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Memorandum

To: Christina Pagnusat, Omy Garcia, Koby Bailey, Peoples Gas & North Shore Gas; Michael Marks, Erin Stitz, Victoria Nielsen, Applied Energy Group; Paige Knutsen, Heidi Gorrill. Katie Baehring, Jim Heffron, Franklin Energy Services; Jennifer Morris, David Brightwell, ICC Staff; Celia Johnson, Illinois Stakeholder Advisory Group

From: Kevin Grabner, Karen Maoz, Sagar Deo, Palak Thakur, Navigant

Cc: Randy Gunn, Rob Neumann, Navigant

Date: December 5, 2018

Re: GPY5 Energy Impact and Cost Effectiveness Summary for Peoples Gas and North Shore Gas

This memo provides background material to support Navigant's summary reporting of verified energy savings and cost effectiveness results for Peoples Gas (PGL) and North Shore Gas (NSG) energy efficiency program portfolios for Gas Program Year 5 (GPY5[1]). 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 Peoples Gas and North Shore Gas GPY5 portfolios. Two cost effectiveness tests 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.

There are four new tabs in the spreadsheet for GPY5 results, adding to the four from GPY4: two for Peoples Gas (GPY5 TRC and GPY5 UCT), and two for North Shore Gas (GPY5 TRC and GPY5 UCT).

[1] Gas Program Year 5 began June 1, 2015 and ended May 31, 2016.

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 GPY5 Peoples Gas and North Shore Gas program portfolios.

Attachment 3: High Impact Measures Tables

Attachment 3 provides our spreadsheet of energy savings results for Illinois TRM High Impact Measures (HIM) for the Peoples Gas and North Shore Gas GPY5 portfolios. There are two tabs in the spreadsheet: one for Peoples Gas, a second for North Shore Gas. The tabs can be filtered and sorted by column. Please note:

- Savings shown are verified gross therms
- The HIM savings summary is rolled up by 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 savings 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. However, the Illinois TRC test differs from the Societal test in that it only includes benefits associated with avoided GHGs and the discount rate applied to future benefits is the gas utilities Weighted Average Cost of Capital (WACC), which is typically used in TRC calculations, as opposed to a societal discount rate.

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.

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

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.

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 generic and program specific categories. The program specific data points are further subdivided into those that are provided by Peoples Gas and North Shore 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
Generic	• Avoided Natural Gas Costs • Line Losses (Unaccounted-for-Gas Factor) • Discount Rates (2014-2017) • Escalation Rates (2014-2017)	Peoples Gas / North Shore Gas
Generic	• Escalation Rates (2018 and beyond) • Discount Rate (2018 and beyond • Non-Energy Benefits (NEBs) Adder • Greenhouse Gas (GHG) Adder	Illinois TRM and Illinois Energy Efficiency Stakeholders Advisory Group Agreement
Program Specific	• Verified Participants / Measure Count • Verified Ex-Post Energy Savings • Realization Rate • Net to Gross Ratio	Navigant Final Evaluation Reports[3]
	• Non-Incentive Costs • Utility Incentive Costs	Peoples Gas / North Shore Gas
	• Incremental Measure Costs • Measure Life • Water Gallon Savings and Avoided Costs	Peoples Gas / North Shore Gas / Navigant / Illinois TRM[4] / Other

Source: Research by Navigant

The values for the generic 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 PGL/NSG. Navigant did not do any extra analysis to validate or replicate the avoided costs. We did however check the values, discount rates, line losses, and environmental adders for reasonableness and application.
- For the years 2014 through 2017, avoided costs were drawn from the PGL/NSG GPY4-6 plan, except that Navigant removed the GHG adder. A Non-Energy Benefit factor of 1.075 is included. For Peoples Gas, a discount rate of 5.85 percent and a line loss factor of 1.019 were applied. For North Shore Gas, a discount rate of 5.88 percent and a line loss factor of 1.003 were applied. For Peoples Gas and North Shore Gas, an escalation rate of 4.28 percent was applied.
- For the years 2018 and beyond, avoided costs were drawn from PGL/NSG GPY7-10 planning values. A GHG adder of $0.13 per therm ($25/metric ton) agreed to by the Illinois SAG is included starting in 2020 for the TRC analysis. A Non-Energy Benefit factor of 1.075 is included. For Peoples Gas and North Shore Gas, an escalation rate of 1.91 percent and a discount rate of 2.38 percent were applied, based on the Illinois TRM version 6.0. For Peoples Gas, a line loss factor of 1.036 was applied. For North Shore Gas, a line loss factor of 1.021 was applied.

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

- Water saving benefits from water saving measures rely upon the Illinois TRM to estimate gallons of water saved per device. Water avoided costs through 2017 for Peoples Gas were estimated using water and sewer rates for the City of Chicago[5]. Water avoided costs for North Shore Gas were estimated using assumptions developed by Nicor Gas through 2017. The escalation rate for water costs is 1.91 percent for PGL and NSG, based on the Illinois TRM version 6.0, applied after 2017.
- Energy saving benefits represent natural gas only taken from final evaluation verified results.
- Incentives and non-incentive program costs were provided by Peoples Gas and North Shore Gas. For some programs, incentive amounts are tracked by program path, while non-incentive costs are tracked and bundled to include multiple paths. This is why some cells are merged in the TRC/UCT tables. We presented results at the path level when possible.
- For incremental measure costs and measure lives, PGL/NSG and Navigant relied upon a combination of program tracking data, program invoices (for direct install), the Illinois TRM, PGL/NSG planning values, and Navigant estimates. The main area where professional judgement is considered was for the incremental measure costs. We use incremental costs from Illinois 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. The tracking data measure costs are invoice/measure costs supplied by program applicants and provided to the implementation contractor.
- For joint programs, the measure costs are the PGL/NSG share of full incremental costs. Incentives and non-incentive costs are the PGL/NSG share of costs.

[5] Available at https://www.cityofchicago.org/city/en/depts/fin/supp_info/utility-billing/water-and-sewer-rates.html.