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# 2021-2022 Natural Gas Demand Side Management Evaluation, Measurement, and Verification (EM&V) Plan

**submitted to the Ontario Energy Board**

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# 1 INTRODUCTION

This document has been prepared for the Ontario Energy Board (OEB) and outlines the Evaluation, Measurement & Verification (EM&V) plan related to Enbridge Gas Distribution Inc.'s (Enbridge) and Union Gas Limited's (Union) natural gas demand-side management (DSM) programs delivered in 2020 and 2021. Although Enbridge and Union amalgamated effective January 1, 2019, becoming Enbridge Gas Inc., the programs continued to be delivered to the various service territories of the legacy utilities to align with previous OEB approvals. The outcome of the exercise is a list of prioritized evaluation activities to be completed in 2021. The OEB approved a 2021 DSM plan for Enbridge Gas Inc. in July 2020.

The overall objectives of the evaluations are to:

- Assess portfolio impacts for the purpose of determining annual savings results, shareholder incentive and lost revenue amounts, and future year targets.
- Assess the effectiveness of energy efficiency programs on their participants and/or market, including results on various scorecard items.
- Identify ways in which programs can be changed or refined to improve their performance.

To date, the Evaluation Contractor (EC) team has completed evaluations of the 2015 through 2019 program years. Targeted studies have been implemented on custom commercial and industrial (C&I) measure life, custom and prescriptive C&I gross savings verification, spillover, and free ridership.

# 2 SCOPE

This evaluation plan addresses the DSM programs delivered in 2020 and 2021. Evaluations of the programs offered in 2015 through 2019 have already been completed, as shown in Table 1. The evaluation types in the plan include:

- **Annual Verification:** The verification of scorecard metrics and calculation of cost effectiveness, shareholder incentive, and lost revenue. This activity also covers the annual update of the technical resource manual (TRM).
- **Targeted Verification:** The verification of specific programs or projects, such as custom C&I, prescriptive C&I, and residential home retrofit.
- **Targeted Net-to-Gross:** The measurement of the influence of the program on the customers' decision to install the energy efficiency measure or project, resulting in net savings. Net savings are the input into the cost effectiveness, shareholder incentive, and lost revenue calculations; free ridership and spillover are components of net-to-gross.
- **Market assessment and market transformation**: The study of market conditions to determine standard practice or market movement. This category includes the measure life study, multi-year market impact study, and new construction market transformation evaluation.

# 3 BACKGROUND

Evaluation activities conducted for the last four program years are shown in the table below.

**Table 1. Evaluation activities completed for 2015 to 2019 program years**

| Evaluation Activity | Program Year | | | | |
|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2018 | 2019 |
| **Annual Verification** (Annual Report, Cost Effectiveness, Technical Resource Manual)* | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Custom Commercial and Industrial Savings** (Verification) | ✓ | ✓ | ✓ | ✓ | |
| **Custom Commercial and Industrial Savings** (Free Ridership) | ✓ | | | ✓ | |
| **Custom Commercial and Industrial Savings** (Spillover) | ✓ | | | | |
| **Custom Commercial and Industrial** (Measure Life Study) | | ✓ | | | |
| **Prescriptive Commercial and Industrial Savings** (Verification and Net-to-Gross) | | | ✓ | | |

*The annual verification includes tracking certification of the C&I Prescriptive programs and desk reviews of projects installed under the whole home programs.

# 4 METHODOLOGY

Evaluation activities are identified and selected using input from three primary sources:

- **Evaluation Contractor:** At the start of the current DSM Framework, the Evaluation Contractor applied a value of information decision process to identify and prioritize a menu of evaluation activities for the DSM portfolio, presented in high, medium, and low priority categories. Those priorities were released in the 2016-2018 Natural Gas Demand Side Management Evaluation, Measurement, and Verification (EM&V) Plan. Most high priority evaluation activities have been completed. As the 2020 DSM programs are substantially similar to the 2016-2019 programs, the 2016-2018 EM&V plan priorities remain suitable.
- **Evaluation Advisory Committee:** The Evaluation Advisory Committee (EAC) provides advice on the scope and timing of possible evaluation activities. The EAC consists of representatives from OEB staff, the utilities, non-utility stakeholders, independent experts, and governmental observers.
- **Ontario Energy Board:** As the procurement agency for evaluation activities, the Staff at the Ontario Energy Board (OEB) provide input on the annual budget available for evaluation activities and which studies can be implemented in a given year.

