NATURAL GAS DEMAND SIDE MANAGEMENT

Final 2023 – 2025 Evaluation Measurement and Verification Plan

Ontario Energy Board

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1 EXECUTIVE SUMMARY

This document has been prepared by DNV, the Evaluation Contractor (EC), for the Ontario Energy Board (OEB). It outlines the Evaluation, Measurement, and Verification (EM&V) Plan related to Enbridge Gas, Inc. (Enbridge's) natural gas demand-side management (DSM) programs delivered in 2023, 2024, and 2025. The outcome of this exercise is a list of prioritized evaluation activities for the OEB to consider undertaking as part of its evaluation process.

1.1 Summary

The objective of the OEB's evaluation process is to produce independently verified natural gas DSM program results. To identify the list of recommended evaluation activities, the EC used a value of information framework which followed the steps outlined below. The process allowed the EC to identify uncertainty (risk) in the natural gas savings estimate and scorecard metrics and prioritize evaluation activities to mitigate the risks to the greatest degree.

1. **Portfolio characterization** identified which programs have the greatest impact within the portfolio.
2. **Offering characterization** identified which offerings have the greatest impact within the programs.
3. **Identify and classify program/offering risks** identified the specific uncertainties (risks) and classified them according to their likelihood of occurring and the level of impact they might have on the offering-level savings estimate and shareholder incentive.
4. **Produce evaluation activities and relative cost** named evaluation activities to address each risk and the relative cost associated with the activities.
5. **Final prioritization.** Returning to the portfolio characterization, the EC was able to use the comparison metrics to identify the greatest risks to the portfolio as a whole, to prioritize evaluation activities across programs/offerings. The final result is an evaluation plan that identifies a list of recommended activities for the OEB to consider undertaking as part of its evaluation process.

The EC also combined activities into individual studies where doing so would reduce the overall cost of the evaluation effort.

1.2 Recommendations and Considerations

Table 1-1 shows the list of recommended stand-alone studies that resulted from this exercise. These studies have been prioritized to ensure that resources are first applied to the highest risks.

Table 1-1. Recommended program prioritization: program analysis

Program Offering(s)	Evaluation Activities	Justification
Top Priority Group		
Commercial Custom **Industrial Custom** **Large Volume Direct Access** **Affordable Housing Multi-Residential** **(All Custom Measures)**	• NTG analysis	• Programs cover more than 50% of portfolio savings • NTG has a larger effect on net savings than CPSV • NTG last studied in 2018 program year
Residential Savings by Design **Commercial Savings by Design** **Affordable Housing Savings by Design**	• Desk review • Participant surveys • Market research	• Required by OEB's November 2022 Decision & Order • Confirm post-program market transformation of builder education • Confirm buildings meet performance criteria
Residential Whole Home	• NTG analysis	• Residential programs are allocated 50% of total DSM portfolio budgets
Residential Whole Home **Low Income Winterproofing**	• Billing analysis	• Residential programs are allocated 50% of total DSM portfolio budgets. • Billing analysis can address multiple dimensions, including measure interaction and rebound
Smart Home	• NTG analysis	• Residential programs are allocated 50% of total DSM portfolio budgets • Free ridership is characterized as high likelihood and high impact
Mid-Level Priority Group		
Commercial Custom **Industrial Custom** **Large Volume Direct Access** **Affordable Housing Multi-Residential**	• Custom Project Savings Verification	• Programs cover more than 50% of portfolio savings • Lower priority than NTG because recent evaluations have shown small adjustment

