savings are calculated using site-specific models developed by the implementation contractors that have built-in statistical regression analysis. The energy model uses at least one year of utility data prior to program participation. This data is associated with site information, such as production and temperatures, to create baseline models that estimate a site's baseline usage based on these variables. After program participation begins, the model compares actual energy consumption to modeled energy consumption. The difference between the modeled energy consumption and actual billing data, minus energy savings for capital projects claimed through other programs, is the savings claimed by the SEM Program.

PGL had three participants in the SEM Program in the private sector that claimed savings in 2022, as shown in Table 2-1. The program savings are characterized as a single installed measure type, which is the whole building measure.

[1] The 2022 report only covers sites and realized savings in the PGL territory. North Shore Gas did not have any sites with gas savings in 2022, so the evaluation team did not include NSG in this report.

Table 2-1. 2022 Volumetric Findings Detail for PGL

Participation	Total
Private Sector	
Participants *	3
Installed Projects †	3
Public Sector	
Participants *	0
Installed Projects †	0
Program 2022 Total	
Participants *	3
Installed Projects †	3

* Participants are defined as customers who formed the individual energy teams. Each participant may have several models covering saving across several locations.
† Installed Projects are defined as the total impact of all SEM activities completed at the site. This include several behavioral and low-cost measures and is custom to each site.
Source: PGL tracking data and Guidehouse evaluation team analysis.

Table 2-2 summarizes the installed measure quantities that are the basis for verified energy savings.

Table 2-2. 2022 Installed Measure Quantities for PGL

Program Category	Program Path	Measure	Quantity Unit	Installed Quantity
Private	Alumni - Private Sector	SEM – whole building	3	3
Public	Alumni - Public Sector	SEM – whole building	0	0

Source: PGL tracking data and Guidehouse evaluation team analysis.

3. Program Savings Detail

Table 3-1 summarizes the energy savings the PGL SEM Program achieved by path in 2022.

Table 3-1. 2022 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)
Alumni - Private Sector	78,883	98%	76,942	0.97	74,634
Alumni - Public Sector	0	0	0	0.97	0
Total or Weighted Average	**78,883**	**98%**	**76,942**	**0.97**	**74,634**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross (NTG): A deemed value. Available on the Illinois Energy Efficiency Stakeholder Advisory Group (SAG) web site: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/.
Source: Guidehouse evaluation team analysis.

4. Program Savings by Measure

The program includes 3 projects, all whole building measures as shown in Table 4-1.

Table 4-1. 2022 Annual Energy Savings by Measure for PGL

Savings Category	Site Identifier (Project ID)	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
SEM – whole building	14048991	49,909	97%	48,310	0.97	46,861
	14049130	11,772	97%	11,426	0.97	11,083
	14049158	17,202	100%	17,206	0.97	16,690
Total or Weighted Average		**78,883**	**98%**	**76,942**	**0.97**	**74,634**

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.
† Net-to-Gross: A deemed value. Available on the SAG web site: https://www.ilsag.info/evaluator-ntg-recommendations-for-2022/.
Source: PGL tracking data and Guidehouse evaluation team analysis.

5. Impact Analysis Findings and Recommendations

5.1 Impact Parameter Estimates

As a behavioral-based model program, the SEM Program does not have standard impact parameters that are used to determine program savings. The program savings are calculated using billing regression methodologies built into the program models that are customized for each site. Table 5-1 shows the singular SEM whole-building measure and realization rate (RR) findings from the evaluation review.

Table 5-1. Verified Gross Savings Parameters

Measure	Unit Basis	Ex Ante Gross (Therms/unit)	Verified Gross (Therms/unit)	Realization Rate	Data Source(s)
SEM	Project	Vary	Vary	98%	Project File Review, PGL Tracking Data*

* Project files and monthly billing data provided by PGL. Where conducted, on-site or telephone interview data collected by Guidehouse.

5.2 Findings and Recommendations

Finding 1. Guidehouse found minor mathematical issues where one site removed year 1 savings from the final claimed savings instead of year 2, and the other site removed the first day's savings in the reporting period from the final claimed savings and annualized using this value. These errors drove the program level realization rate below 100 percent.

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

Table 5-2 shows the historical gross RR and NTG values for the SEM program.