The recommendations contained in this report are for consideration by the OEB based on the EC's review of the programs and evaluation work to date. The decision to proceed on any evaluation must be made by the OEB. For example, though the EC recommends a residential home retrofit evaluation, the OEB would need to determine whether to proceed with the study based on numerous factors such as anticipated changes to the program, target market, and EAC advice.

# 5 SUMMARY OF PLAN

Table 2 shows a list of the EC recommended evaluation activities in 2021 and 2022, including the rationale for each activity and the status of the effort at the time this document was finalized.

**Table 2. Summary of evaluation plan by type of evaluation**

| Evaluation Activity | Rationale / Opportunities | Priority | Status |
|---|---|---|---|
| **Annual Verification for 2020 & 2021 program years** | This work produces the OEB's annual evaluation report, which is used to verify overall utility performance. | High | Status quo; Evaluation Contractor contract already established. |
| **Custom Commercial and Industrial Savings Verification of eTools** | This work will focus on validating and increasing the accuracy of energy modeling software. | High | Study approved; analysis method being finalized |
| **Custom Commercial and Industrial Savings Verification** | Depending on COVID-19 status, re-assess to determine whether traditional verification, including on-site visits, is appropriate. | Medium | Recommended by EC to consider alternate approaches |
| **Custom Commercial and Industrial Free Ridership Study** | This work will focus on estimating free ridership for the 2020 and/or 2021 program years. | Medium | Recommended by EC |
| **Residential Home Retrofit** | This study may include verification of assumptions used in energy modelling software, billing analysis and/or the review of the manner in which the software is used. Analysis in these areas can help increase the accuracy of estimated savings, cost effectiveness and energy reductions in residential programs.<br>OEB Staff is working with the EC and Evaluation Advisory Committee (EAC), including Enbridge, to understand what evaluation study would provide the most useful data to inform the program going forward, given the anticipated changes to program design. | High | Recommended by EC. A competitive proposal process is being considered. The approach and value are being discussed with the EAC. |
| **Multi-Year Market Impact Study** | This study would evaluate the overall influence that a long-standing program (or two) has had on the broader market. It will look at manufacturing, retail, and consumer trends, among others.<br>It would provide valuable information for the new DSM policy framework and direction for future program design. | Low | OEB Staff is in preliminary research and discussions with the EC and EAC. |
| **New Construction Market Transformation Evaluation** | This study would evaluate the current new construction market transformation program to understand how building practices have shifted because of the program. | Low | OEB Staff is in preliminary research and discussions with the EC and EAC. |

# 6 KEY EVALUATION DESIGN CONSIDERATIONS AND RECOMMENDATIONS

The recommendations in Table 2 are consistent with the evaluation activities that have been conducted throughout the 2015-2020 DSM Framework; however, recently the EC and EAC have been discussing alternative approaches that could be considered. These include:

- **Residential Home Retrofit Program:** The residential home retrofit program has been central to the utility portfolio and is allocated a sizable portion of the overall budget and shareholder incentive. Although efforts have been taken in the past to complete an evaluation of the residential home retrofit programs, no evaluation has transpired.

  **EC RECOMMENDATION:** The EC recommends that the residential home retrofit programs be studied. Considering key changes to the program, the nature and scope of the evaluation should be discussed further with the EAC to ensure the final scope and results will be useful. Evaluation options that should be considered include verification of assumptions used in energy modelling software, billing analysis, and/or the review of the manner in which the software is used. Studying these areas will help increase the accuracy of estimated savings, cost effectiveness and energy reductions in residential programs. If billing analysis is pursued, the EC recommends the 2018 residential home retrofit program provide the population for a billing analysis. By using the 2018 program, the evaluator will have a full year of billing data to analyze post measure installation.

  **OEB RESPONSE:** The OEB agrees that it is important to study the home retrofit program, but that further discussions with the EC and EAC are required in order to ensure the final scope and results will be useful.

- **Custom C&I Verification (CPSV):** The annual CPSV process has historically included an extensive evaluation effort to verify the savings achieved by custom DSM programs in C&I facilities. While the level of evaluation is warranted due to the portion of the gross cumulative portfolio savings represented by these programs (50% in 2018), consistent year-over-year verification results have demonstrated that a less rigorous process could be employed to provide similar value. The adjustment factors for CPSV, shown in Table 3, have historically stayed within a relatively small band close to 100%.