Program Offering(s)	Evaluation Activities	Justification
(All Custom Measures)		• Cost is high so should be conducted as infrequently as possible
Commercial Prescriptive Downstream **Commercial Prescriptive Midstream** **Commercial Direct Install**	• NTG analysis • Installation confirmation	• Last NTG study is outdated • Last installation rate study is outdated
Low Income Home Winterproofing **Commercial Direct Install** **(Direct Install Measures)**	• Continued installation and operation	• When stand-alone, low-cost solution to high impact risk potential
Lowest Priority Group		
Whole Building Pay for Performance	• Deeper energy savings verification	• Medium cost solution for offering with relatively low benefit and shareholder incentive impact
Residential Single Measure **Residential Smart Home** **Low Income Winterproofing** **Low Income Affordable Housing Multi-Residential** **Commercial Prescriptive Downstream** **Commercial Direct Install** **Commercial Prescriptive Midstream** **Large Volume Direct Access** **(Prescriptive Measures)**	• TRM savings verification	• Low impact risk with high cost to mitigate.
Residential Single Measure	• NTG analysis	• Single Measure offering is new. Depending on offering size, a NTG analysis could be elevated to Mid-Level priority.
All Program Offering Measures	• Electricity, water impacts • Rebound effect	• Electricity and water impacts have a low impact until/unless fuel switching becomes more prevalent • Rebound effect can be difficult to measure (unless in conjunction with another study) and impact is low

In addition to the studies and activities in the table above, DNV acknowledges the following, consistent with the OEB's Decision and Order on Enbridge Gas Inc.'s 2023-2025 DSM Plan (EB-2021-0002):

- The OEB's Demand Side Management Stakeholder Advisory Group should discuss the accuracy of the 15% non-energy impact adder in coordination with IESO.
- The OEB's Demand Side Management Stakeholder Advisory Group should discuss options for investigating the components of utility avoided cost.

Table 1-2 shows a list of the EC recommended evaluation activities by year through 2026, including the rationale for each activity and the status of the effort at the time this document was finalized. The year associated with each evaluation is the year in which the EC proposes the study be conducted.

Table 1-2. Summary of evaluation plan by program and year

Evaluation Activity	Calendar Year Undertaken				Rationale	Status	Outcome/ Deliverables	Relative Evaluation Cost
	2023	2024	2025	2026				
Annual Verification for 2023 - 2025 program years		✓	✓	✓	This work produces the OEB's annual evaluation report, which is used to verify overall utility performance.	Status quo: Evaluation Contractor contract already established.	Annual verification report summarizing all evaluation activities for that year	Medium
Gross Savings Verification Commercial Custom Industrial Custom Large Volume Direct Access Affordable Housing Multi-Residential (All Custom Measures)		✓			2023 program year – 5 years since last study	Contractor selected and in discussions with OEB and EAC on methodology	Report on gross savings verification that provides updated gross savings realization rates	High
Net-to-Gross Study Commercial Custom Industrial Custom Large Volume Direct Access Affordable Housing Multi-Residential (All Custom Measures)	✓	✓	✓		2023 – 2024 program years – 5 years since last study	Contractor selected and in discussions with OEB and EAC on methodology	Report on net-to-gross that defines free ridership and spillover adjustment factors	Medium
Market Transformation Residential Savings by Design Commercial Savings by Design Affordable Housing Savings by Design		✓			Required by the OEB in the November 2022 DSM Decision & Order	OEB Staff is in preliminary research and discussions with the EC and EAC.	Report on the influence of the Savings by Design offerings in changing the new construction market in Ontario	Medium
Net-to-Gross Study Residential Whole Home		✓			Residential programs are allocated 50% of total DSM portfolio budgets, and free ridership is a high likelihood and medium impact risk	OEB Staff is in preliminary research and discussions with the EC and EAC.	Report on net-to-gross that defines free ridership and spillover adjustment factors	Medium

