



Strategic Energy Management Impact Evaluation Report

Energy Efficiency Plan Year 2020
(1/1/2020-12/31/2020)

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Nicor Gas

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1. Introduction

This report presents the results of the impact evaluation of the Nicor Gas 2020 Strategic Energy Management (SEM) Program. It presents a summary of the energy impacts for the total program, and is broken out by relevant measure and program structure details. Appendix A presents the impact analysis methodology. Program year 2020 covers January 1, 2020 through December 31, 2020.

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 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 2020, ComEd, Nicor Gas, Peoples Gas, and North Shore Gas continued to 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. This training usually lasts for 1 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 two years 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.

Nicor Gas had 16 gas participants in the SEM Program that claimed savings in 2020, as shown in Table 2-1. The program savings are characterized as a single installed measure type, which is the whole building measure.

Table 2-1. 2020 Volumetric Summary for Nicor Gas

| Participation | Nicor Gas | Total |
|----------------------|-----------|-------|
| Participants * | 16 | 16 |
| Installed Projects † | 16 | 16 |

* Participants are defined as customers who form 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: Nicor Gas tracking data and evaluation team analysis.

3. Program Savings Detail

Table 3-1 summarizes the energy savings the Nicor Gas SEM Program achieved in 2020.

Table 3-1. 2020 Annual Energy Savings Summary for Nicor Gas

| Program Path | Ex Ante Gross Savings (Therms) | Verified Gross RR* | Verified Gross Savings (Therms) | NTG† | Verified Net Savings (Therms) |
|-----------------------------|--------------------------------|--------------------|---------------------------------|------|-------------------------------|
| Strategic Energy Management | 1,833,450 | 99% | 1,816,530 | 1.00 | 1,816,530 |

* Realization Rate (RR) is the ratio of verified gross savings to ex ante gross savings, based on evaluation research findings.

† A deemed value. Available on the SAG web site: https://www.ilsag.info/ntg_2020.

Source: Guidehouse evaluation team analysis.

4. Program Savings by Measure

The SEM Program tracked and evaluated savings at the site level, rather than at the measure level. SEM site level detail can be found in Table B-1.

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. Appendix C shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report.

5.2 Findings and Recommendations

The implementation contractor provided the site-specific models to Guidehouse for early review. Through this process, the implementer made adjustments to the models based on Guidehouse's feedback. The implementer was mindful in applying best practices during the SEM modeling process. Issues appearing in the models were clearly flagged and explained, model review occurred early, and site activities were clearly laid out in the provided documentation. Savings will not be finalized until a full year of post installation data is collected but early model review allows Guidehouse staff to provide guidance on different aspects of the model including careful review of all variables, handling of capital projects, and handling abnormal operation.

Recommendation 1. As was the case in 2020, models and reports should be provided to the evaluation team early if the implementer or evaluator has concerns about different aspects of the model or if an emerging, high-level issue affects the overall program (such as COVID normalization for 2020). These early reviews can provide guidance to the implementer to adjust ex ante savings before it gets finalized.

Several sites had a large number of models under one customer. School districts specifically had customers with more than 20 models, which greatly increased the required level of effort to complete the review of these projects.

Recommendation 2. Early in the third quarter, provide a summary to the evaluation team with an expected number of customers and models for the program year.

The school district sites included multiple models that had simplified input information included in the model documentation. Due to the large volume of models and their low individual impact, Guidehouse understands why standard models with less documentation are provided for specific segments such as school districts. The models included data tables with standard inputs, but each model only used a portion of these inputs to create the final model. Often, these sites included a variable called “production”, but it was not clear what sort of production this variable represented. Due to the variation in inputs and limited documentation, Guidehouse was unable to recreate these models exactly as compared to what the implementer provided, resulting in slight differences in realization rates.

Recommendation 3. Clearly define and document all variables used in the final model. Remove or hide unused variables.

Several sites were impacted by COVID-19 and adjustments were made to the SEM models to account for abnormal energy use caused by the pandemic. Guidehouse was able to review these model adjustments and worked with the implementer to apply new best practice methods.

Appendix A. Impact Analysis Methodology

Verified Gross Program Savings Analysis Approach

Verified gross savings from the 2020 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 or shutdowns). For participants with coordinated gas and electric activities, Guidehouse independently evaluated the electric savings for ComEd and the gas savings for Nicor Gas using separate energy models.

