

Memorandum

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From: Kevin Grabner, Karen Maoz, Sagar Deo, Navigant Consulting

Cc: Randy Gunn, Laura Agapay-Read, Navigant Consulting

Date: August 25, 2017

Re: Draft GPY4 Energy Impact and Cost Effectiveness Summary for Nicor Gas

This memo provides background material to support Navigant's summary reporting of verified energy savings and cost effectiveness results for the Nicor Gas energy efficiency program portfolio for Gas Program Year 4 (GPY4¹). Navigant is providing brief annual summary reporting for each program year, GPY4, GPY5, and GPY6, and will produce a final report summarizing the combined results for the three program years after the conclusion of GPY6.

The summary reporting is presented in three spreadsheet attachments:

- Attachment 1: Cost-Effectiveness Results Tables
- Attachment 2: Verified Energy Savings Summary Tables
- Attachment 3: High Impact Measures Tables

Key background information on each attachment follows.

Attachment 1: Cost Effectiveness Results Tables

Attachment 1 provides our spreadsheet of cost effectiveness results for the Nicor Gas GPY4 portfolio. Two cost effectiveness test results are presented:

- The Total Resource Costs Test (TRC)
- The Utility Cost Test (UCT)

A brief methodology and data discussion on these two tests is presented below.

Attachment 2: Verified Energy Savings Summary Tables

Attachment 2 provides our spreadsheet summary of the components of verified therm savings and utility program costs for the GPY4 Nicor Gas program portfolio.

¹ Gas Program Year 4 began June 1, 2014 and ended May 31, 2015.

Attachment 3: High Impact Measures Tables

Attachment 3 provides our spreadsheet of energy savings results for Illinois TRM High Impact Measures (HIM) for the Nicor Gas GPY4 portfolio. There are two tabs in the spreadsheet: one that maps Nicor Gas measures to TRM measures, and a second that sums all the savings to the Illinois TRM section level. The tabs can be filtered and sorted by column. Please note:

- Savings shown are verified gross therms
- The summary does not include custom measures or behavioral savings. It includes only prescriptive measures based on Illinois TRM version 3.0, effective for GPY4, plus a few prescriptive measures that were candidates for future Illinois TRMs.
- The Illinois TRM places some common-area multifamily measures in the C&I sector, while we group multifamily common-area prescriptive measures with the residential sector.
- The HIM savings summary is rolled up by TRM measure and sector, without reference to program.

Cost Effectiveness Methodology

The Illinois TRC test is defined in the Illinois Power Agency Act SB1592 as follows:

*'Total resource cost test' or 'TRC test' means a standard that is met if, for an investment in energy efficiency or demand-response measures, the benefit-cost ratio is greater than one. The benefit-cost ratio is the ratio of the net present value of the total benefits of the program to the net present value of the total costs as calculated over the lifetime of the measures. A total resource cost test compares the sum of avoided gas utility costs, representing the benefits that accrue to the system and the participant in the delivery of those efficiency measures, to the sum of all incremental costs of end-use measures that are implemented due to the program (including both utility and participant contributions), plus costs to administer, deliver, and evaluate each demand-side program, to quantify the net savings obtained by substituting the demand-side program for supply resources. In calculating avoided costs of energy that a gas utility would otherwise have had to acquire, reasonable estimates shall be included of financial costs likely to be imposed by future regulations and legislation on emissions of greenhouse gases.'*²

The Illinois TRC test differs from traditional TRC tests in its requirement to include a reasonable estimate of the financial costs associated with future regulations and legislation on the emissions of greenhouse gases (GHG). Additional benefits included in the calculation are the non-energy benefits with a multiplier applied to the energy avoided costs, and water savings. This difference adds an additional benefit to investments in efficiency programs that are typically included in the Societal Test in other jurisdictions.

The results of the Utility Cost Test (UCT) are also presented. The UCT approaches cost effectiveness from the perspective of the utility. It determines whether the energy supply costs avoided by the utility exceed the overhead and cost outlays that the utility incurred to implement energy efficiency programs. Since the UCT is primarily focused on utility outlays, incentives paid by the utility to either participants or third party implementers are included in the calculation in place of incremental or participant costs. Additionally, since non-energy benefits accrue to society rather than to the utility implementing energy efficiency programs, these benefits are not included in the UCT formula.

² Illinois Power Agency Act SB1592, pages 7-8.

Incremental Measure Cost Approach

Incremental cost means the difference between the cost of the efficient measure and the cost of the most relevant baseline measure that would have been installed (if any) in the absence of the efficiency program. Installation costs (material and labor) and Operations and Maintenance (O&M) costs shall be included if there is a difference between the efficient measure and the baseline measure. In cases where the efficient measure has a significantly shorter or longer life than the relevant baseline measure, the avoided baseline replacement measure costs should be accounted for in the TRC analysis. The incremental cost input in the TRC analysis is not reduced by the amount of any incentives.

Data Assumptions in the Cost Effectiveness Calculations

The data points needed to conduct the Illinois TRC and UCT tests are provided in Table 1 below and are divided into general and program specific categories. The program specific data points are further subdivided into those that are provided by Nicor Gas, those that are a result of Navigant's evaluation activities, and those from multiple sources.