Evaluation Activity	Calendar Year Undertaken				Rationale	Status	Outcome/ Deliverables	Relative Evaluation Cost
	2023	2024	2025	2026				
Billing Analysis Residential Whole Home Low Income Home Winterproofing			✓		High priority evaluation but removing furnaces from the program constitutes a material change. Wait at least 1 full year from 2023 installations.	OEB Staff is in preliminary research and discussions with the EC and EAC.	Report on the energy savings determined through billing analysis as compared to the building simulation estimates	Medium
Net-to-Gross Study Smart Home		✓			High priority evaluation; no material changes from past years	OEB Staff is in preliminary research and discussions with the EC and EAC.	Report on net-to-gross that defines free ridership and spillover adjustment factors	Medium
Net-to-Gross Study Commercial Prescriptive			✓		Medium priority – 7 years since last study	OEB Staff is in preliminary research and discussions with the EC and EAC.	Report on net-to-gross that defines free ridership and spillover adjustment factors and an installation rate	Medium
Persistence Study Low Income Home Winterproofing Commercial Direct Install (Direct Install Measures)		✓			Medium priority but relatively low cost and high impact risk potential	OEB Staff is in preliminary research and discussions with the EC and EAC.	Report on the installation rate of direct install measures at the time the study was conducted	Low

2 INTRODUCTION

2.1 Scope

This evaluation plan addresses Enbridge Gas Inc.'s (Enbridge) natural gas DSM programs approved by the OEB for the 2023-2025 term. The evaluation activities are recommended for the OEB to consider undertaking as part of its evaluation process. These are recommended studies for the OEB to consider completing in addition to the already-contracted EC team responsibilities, which include oversight of all evaluations, an annual review and update(s) of the technical reference manual (TRM), an annual report summarizing all evaluation activities and results, and a cost effectiveness assessment of the utility programs.

Table 2-1 shows the programs and offerings that have been approved for 2023 – 2025 and their relation to project offerings in the 2015 – 2022 framework.

Table 2-1. Programs approved for 2023 – 2025

2023-2025 Program and Offering(s)	Relation to Previous Offerings
Residential Program	
Residential Whole Home	Pre-existing; now delivered in conjunction with Natural Resources Canada
Residential Single Measure	New
Residential Smart Home	Expansion of Adaptive Thermostats
Low Income Program	
Home Winterproofing	Pre-existing
Affordable Housing Multi-Residential	Pre-existing
Commercial Program	
Commercial Custom	Previously combined with Industrial
Prescriptive Downstream	Pre-existing
Direct Install	Pre-existing
Prescriptive Midstream	Previously combined with Downstream
Industrial Program	
Industrial Custom	Previously combined with Commercial
Large Volume Program	
Direct Access	Pre-existing
Energy Performance Program	
Whole Building Pay for Performance	New
Building Beyond Code Program	
Residential Savings by Design	Pre-existing
Commercial Savings by Design	Pre-existing
Affordable Housing Savings by Design	Pre-existing
Commercial Air Tightness Testing	New

2.2 Methodology

To identify the recommended evaluation activities, the EC used a value of information framework which followed the steps outlined below. The process allowed the EC to identify uncertainty (risk) in the natural gas savings estimate and scorecard metrics and prioritize evaluation activities to mitigate the risks to the greatest degree.

1. **Portfolio characterization.** The process started at the broadest level to identify program priorities based on comparison metrics. The portfolio characterization allowed the EC to determine the programs/offerings that had the greatest impact on the portfolio-level natural gas savings estimate and shareholder incentive.
2. **Offering characterization.** The next step was to characterize each program and/or offering individually in terms of target market, past evaluation activities, program maturity, historic budget and savings, Key Changes from Previous Offerings, scorecard metrics, process flow, future plans and program offerings. This characterization provided the information necessary to identify the components that may cause uncertainty (risk) in the program's natural gas savings estimate and shareholder incentive.
3. **Identify and classify program/offering risks.** The next step was to identify the specific uncertainties (risks) and classify them according to their likelihood of occurring and the level of impact they might have on the offering-level savings estimate and shareholder incentive. For example, if the energy savings estimate for an unpopular measure is known to use outdated information then the risk is likely to occur, but the impact is low because the measure is not installed very often.
4. **Produce evaluation activities and relative cost.** The EC then identified evaluation activities to address each risk and the relative cost associated with the activities. The combination of likelihood, risk, and cost allowed us to combine evaluation activities into studies.
5. **Final prioritization.** Returning to the portfolio characterization, the EC was able to use the comparison metrics to identify the greatest risks to the portfolio as a whole to prioritize evaluation activities across programs/offerings. The final result is an evaluation plan that recommends certain evaluation activities for the OEB to consider undertaking as part of its evaluation process.

