

Strategic Energy Management Impact Evaluation Report

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

Prepared for:

Nicor Gas Company

FINAL

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Introduction

This report presents the results of the impact evaluation of the Nicor Gas Strategic Energy Management (SEM) program. It presents a summary of the energy impacts for the total program and broken out by relevant measure and program structure details. The appendices present the impact analysis methodology and the TRC inputs. Program year 2024 covers January 1, 2024 through December 31, 2024.

Program Description

The goal of the SEM program is to train personnel at participating commercial and industrial customer sites to apply a process of continuous energy management improvements that result in tangible energy savings. The program trains participants to identify low-cost and no-cost measures, improve process efficiency, and reduce energy usage through behavioral changes.

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 and consideration of energy efficiency in all capital efforts). The program provides training and implementer support to identify O&M improvements. This training usually lasts for one year and occurs monthly or bimonthly.

SEM program savings are calculated using site-specific energy 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-specific parameters, such as production volume, hours of operation, and local climate data to create baseline models that estimate a site's typical energy usage. For participants with coordinated gas and electric activities, the evaluation team independently evaluated the electricity savings for ComEd and the gas savings for Nicor Gas using separate energy models.

After program participation begins, actual (billed) energy consumption is compared to the forecasted energy consumption predicted by the model. 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.

The program had 25 participants in 2024. As shown in the following table, six participants were new to the SEM program while 19 were ongoing alumni participants. The ratio of new to alumni participation can affect year-to-year savings, as new participants often have the highest volume of savings.

Table 1. 2024 Volumetric Findings Detail

Participation	New Participants	Alumni Participants	Total
Participants *	6	19	25

* Participants are defined as customers who formed the individual energy teams. Each participant may have several models covering saving across several locations

Source: Nicor Gas tracking data and evaluation team analysis.

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

Table 2. 2024 Installed Measure Quantities

Program Path	Measure	Quantity Unit	Installed Quantity
Private	SEM – whole building	12	12
Public	SEM – whole building	13	13

Source: Nicor Gas tracking data and evaluation team analysis.

Program Savings Detail

Table 3 summarizes the energy savings SEM Program achieved by path in 2024.

Table 3. 2024 Annual Energy Savings Summary

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR*	Verified Gross Savings (Therms)	NTG†	Verified Net Savings (Therms)
Private Sector	631,980	100%	631,980	1.00	631,980
Public Sector	794,559	100%	794,559	1.00	794,559
Total	1,426,539	100%	1,426,539	1.00	1,426,539

* 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: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2024/>.

Source: Evaluation team analysis.

Impact Analysis Findings and Recommendations

This finding and recommendation reflect a minor improvement suggestion to program savings reporting and project documentation observed during the 2024 evaluation. Overall, the program is functioning as intended and effectively producing persistent savings. This finding had minimal or no impact on overall program savings but were included to allow for continual program improvement.

Finding 1. Almost all provided models utilize a single heating degree-day (HDD) based variable, which does not capture cooling-season gas savings from non-heating end-uses (dehumidification, process loads, domestic hot water etc.) While heating-season savings likely encompass the bulk of measure savings, models may be underestimating savings from installed measures during periods where HDD values equal zero.

Recommendation 1. When available, utilize multiple independent variables to ensure all savings are captured. If no additional variables are available or if the implementation team elects to use exclusively HDD, a brief narrative description should be provided to justify the exclusive use of HDD values. For the current program year, all indicator variables were within program guidelines and the savings estimates were likely conservative, so ultimately no adjustments were made. But additional savings may be available if diverse variables are implemented.

Appendix A. Impact Analysis Methodology

The analysis of the Nicor Gas SEM program was based on a sample of projects that was representative of the overall population. 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

Population Summary			Sample Summary			
Sampling Strata	Number of Projects (N)	Ex Ante Gross Savings (Therms)	Sampled Quantity (N)	Ex Ante Gross Savings (Therms)	Sampled % of Population (% Therms)	
Small	19	453,034	5	49,653	11%	
Medium	4	440,381	4	440,381	100%	
Large	2	533,124	2	533,124	100%	
Total	25	1,426,539	11	1,023,158	72%	

Source: Evaluation team analysis.