Table 5-2. Verified Gross Savings Parameters

Program Year	PGL Verified Gross RR	NSG Verified Gross RR	PGL NTG	NSG NTG
2019	99%	102%	1.00	1.00
2020	89%	29%	1.00	1.00
2021	114%	81%	1.00	1.00
2022	98%	-	0.97	0.97

Source: Guidehouse evaluation team analysis.

Appendix A. Impact Analysis Methodology

A.1 Engineering Review of Project Files

The evaluation team conducted a census of sites participating in the PGL SEM Program in 2022 and reviewed project files and SEM models for three projects (Table A-1).

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)
	All	3	78,883	3	78,883	100%
TOTAL		**3**	**78,883**	**3**	**78,883**	**100%**

Source: Guidehouse evaluation team analysis.

A.2 Verified Gross Program Savings Analysis Approach

Verified gross savings from the 2022 SEM Program were calculated using implementer provided statistical models that are grounded in site-specific data. These multi-variable regression models draw upon site data, including energy usage, production, weather data and seasonality effects including holidays and shutdowns. For participants with coordinated gas and electric activities, the evaluation team independently evaluated the electric savings for ComEd and the gas savings for PGL using separate energy models.

The evaluation review of the models was driven by the following procedure:

- **A site-specific analysis approach** – since this program contains primarily behavioral-based changes, the International Performance Measurement and Verification Protocol (IPMVP) Option C Whole Facility billing/metered data regression was the main approach to impact evaluation.
- **Data collection focused on verifying and updating the assumptions that feed into the implementer's energy model for each site** – which included program tracking data and supporting documentation (project specifications, invoices, etc.), utility billing and interval data, the evaluation team calibrated building automation system trend logs, and telephone conversations with onsite staff.

For each site, the evaluation team reviewed and updated the statistical models provided by the implementer. The evaluation generally followed these processes for this review:

Step 1: Recreated the energy models to ensure these aligned with the provided data.

Step 2: Confirmed the model savings calculations accounted for all capital projects. Savings from capital projects were subtracted from total measurement period savings.

Step 3: Identified and accounted for any short-term effects that were occurring outside the SEM influence. Telephone interviews with the site staff confirmed these changes.

Step 4: Made additional changes to the models as needed. Changes included excluding outlier data points or including additional variables. Outlier points that were above 110% or below 90% of baseline period variables were excluded if the residual amount was out of line with other residuals in the measurement period.

The evaluation team identified several changes that occurred at the sites that had short-term or long-term effects on the statistical model. The changes that could affect the model savings include:

- Facility shutdowns
- Change in hours of operation
- Change in numbers of employees
- Change in production
- Other capital measures installed at the site that were implemented through other utility energy efficiency and demand response programs, or outside of the PGL program.

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Appendix B. Impact Analysis Supplemental Information

Table B-1 summarizes the site-level incremental gas savings the SEM Program achieved in 2022, with differences between ex ante savings and verified savings explained in the following text.

Table B-1. 2022 Energy Savings by Site

Project ID	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Gross Therm Realization Rate
14048991	49,909	48,310	96.8%
14049130	11,772	11,426	97.1%
14049158	17,202	17,206	100.0%

Source: PGL tracking data and Guidehouse team analysis.

Project 14048991: The evaluation team was unable to replicate the "Y3 Gross Savings" value subtracted from the current year savings as shown in the site level report. It appears the implementer may have removed Year 1 (Y1) Gross Savings instead of the Year 2 (Y2) value. The evaluation team removed the Year 2 value of 9,477 therms.

Project 14049130: The implementer's model removed the first day's savings in the reporting period from the final claimed savings and annualized using this value. The evaluation team annualized final year savings using a value that did not remove the first day's savings.

Project 14049158: The evaluation team did not find any issues with this site.

Appendix C. Program Specific Inputs for the Illinois TRC

Table C-1 shows 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 for PGL

Program Path	Savings Category	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (therms)	Verified Gross Savings (therms)	Verified Net Savings (therms)
Alumni - Private Sector	SEM- whole building	Project	3	7	78,883	76,942	74,634
Alumni - Public Sector	SEM- whole building	Project	0	-	0	0	0
Total or Weighted Average			**3**	**7**	**78,883**	**76,942**	**74,634**

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