

Evaluation Engagement Leads to Greater Certainty and Savings

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ABSTRACT

This paper describes how Nicor Gas' policy for ongoing engagement with its third-party evaluator led to improved program outcomes and increased savings certainty. This paper reviews evaluation activities throughout the statewide utility process and demonstrates how active utility involvement using consulting staff augmentation in the management and oversight of evaluation activities ultimately leads to greater savings. Nicor Gas staff, along with its staff support contractor, worked to improve the third-party evaluator's program understanding and applied critical reviews of evaluation activities. These ongoing efforts allowed Nicor Gas to anticipate and mitigate goal achievement risks in advance. The ongoing monitoring and continuous program and savings estimation improvements have yielded greater certainty, as measured by a 20% improvement in evaluation realization rates (*ex post* savings/*ex ante* estimates) over the past eight years with a 51% reduction in the coefficient of variation among the realization rates from individual programs. This paper describes the points where utility staff and its contractor engaged with the third-party evaluator such as early reviews of progress and results, involvement with Technical Reference Manual protocols, and tracking of evaluation recommendation implementation. The paper also describes examples of the outcomes of these processes. The benefits of this deep engagement include increased savings, increased certainty of achieving goals, and program process improvements.

Introduction and Background

Nicor Gas is a gas distribution company serving more than 2.2 million homes and businesses in northern Illinois. In 2020, Nicor Gas saved over 16 million British Thermal Units (BTUs) from its energy efficiency programs for homes and businesses. Nicor Gas is subject to the energy efficiency requirements and policies in Illinois (Illinois Policy Manual 2018). In Illinois, 2% of the legislated program budget amount is set aside for third-party evaluators to calculate and report annual and lifetime net program savings. These savings results are compared to legislated program goals to determine utility-earned financial incentives for the utility's energy efficiency efforts. The third-party evaluators utilize a statewide Technical Reference Manual (TRM) for calculating gross savings and apply approved Net-to-Gross (NTG) protocols to determine NTG in advance of the program year.

For the past eight years, Apex Analytics staff has supported Nicor Gas by performing detailed reviews and advisory services related to third-party evaluation activities. While most utilities manage and oversee their third-party evaluators with utility staff and implementer reviews of evaluator work products, the Nicor Gas approach utilizes an experienced evaluation consultant (Apex Analytics) in the role of staff augmentation to bring detailed knowledge and experience for addressing complex evaluation issues.

Apex Analytics assists Nicor Gas with the many different evaluation activities occurring throughout the Illinois statewide evaluation process (Illinois Policy Manual 2018), which include the following:

- Evaluation planning
- TRM
- NTG protocols
- Parallel path reviews
- Interim results
- Evaluation report reviews
- Recommendation implementation tracking

Evaluation Planning

Third-party evaluators prepare four-year evaluation plans to meet Illinois requirements. Illinois requires evaluators to calculate net savings for every program annually using prospectively agreed upon NTG values. New NTG research must be conducted at least once during the four-year cycle following agreed upon statewide protocols, except for certain programs where it is conducted annually. In addition, as can be conducted within the capped budget, process or market potential program research to assist in program design or delivery is included in these plans. Nicor Gas and Apex Analytics work with the third-party evaluators and the Illinois Stakeholder Advisory Group (SAG) to prioritize needs and ensure the evaluation plan will provide the most value. Regular evaluation program management meetings are held between Nicor Gas, Apex Analytics, and the third-party evaluator.

TRM

Evaluators and interested stakeholders update the TRM (Illinois TRM 2020) annually by first identifying potential updates and then prioritizing the updates based on perceived savings impacts. The TRM is used as the agreed-upon guide to estimate savings or assumptions for savings for most measures implemented through programs. Because the inputs to savings are spelled out in the TRM, the Illinois utilities enjoy a high degree of certainty regarding measure savings in advance of the evaluation, leaving participation as the primary uncertainty of utility programs. Any Illinois stakeholder (utility, evaluator, commission staff, interested other party) may propose a TRM update, and the others ultimately must agree on the update (or it proceeds to a legal procedure for resolution). Nicor Gas will manage and track the TRM updates while Apex Analytics advises and participates in the technical analysis and stakeholder discussion.