Once these steps were completed, the EC sought comments from the OEB and Evaluation Advisory Committee (EAC) on the planned evaluation activities and timeline.

3 PORTFOLIO OVERVIEW

DNV characterized the portfolio in terms of the costs and benefits to ratepayers. The costs include the program budget and shareholder incentive. The benefits are the energy savings and non-energy benefits that result from the program. Programs with a greater portion of budget, shareholder incentive, or energy savings will provide proportionally larger impact than programs with smaller portions of the same. Because energy savings are often the metric used to determine the shareholder incentive, it has an effect on both costs and benefits; however, the relative impact of the cost effect is a result of the DSMSI allocation, not the savings themselves.

Table 3-1 characterizes programs and offerings with savings targets through the demand side management shareholder incentive (DSMSI) and 2023 savings target. Each program and offering shown in Table 3-1 uses a target adjustment mechanism (TAM) to determine targets for subsequent years of the plan. The TAM uses a ratio of performance per budget to scale the subsequent year target according to the achievement of the prior year. In this way, programs that greatly underperform their target per budget dollar will have a much lower target in Year 2 and vice versa. Programs are also assigned a productivity factor and inflation adjustment for subsequent years.

Because of the TAM, there are no clear savings targets for these programs for 2024 and 2025. DNV used the proportional savings by program from the 2023 targets to represent the entire plan period.

Table 3-1. Characterization of DSMSI allocation and target savings for TAM programs

Program and Offering(s)	Metric	DSMSI Allocation	Metric Weighting	2023 Target
Residential Program Scorecard				
Residential Whole Home	Net Annual Gas Savings (m3)	22%	100%	22,135,911
Residential Single Measure				
Residential Smart Home				
Low Income Program Scorecard				
Home Winterproofing	Single Family Net Annual Gas Savings (m3)	22%	50%	2,872,796
Affordable Housing Multi-Residential	Multi-Residential Net Annual Gas Savings (m3)		50%	5,015,604
Commercial Program Scorecard				
Commercial Custom	Large Customer Net Annual Gas Savings (m3)	22%	50%	15,441,281
Prescriptive Downstream				
Direct Install	Small Customer Net Annual Gas Savings (m3)		50%	8,914,062
Prescriptive Midstream				
Industrial Program Scorecard				
Industrial Custom	Net Annual Gas Savings (m3)	22%	100%	50,376,897
Large Volume Program Scorecard				
Direct Access	Net Annual Gas Savings (m3)	3%	100%	9,300,000

Table 3-2 characterizes programs and offerings with non-savings targets through the DSMSI and metric targets for all three plan years. These non-TAM programs are characterized by participation and unit achievement rather than energy savings, the exception being the Whole Building Pay for Performance offering which also has an annual savings target.

Table 3-2. Characterization of DSMSI allocation and targets for non-TAM programs

Program and Offering(s)	Metric	DSMSI Allocation	Metric* Weighting	2023 Target	2024 Target	2025 Target
Energy Performance Program Scorecard						
Whole Building Pay For Performance	Number of Participants	1%	50%	25	25	25
	Net Annual Gas Savings (m3)		50%	0	125,000	250,000
Building Beyond Code Program Scorecard						
Residential Savings By Design	Number of Energy Star Homes	8%	15%	1,450	2,000	2,759
	Number of Net Zero Ready Homes		15%	0	10	13
Commercial Savings By Design	Number of Participants		30%	28	31	34
Affordable Housing Savings By Design	Number of Participants		30%	18	21	25
Commercial Air Tightness Testing	Number of Participants		5%	5	6	7
	Number of Qualified Agents		5%	10	10	10

* In 2023, the Metric Weighting for the Whole Building Pay For Performance offering is 100% for the Number of Participants and 0% for Net Annual Gas Savings. Similarly, in 2023 the Metric Weighting for the Residential Savings By Design offering is 30% for the Number of Energy Star Homes and 0% for the Number of Net Zero Ready Homes.