**Table 3. Historical CPSV and free ridership adjustment factors for Enbridge and Union**

| Evaluation Activity | Program Year | | | |
|---|---|---|---|---|
| | 2015 | 2016* | 2017† | 2018 |
| **CPSV Adjustment Factors** | | | | |
| Enbridge C&I | 95% | 105% | 109% | 111% |
| Union C&I | 98% | 101% | 91% | 91% |
| Union Large Volume | 135% | 101% | 90% | 90% |
| **Free Ridership Adjustment Factors** | | | | |
| Enbridge C&I | 31% | 29% | 50% | 53% |
| Union C&I | 44% | 35% | 37% | 37% |
| Union Large Volume | 12% | 9% | 15% | 15% |

* 2016 free ridership values are based on the 2015 NTG study results, adjusted for the mix of projects installed in the 2016 program.

† 2017 free ridership values are based on the 2018 NTG study, which was completed at the same time as the 2017 evaluation. The 2018 study results were adjusted for the mix of projects installed in the 2017 program.

Aside from a 135% adjustment on the 2015 Union Large Volume program, the adjustment factors resulting from CPSV studies have ranged between 90% and 111%. Over the past three evaluations and within individual programs, the range of adjustments is even smaller, with the Union Large Volume program showing the largest band at 11%, from 90% to 101%. These relatively consistent results suggest two possible adjustments to the existing annual study:

- The cadence of CPSV studies could be decreased from the current one study per year to one study per 1.5 years or one study per two years.
- The sampling methodology could be changed to implement "rolling" samples that reduce the number of projects reviewed each year. In this methodology, the samples are combined across years to get a statistically precise adjustment factor. For example, if the most recent verification sampled 100 sites in 2019, a rolling analysis could limit the 2020 sample to 60 sites and combine them with several sites from 2019 to produce a 2020 adjustment factor. The 2021 year would also include 60 sites and be combined with the 2020 sample to produce 2021 results. (The numbers used in the example are for illustration purposes only.) A rolling sample can be implemented across any defined time frame; it does not only need to be over two years. A shorter rolling time period could be more effective until the new DSM framework is in place. A longer rolling time period will require fewer sites per year to achieve the same precision. A similar process is used in Massachusetts, where a three-year rolling average is used to estimate gross savings.

Both options will produce results at a lower cost and effort for a calculation input that has not varied significantly across the previous four program years.

**EC RECOMMENDATION:** The EC recommends that future evaluations implement a multi-year rolling sample methodology to determine custom C&I gross savings. Because of the ongoing COVID-19 pandemic, it's difficult to know whether this methodology can be implemented with the 2020 program year evaluation, or whether the evaluation will be curtailed like 2019.

**OEB RESPONSE:** In an effort to use evaluation resources as effectively as possible, the OEB, with input from the EC and EAC, is considering alternative approaches to determine custom C&I gross savings, including reducing the frequency of site visits and conducting site assessments remotely.

- **Custom C&I Net-to-Gross (NTG):** The evaluation of free ridership is less expensive than CPSV and less time consuming, while having an important role in confirming net custom program savings. The free ridership adjustment factors, shown in Table 3, have historically been evaluated to fall around or below 50% and across a range of values from 9% to 53%. Even within programs, the range can be high, with the Enbridge C&I program ranging from 29% to 53%, a band of 24%. The larger range of adjustments suggest that free ridership studies could be conducted more frequently than the current cadence of one study every two years. With this change, the free ridership study could also be adjusted to a more real-time measurement scheme, with data collection undertaken as close to project installation as possible, which improves the quality of the final result.

  **EC RECOMMENDATION:** The EC recommends annual free ridership measurement with data collection conducted in two rounds, starting in the 2020 program year. Annual measurement will increase the accuracy of the net savings used in the shareholder incentive and lost revenue calculations. Two rounds of data collection will ensure that data is collected closer to the time of project implementation, which is a best practice in free ridership studies.

  **OEB RESPONSE:** The OEB will consider more frequent free ridership assessments in order to prioritize evaluation resources to areas that will help ensure final verified savings are as accurate as possible.

## About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil and gas, and energy industries. We also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping our customers make the world safer, smarter and greener.