NTG Protocols

The Illinois TRM contains a separate volume dedicated to NTG protocols. These were developed primarily by the third-party evaluators as documentation of agreement on statewide approaches for estimating NTG that vary by program type. These approaches are reviewed annually by interested stakeholders, who assess the questionnaire protocol and score with the goal of continuous improvement. Apex Analytics reviews the protocols and survey data in detail and participates in the discussions, offering suggestions where improvements are identified.

Parallel Path Reviews

Parallel path reviews are a process implemented by Nicor Gas, program implementers, and Apex Analytics with the third-party evaluators to obtain early agreement on baseline conditions, measure life, and savings measurement approaches for large projects with measures that the TRM does not cover, such as complex measures in custom programs. This process gets as close to real-time evaluation as possible, better aligns Nicor Gas' implementation and evaluation in determining best practice savings methodologies, and reduces the evaluation iterations during reporting, along with savings uncertainty for Nicor Gas.

Interim Results

Halfway through the program year, Nicor Gas provides the third-party evaluator with program data to date to estimate savings to date for each program. Nicor Gas, implementers, and Apex Analytics review these early results to identify possible tracking database errors or areas of disagreement on evaluation assumptions, approaches, or implementation that can be resolved prior to end-of-year.

Evaluation Report Reviews

After the end of the program year, the third-party evaluator completes the impact evaluation and documents recommendations for future program improvement. Nicor Gas and Apex Analytics review the results in detail against the *ex ante* unit savings estimates to assess variances in realization rates and other differences from expectations. Nicor Gas, implementers, and Apex Analytics also review any recommendation improvements, as Nicor Gas and stakeholders agreed that all must be addressed. Apex Analytics and the program implementers provide input to Nicor Gas on whether the recommendation is actionable and will improve the program. Together these parties provide feedback to the third-party evaluator to ultimately ensure recommendations are actionable and will lead to desired improvements.

Recommendation Implementation Tracking

Nicor Gas and Apex Analytics work with the program implementers to ensure recommendations are implemented. Nicor Gas creates a tracker that lists all the recommendations by program. Nicor Gas and Apex Analytics meet regularly with the implementers to assess progress until the improvement is complete, with Apex Analytics providing advice on how to implement the improvement.

Methodology for Assessing Engagement Impacts

In each of the areas of program engagement discussed above, the authors of this paper identified and tracked the results of this in-depth engagement to quantify savings impacts, uncertainty reduction, or other benefit. Where possible, we quantified impacts using TRM formulae or applying NTG results to program savings. Other results, such as identifying market potential that does not directly result in quantified savings, are noted as well.

Results

The results for each evaluation task described above are discussed in the following sections.

Evaluation Planning

Illinois state policy limits evaluation budgets to 2% of program budgets, and the plans must include an accounting of net savings for every program every year, along with a mid-year estimate, and allow budget to support the annual TRM update and NTG protocol processes. This policy effectively limits the budget for primary research to assess processes or provide better estimates of savings and/or market potential. Third-party evaluators calculate program net savings by primarily relying on the TRM values and assumptions (except for large custom measures or estimates that require billing analysis) and prospective NTG values from research conducted at least once over the four-year plan cycle. Potential process or additional impact research is identified by Nicor Gas, Apex Analytics, or the evaluator and discussed and prioritized jointly by the same parties. The budget for the additional research is an important aspect of Nicor Gas continuous program improvement. As an example of the additional research for the current plan cycle (2018–2021), Nicor Gas and the third-party evaluator agreed that detailed research into steam traps was needed and developed the evaluation plan to include a market study to assess the opportunity for improved steam trap operation in commercial and industrial applications. This study was conducted in concert with a survey of existing participants to estimate program spillover occurring from program education about steam trap operation and repair. In addition to the market study and spillover survey, a third component was to conduct a deep dive into the TRM algorithm to ensure its correct use and assumptions. All three of these components yielded increased savings for Nicor Gas, as shown in Table 1.