Table 3-3 and Figure 3-1 show the distribution of energy savings, budget, and DSMSI across programs for the 2023 program year. They show that the shareholder incentive is distributed equally across the four largest resource acquisition programs: Residential, Low Income, Commercial, and Industrial. The remaining 12% of DSMSI is distributed across the Large Volume (3%), Energy Performance (1%), and Building Beyond Code (8%) programs.

Table 3-3 and Figure 3-1 show that the Residential program is allocated approximately 50% of the portfolio implementation budget. The Residential program consists of three separate offerings: Residential Whole Home, Residential Single Measure, and Smart Home. Although the savings achievements and costs of the three programs are combined for scorecard achievement and cost effectiveness, the November Decision and Order[1] suggests that the Residential Whole Home offering is meant to absorb more than 85% of the 2023 residential program budget, with the remaining split almost evenly across the other two offerings. For benefits, however, the Enbridge program plan[2] suggests that the Residential Whole Home offering is meant to provide approximately 74% of the benefits[3] from the Residential program, followed by Smart Home at approximately 21% and Single Measure at approximately 4%.

The Low Income and Commercial Programs are each allocated approximately 16% of the portfolio budget.

[1] Decision and Order, EB-2021-0002, November 15, 2022.

[2] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit D, Tab 1, Schedule 4, Page 2 of 2. Table 1: 2023 TRC-Plus and Net Benefits

[3] The Enbridge Plan benefits do not account for the Decision and Order cancellation of the Low Carbon Transition Program. Those funds were re-allocated to the Whole Home Residential offering, effectively doubling its budget. DNV accounted for the change by doubling the TRC benefits.

- The Commercial Program comprises four offerings: Custom, Prescriptive Downstream, Direct Install, and Prescriptive Midstream. Commercial Custom is allocated approximately 55% of the commercial program budget but is meant to provide 78% of the program benefits. Direct Install is allocated approximately 22% of the program budget and meant to provide 11% of the program benefits. The remaining program budget is split almost evenly between Downstream Prescriptive and Midstream Prescriptive, which provide 7% and 5% of the commercial program benefits respectively. The energy savings achievements from these offerings are divided at the program level into two categories: Large Customer and Small Customer. The Large Customer target is approximately two-thirds of the energy savings target for the Commercial program.
- The Low Income program comprises two offerings: Home Winterproofing and Affordable Housing Multi-Residential. Home Winterproofing is allocated approximately two-thirds of the program budget but is meant to provide only 43% of the program benefits. Affordable Housing Multi-Residential is allocated one-third of the program budget and meant to provide 57% of program benefits.

The Industrial Program, which consists of only one offering, Industrial Custom, is allotted approximately 10% of the portfolio budget but is meant to provide 35% of the portfolio benefits and almost 45% of the 2023 portfolio energy savings.