Verified Gross Program Savings Analysis Approach

The SEM program savings are calculated using billing regression methodologies built into the program models that are customized for each site. Verified gross savings from the 2024 SEM program were calculated by recreating and validating 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.

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 evaluate savings.
- **Data collection focused on verifying and updating the assumptions that feed into the implementer’s energy model for each site** – data sources include program tracking data and supporting documentation (project specifications, invoices, etc.), utility billing and interval data.

For each sampled site, the evaluation team reviewed and updated the statistical models provided by the implementer. The evaluation generally followed this process 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. Additional data requests and follow ups with the implementation team and site contacts.

Step 4: Made additional changes to the models as needed. Changes included exclusion of outlier data points, inclusion of additional variables, or annualization adjustments. Outlier points that were more than 110% or less than 90% of baseline period variables were generally excluded if the residual was out of line with other residuals in the measurement period.

Step 5: Models were re-run to determine verified gross savings values. These values were then compared to the ex ante savings to develop measure, strata, and program level realization rates. The strata-level realization rates are then applied to the program population to inform gross program savings.

The evaluation team identified potential changes to typical operation at the sites that may have 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 Nicor Gas programs

Savings Rollup

There are two basic statistical methods for combining individual gross realization rates from the sample projects into an estimate of verified gross therms savings for the population when using stratified random sampling: separate and combined ratio estimation.¹ In the case of a separate ratio estimation, a separate gross therms savings RR is calculated for each stratum and then combined. In the case of a combined ratio estimation, the evaluation completes a single gross therms savings realization rate calculation, rather than calculating separate gross realization rates by stratum.

The evaluation team used the separate ratio estimation technique to estimate verified gross impacts for the program. The separate ratio estimation technique follows the steps outlined in the California Evaluation Framework,² which identifies best practices in program evaluation. The team matched these steps to the stratified random sampling method it used to create the sample for the component. The verified gross realization rate for the program was 100% at a 9.4% relative precision at a 90% confidence interval.

¹ A full discussion and comparison of separate vs. combined ratio estimation can be found in *Sampling Techniques* (Cochran, 1977), pp. 164-169.

² Tec Market Works, *The California Evaluation Framework*, prepared for the California Energy Commission, June 2004, available at <http://www.calmac.org>.

Table A-1 Relative Precision at 90% Confident

Strata	Relative Precision	Mean Realization Rate	Standard Error
Large	0%	100.0%	--
Medium	33.3%	100.0%	14.1%
Small	32.2%	100.0%	15.1%
Total or Weighted Average	9.4%	100.0%	5.3%

Source: Nicor Gas tracking data and Guidehouse team analysis.

Impact Analysis Supplemental Information

Table A-3 summarizes the sample site-level incremental gas savings the SEM program achieved in 2024. As the verified realization rate is 100% for all sites, no additional site-specific narrative is needed.

Table A-1. 2024 Energy Savings by Sampled Site

Site Identifier	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Gross Realization Rate
Site A	272,334	272,334	100%
Site B	260,790	260,790	100%
Site C	200,699	200,699	100%
Site D	88,800	88,800	100%
Site E	84,048	84,048	100%
Site F	66,834	66,834	100%
Site G	21,400	21,400	100%
Site H	13,539	13,539	100%
Site I	6,712	6,712	100%
Site J	4,087	4,087	100%
Site K	3,915	3,915	100%
Total	1,023,158	1,023,158	100%

Source: Nicor Gas tracking data and Guidehouse team analysis.

Appendix B. Program Specific Inputs for the Illinois TRC

Table B-1 shows 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 B-1. Verified Cost Effectiveness Inputs

Program Path	Participation Category	DAC Project	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
Private Sector	First Year	No	5	7	387,734	387,734	387,734
	Alumni	No	7	7	244,246	244,246	244,246
Public Sector	First Year	No	1	7	19,482	19,482	19,482
	Alumni	No	12	7	775,077	775,077	775,077
Total or Weighted Average			25	7	1,426,539	1,426,539	1,426,539

Source: Evaluation team analysis.