Table 1. Example studies leading to increased savings

| Measure Type | Description | Annual Therms Savings Increase | Lifetime Therms Savings Increase |
|-----------------------------|---|--|--|
| Steam Trap Market Potential | The research showed that steam trap O&M can reduce energy waste and there is significant potential. | Not estimated, as study assessed potential | Not estimated, as study assessed potential |
| Steam Trap Spillover | The spillover survey from non-steam trap programs identified that some customers will improve their steam trap operations and maintenance practices as a result of their program participation. | 0.037 million | 0.22 million |
| Steam Trap Algorithm Update | Updates were made to the algorithm, which increased the applicability to more situations, allowing savings to be claimed. | 2.3 million | 13.6 million |

TRM

Nicor Gas, implementers, and Apex Analytics engage with the TRM update process by (1) identifying measures where savings estimates can be more accurate or applicable to program designs, and (2) actively participating in discussions to gain consensus on savings updates. Nicor Gas and its implementers identify real-world program situations where the TRM isn't fully applicable to specific program design or where they have concerns about the current TRM algorithms. Apex Analytics brings its broad evaluation experience to these discussions to provide Nicor Gas with advice and detailed expertise to assist in these discussions. Table 2 provides example TRM improvements from 2020 that resulted in increased savings.¹

Table 2. 2020 TRM updates resulting in increased savings

| Measure Type | Description | Annual Therms Savings Increase | Lifetime Therms Savings Increase |
|---------------------|--|--------------------------------|----------------------------------|
| Advanced Thermostat | The TRM deemed savings estimates were referenced from a billing analysis of past program participants. However, the algorithm also applied an installation rate to the equation. Through discussions in the TRM working group, stakeholders agreed the installation rate was redundant (as the billing analysis would include those that purchased a thermostat but did not install it). | 0.110 million | 1.2 million |
| Behavior Program | The TRM working group agreed to utilize secondary research about savings persistence from behavior programs to update its expected useful life (EUL). Nicor Gas evaluation staff participated in reviewing the research. The group came to a consensus that increased the measure life from four years (with declining savings) to six years (with declining savings). | N/A | 0.95 million |

¹ Note that the goal of the TRM update process is to provide more accurate savings estimates, which may result in savings decreases or increases. The examples provided are showing recent updates resulting in savings increases.

NTG Protocols

The Illinois statewide NTG protocols were developed and documented in 2016 through a consensus process of third-party evaluators and interested stakeholders. Since then, evaluators, utility evaluation staff, and stakeholders have held a series of meetings each year to review the analysis and discuss potential improvements. In its 2020 update, the involved parties reviewed years of data showing that customers may have difficulty interpreting the questions. The general approach for the NTG protocols applied to most programs that use customer self-report data takes the average of two free-ridership scores generated by responses to a program influence question (“How influential are the different aspects of the program in your decision to install the measure?” (0 to 10 scale)) and a counterfactual question (“How likely would you be to install the same measure without the program?” (0 to 10 scale)). Data from implementation suggest that some customers answer the program influence questions by reporting their satisfaction with the program element (with scores typically ranging from 8 to 10). The counterfactual question often generated much lower scores, but customers seemed confused by what was being asked and a significant portion provided responses that were inconsistent with the program influence response.

Working together with evaluators, Apex Analytics suggested different question approaches that only asked about program influence overall and offered different scenarios for the customer to consider as to what was most likely to occur absent the program. Instead of the counterfactual question (“How likely would you be to install the same measure without the program?” (0 to 10 scale)), the survey asked “Which is the most likely scenario of what would have happened without the program?”. Possible responses were (a) we most likely would have implemented the same exact measure, (b) we most likely would have delayed or changed the measure, or (c) we most likely would not have implemented the energy efficiency measure at all.² The new methodologies were tested in 2021 evaluation research. The initial results indicated that responses about program influence varied more than before and there were fewer contradictory responses with the counterfactual scenario question. It appears the new approach is likely better understood by customers, although the review indicated some additional changes to specific question wording are warranted. We did not quantify savings impacts as changes in both the programs and the protocol would not allow for a direct comparison.