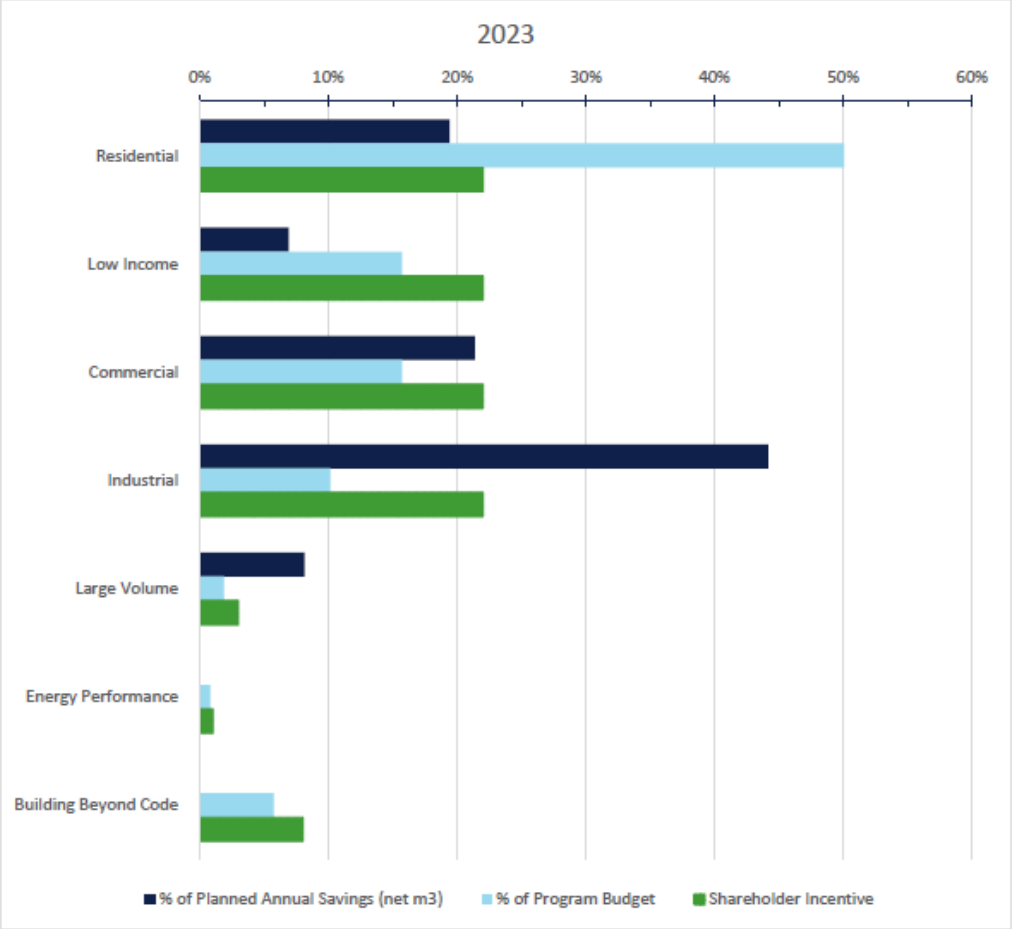
The Large Volume Program is the smallest of the resource acquisition programs at 2% of the portfolio budget and benefits.

Table 3-3. Distribution of savings, budget, and DSMSI across programs for the 2023 program year

Program	% of Planned Annual Savings*	% of Program Budget*	% DSMSI
Residential	19%	50%	22%
Low Income	7%	16%	22%
Commercial	21%	16%	22%
Industrial	44%	10%	22%
Large Volume	8%	2%	3%
Energy Performance	0%	1%	1%
Building Beyond Code	NA	6%	8%

* Values may not add to 100% due to rounding

Figure 3-1. Distribution of savings, budget, and DSMSI across programs for the 2023 program year



The Portfolio Characterization activity offers the following observations based on the 2023 data:

- DSMSI:
  - 88% of the DSMSI is applied equally across the four largest resource acquisition programs
  - Of the remaining 12%, 2/3 is applied to the Building Beyond Code program
- Budget:
  - 50% of the portfolio budget is assigned to the Residential Program. More than 85% of the Residential Program Budget is assigned to the Whole Home offering.
  - 16% of the budget is assigned to each of the Low Income and Commercial Programs. Commercial Custom is allocated 55% of the Commercial Program budget. Home Winterproofing is allocated two-thirds of the Low Income budget.
  - 10% of the budget is assigned to the Industrial Program, followed by 2% to the Large Volume Program.
- Energy savings:[4]

[4]Decision and Order, EB-2021-0002, November 15, 2022.