Guidehouse's 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 (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** – this data included: program tracking data and supporting documentation (project specifications, invoices, etc.), utility billing and interval data, Guidehouse-calibrated building automation system trend logs, and telephone conversations with onsite staff.

For each site, Guidehouse reviewed and updated the statistical models provided by the implementer. Guidehouse staff generally followed the following 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. 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 was out of line with other residuals in the measurement period.

Guidehouse identified a number of changes that occurred at the site that had short-term or long-term effects on the statistical model. The changes that could affect the model savings include:

- 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 ComEd or Nicor Gas programs

Guidehouse reviewed site-specific models from a sample of 10 sites drawn from a population of 16 projects for the 2020 evaluation. The sample included 76% of ex ante program energy savings.

Appendix B. Site Level Impact Analysis Details

Table B-1 summarizes the site-level incremental gas savings the SEM Program achieved in 2020, and differences between ex ante savings and verified savings are explained below.

Table B-1. 2020 Energy Savings by Site

| Site | Ex Ante Gross Savings (therms) | Verified Gross Therm Realization Rate | Verified Gross Savings (therms) |
|--------|--------------------------------|---------------------------------------|---------------------------------|
| Site A | 107,675 | 99.7% | 107,398 |
| Site B | 14,919 | 95.8% | 14,298 |
| Site C | 102,925 | 101.3% | 104,276 |
| Site D | 4,573 | 104.4% | 4,776 |
| Site E | 19,095 | 94.9% | 18,123 |
| Site F | 496,204 | 100.0% | 496,204 |
| Site G | 168,515 | 100.0% | 168,515 |
| Site H | 19,095 | 101.6% | 19,398 |
| Site I | 385,609 | 97.3% | 375,299 |
| Site J | 69,935 | 96.7% | 67,642 |

Source: Nicor Gas tracking data and Guidehouse team analysis.

Site A: This site included 24 separate models. When recreating the models, there were cases when the ex post regressions were slightly different from the ex ante regressions. These models used standard input data and were less documented than other SEM models. Guidehouse discusses this issue in detail in recommendation 3 above. These differences were very slight and resulted in a realization rate of 99.7%, representing less than 500 therms.

Site B: This site included two separate models. The ex post model regression varied slightly from the implementer-provided regression model. The differences resulted in a realization rate of 95.8%, representing less than 1,000 therms.

Site C: The ex post model regression varied slightly from the implementer-provided regression model. These differences resulted in a realization rate of 101.3%, representing approximately 1,000 therms.

Site D: This site included two separate models. The ex post model regression varied slightly from the implementer-provided regression model. The differences resulted in a realization rate of 104.4%, representing less than 200 therms.

Site E: The ex post model regression varied slightly from the implementer-provided regression model. The differences resulted in a realization rate of 94.9%, representing approximately 1,000 therms.

Site F: This site participated in the Custom and SEM programs during 2020. Guidehouse and the implementer had several conversations regarding the accounting of both program projects occurring at the same time. Based on these early conversations, Guidehouse was able to

identify issues early, and the implementer addressed these issues before final savings was claimed, resulting in a 100% RR.

Site G: Guidehouse identified a number of time periods where the site operations were abnormal. Guidehouse staff discussed these issues with the implementer, who addressed these aspects in the final claimed savings, resulting in a 100% realization rate.

Site H: The ex post model regression varied slightly from the implementer-provided regression model. The differences resulted in a realization rate of 101.6%, representing approximately 200 therms.

Site I: The ex post model regression varied slightly from the implementer-provided regression model. The differences resulted in a realization rate of 97.3%, representing approximately 10,000 therms.

Site J: The ex post model regression varied slightly from the implementer-provided regression model. The differences resulted in a realization rate of 96.7%, representing approximately 3,000 therms.

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. 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

| Program Path | Research Category | Units | Quantity | Effective Useful Life | Ex Ante Gross Savings (Therms) | Verified Gross Savings (Therms) | Verified Net Savings (Therms) |
|--------------|-----------------------------|-------|----------|-----------------------|--------------------------------|---------------------------------|-------------------------------|
| Nicor Gas | Strategic Energy Management | Sites | 16 | 5.0* | 1,833,450 | 1,816,530 | 1,816,530 |

* An effective useful life (EUL) of 7 years is currently under consideration with the Illinois Technical Reference Manual Technical Advisory Committee. If 7 years is accepted, Guidehouse will update the EUL for the TRC calculation.

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