Parallel Path Reviews

In the parallel path review discussions, Nicor Gas and implementation staff facilitate discussions between customers and evaluators to ensure evaluators understand both baseline and program-induced conditions for the project. Apex Analytics provides review and advice about savings approaches and assumptions as these projects are complex and may involve behavior elements, such as strategic energy management. As an example, in one very large project, the evaluators initially assumed a measure lifetime equal to that of the lowest lifetime equipment in a complex system involving multiple equipment replacements. Through the facilitation of customer discussions, it became apparent that, due to the complexity of the project, the customer was more likely to replace that shorter-life equipment to maintain the new full system rather than look at changing the entire system. As a result, the EUL of the project increased from 13 to 21 years, resulting in Nicor Gas being able to claim increased savings of 94 million lifetime therms.³

Interim Results

In the 2020 interim evaluation, the third-party evaluator assessed 11 programs representing over 100 different program measures. Of the measures assessed, approximately half had discrepancies between *ex ante* estimates and the interim evaluated results. Reasons for discrepancies included the following:

² This is a simplification of the new survey wording. Exact wording is dependent on the specific program and its design.

³ As Nicor Gas financial incentives are tied to lifetime savings, increasing the estimated lifetime improves claimed savings and earned incentives.

- Implementer use of a previous version of TRM assumptions
- Typographical errors or transposing of equipment characteristics in tracking database
- Incorrect climate zones applied to the project zip code
- Lack of reference to data sources
- Application of incorrect NTG values that are not the latest approved prospective values
- Questions about whether multiple instances of certain measures are allowed through the program
- Missing data on equipment, building size, or characterization
- Discrepancy between tracking database data and model number lookup specifications

As a result of Nicor Gas and Apex Analytics working together with the third-party evaluator, Nicor Gas asked its implementers to update the tracking database assumptions, which resulted in a more accurate estimation of progress towards savings goals going into the last half of the year. As a longer-term outcome, Nicor Gas updated its implementer contracts to better encourage accurate tracking data by tying a portion of compensation to realization rates. Figure 1 illustrates how the interim reviews have improved the end-of-year realization rates over time. The figure shows the trends over time from the weighted average across all programs. Comparing the first year to the most recent year, Nicor Gas achieved a 20% improvement in the average portfolio evaluation realization rate (*ex post savings/ex ante estimates*). The coefficient of variation, which measures individual program differences from 100%, also improved by 51% over the past eight years.