Table 1. Data Points Needed to Conduct the Illinois TRC Test

Category	Data Point	Source
General	<ul style="list-style-type: none"> • Avoided Natural Gas Costs • Line Loss (Unaccounted-for-Gas Factor) • Discount Rate (2014-2017) 	Nicor Gas
	<ul style="list-style-type: none"> • Discount Rate (2018 and beyond) • Non-Energy Benefits (NEBs) Adder • Greenhouse Gas (GHG) Carbon Adder 	Illinois TRM and Illinois Energy Efficiency Stakeholders Advisory Group Agreement
	<ul style="list-style-type: none"> • Verified Participants / Measure Count • Verified Ex-Post Energy Savings • Realization Rate • Net to Gross Ratio 	Navigant Final Evaluation Reports ³
Program Specific	<ul style="list-style-type: none"> • Non-Incentive Costs • Utility Incentive Costs 	Nicor Gas
	<ul style="list-style-type: none"> • Incremental Measure Costs • Measure Life • Water Gallon Savings and Avoided Costs 	Nicor Gas / Navigant / Illinois TRM ⁴ / Other

Source: Research by Navigant

The values for the general data points used in the cost-benefit calculations for all programs and the portfolio are summarized below.

³ Evaluation documents are available at: <http://www.ilsag.info/evaluation-documents.html>

⁴ Illinois Statewide Technical Reference Manual (Illinois TRM). Available at: <http://www.ilsag.info/technical-reference-manual.html>

- Natural gas avoided costs are based on values provided by Nicor Gas.
- For the years 2014 through 2017, avoided costs were drawn from the Nicor Gas GPY4-6 energy efficiency plan (EEP 2.0 Approved), except that Navigant removed the GHG adder. A Non-Energy Benefits adder is included, calculated as 7.5 percent of the sum of the annual avoided cost plus the GHG adder, noting that in our calculation the GHG adder is zero prior to 2020. A discount rate of 8.09 percent and a line loss factor of 1.000 were applied.
- For the years 2018 and beyond, avoided costs were drawn from Nicor Gas GPY7-10 planning values (EEP 3.0). A GHG adder of \$0.134 per therm (based on a carbon adder of \$25/metric ton) agreed to by the Illinois SAG is included starting in 2020 for the TRC analysis, and escalating at 5 percent. The Non-Energy Benefits adder is calculated as 7.5 percent of the sum of the annual avoided cost plus the GHG adder, noting that the GHG adder is zero in 2018 and 2019. A discount rate of 2.38 percent was applied, based on the Illinois TRM version 6.0, and the line loss factor was 1.000.

The following points are noted for the program-specific data points used in the cost-benefit calculations.

- Energy saving benefits represent natural gas only taken from final evaluation verified results from GPY4.
- Incentive amounts were obtained from Nicor Gas tracking data and their E3 cost effectiveness model input sheets.
- Nicor Gas non-incentive costs were provided by Nicor Gas.
- For joint programs with ComEd, the measure costs are the Nicor Gas share of full incremental costs. Incentives and non-incentive costs are the Nicor Gas share of costs.
- For incremental measure costs, Nicor Gas indicated the following regarding data they provided: "The tracking data measure costs are invoice/measure costs supplied by the IC's. The E3 measure costs are true incremental costs of the installed project/measure. We use incremental costs from TRM for measures where the tracking data measure costs do not clearly provide incremental cost information (i.e., when the tracking data provides installed cost but not incremental costs). In other cases, we use tracking data measure cost as the true indication of project incremental cost. These include cases where the TRM does not provide incremental costs, or cases where tracking data provides more accurate, site-specific incremental costs than those provided in the TRM."
- Professional judgement was used for reviewing and identifying the appropriate incremental measure costs (IMC). Navigant reviewed the data Nicor Gas provided for incremental measure costs and measure lives and incorporated it into our cost-effectiveness model. After analyzing the tracking data measure costs, the measure specific IMC deemed by the TRM v3.0 and the IMC data provided by Nicor Gas, Navigant was confident that the appropriate IMC values were assigned to each measure implemented in GPY4. A similar analysis with full reference to the TRM was done for future avoided costs (early replacement measures), measure life, and remaining life values.
- Water saving benefits from water saving measures rely upon the Illinois TRM and Nicor Gas analysis to estimate gallons of water saved per device. Water avoided costs were estimated using assumptions developed by Nicor Gas.
- For early replacement measures, Navigant calculated the savings for the remaining life of the existing equipment and the savings for the remaining measure life per the algorithms deemed in the TRM v3.0. This analysis is not included in the evaluation reports as they only list the first-year savings value for each measure.
- For the Retro-Commissioning and Custom Programs, non-incentive costs provided by Nicor Gas were combined. There is one cost-effectiveness calculation for these two programs.

- Business New Construction – The interactive energy effects and costs for electric savings due to ComEd's measures were not included in our analysis.
- Energy Savings Kits – The non-incentive costs provided by Nicor Gas for Energy Savings Kits were combined with the HEER Program.
- EEE Kits Program – Since the measure cost data provided by Nicor Gas was at a Kit level, the TRC analysis was also conducted at that level as opposed to a measure level analysis.