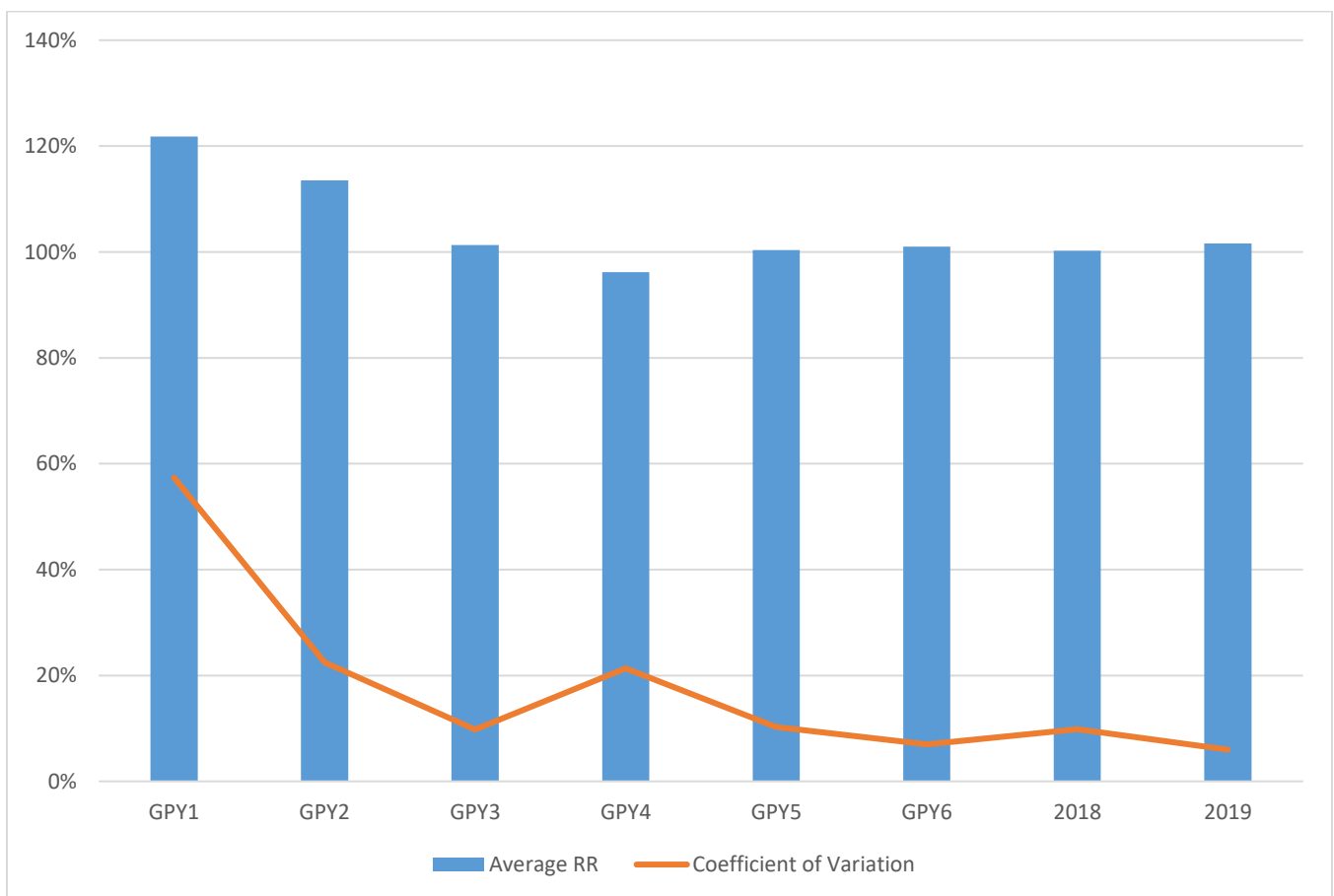


Figure 1. Impact of Nicor Gas’s report follow-up on average realization rates (RR) of all programs and the coefficient of variation among individual programs over time

Evaluation Report Reviews

Due to the interim report step discussed above, most realization rates in the final report were very close to 1. Any measures that varied from 1 were typically custom measures (that may not be part of the Parallel Path because they are too small), were due to new assumptions since the interim evaluation, or fell outside the TRM algorithms because the evaluation relied on billing analysis. Overall, the realization rate for 2019 was 100% and for 2020 was 101%, showing the process is working. Additionally, the process that incorporates a careful review of the recommendations by Nicor Gas, the implementers, and Apex Analytics has proven valuable in making improvements to the tracking system and *ex ante* calculations as well as to the program designs that ultimately create greater savings.

Recommendation Implementation Tracking

Once Nicor Gas, Apex Analytics, and implementers resolve concerns about the recommendations with the third-party evaluator, Nicor Gas tracks each recommendation and meets with implementers to monitor progress towards implementation. For the 2020 recommendations posted by the July 2021 completion of reports, 70% of the recommendations had been incorporated by September 2021. This rapid response occurs because of the attention focused on it as Nicor Gas tracks and assigns accountability among its staff and implementers to implement the recommendation. Over time, the number of recommendations in the reports has decreased as some apply year after year and, once resolved, should not resurface. Many recommendations are specific to the particular projects and assumptions for that year; however, the number of recommendations has dropped from over seven recommendations per program in 2016 to about five recommendations per program in 2020, saving both evaluation budget and follow-up costs.

Conclusions

The multi-point engagement process between Nicor Gas, Apex Analytics (providing extended expertise), implementers, and the third-party evaluators has been successful in achieving more predictable results and has improved the accuracy of both the *ex ante* estimates and *ex post* calculations. It frees up evaluation resources to focus on key uncertainties over time and helps improve programs that ultimately save more energy and make the programs more successful. While many of the evaluation topic areas discussed in this paper follow a standard model of how program administrators work with third-party evaluators, Nicor Gas's approach to augment its internal staff with outside evaluation expertise allows for deeper engagement and has resulted in greater savings through detailed analysis of energy efficiency technologies, NTG protocol improvements, and a rigorous process for program improvements. This model of continuous improvement should be considered anywhere programs are implemented.

References

Illinois Policy Manual, Version 1.1 (2018). <https://www.ilsag.info/policy/illinois-ee-policy-manual/>
Illinois TRM, Version 9.0 (2020). <https://www.ilsag.info/technical-reference-manual/il-trm-version-9/>