- Nearly 45% of the 2023 portfolio energy savings are meant to come from the Industrial Program
- The Commercial and Residential Programs have the next largest and nearly equivalent levels of expected 2023 energy savings, at roughly 20% each.
- The Large Volume Program is expected to produce 8% of the 2023 portfolio energy savings, followed by the Low Income program at 7%.

- Benefits:[5]

- 35% of portfolio benefits are meant to come from the Industrial Program.
- Within the Residential Program (33% of portfolio benefits), the Whole Home offering is meant to produce approximately 74% of the program benefits (24% of portfolio benefits) and the Smart Home offering approximately 21% of the program benefits (7% of portfolio benefits).
- Within the Commercial Program (22% of portfolio benefits), 78% of program benefits (17% of portfolio benefits) are meant to come from the Commercial Custom offering. Direct Install is intended to provide 11% of program benefits (2% of portfolio benefits).
- Within the Low Income program (9% of portfolio benefits), Affordable Multi-Residential is meant to produce 57% of program benefits (5% of portfolio benefits).
- Large Volume Direct Access is expected to produce approximately 2% of portfolio benefits.

If the evaluation activities were assigned solely according to the Portfolio Characterization, the greatest resources would be applied to the Industrial Program, the Residential Whole Home offering, and the Commercial Custom offering. Secondary targets would include Residential Smart Home, Affordable Housing Multi-Residential, and Home Winterproofing.

[5] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit D, Tab 1, Schedule 4, Page 2 of 2. Table 1: 2023 TRC-Plus and Net Benefits

4 PROGRAM AND OFFERING CHARACTERIZATION

DNV characterized each program and offering individually in terms of target market, past evaluation activities, program maturity, 2023 budget and savings, key changes from previous offerings, scorecard metrics, and program offerings. Using this information, we identified the components that may cause uncertainty (risk) in the program's natural gas savings estimate and shareholder incentive.

The following sections show the characterization for each program and offering, as well as the DNV-identified risks, estimate of the likelihood and impact of each risk, mitigation approach, and the relative cost of the mitigation approach. We then describe each mitigation approach individually for each program and offering.

4.1 Residential Program

The Residential program consists of three offerings: Residential Whole Home, Residential Single Measure, and Residential Smart Home. Results are combined into an annual savings target and contribute to a single program-level shareholder incentive.

The Residential program accounts for:

- 22% of the overall DSMSI Allocation
- 19% of the planned 2023 Portfolio Annual Net Savings
- 50% of the planned 2023 Program Budget (less admin costs)

Table 4-1. Residential Program 2023 Scorecard

Residential Program Scorecard		2023 Scorecard Targets			
Offerings	Metric	DSMSI Allocation	Metric Weighting	2023 Target (100%)	Budget
Residential Whole Home	Net Annual Gas Savings (m3)	22%	100%	22,135,911	$70,378,564
Residential Single Measure					
Residential Smart Home					

4.1.1 Residential Whole Home

The Residential Whole Home offering is the continuation of a previous offering by Enbridge. There are two significant changes to this offering from previous years:

- There are no longer incentives for gas-fired water heaters or furnaces.
- The offering is now delivered jointly with Natural Resources Canada (NRCan). Participants can receive incentives for space heating heat pumps and heat pump water heaters.

Program Type	Residential
Relative Size, Portfolio **Relative Size, Program**	24% Benefits, 44% Costs 74% Benefits, 87% Costs
Maturity	More than 10 years
Target Market	Residential customers with homes heated by natural gas
Past Evaluations	None

4.1.1.1 Summary of offering

Residential Whole Home is designed to help customers reduce their energy consumption by taking a comprehensive approach to identifying opportunities for energy efficiency upgrades.

The following activities are required for participation:

1. An initial home energy audit, called the pre-assessment, conducted by a Registered Energy Advisor through a Service Organization licensed by NRCan.
2. Installation of at least one eligible measure.
3. A post-assessment home energy audit, conducted by a Registered Energy Advisor through a Service Organization licensed by NRCan.

Eligible measures included in the Residential Whole Home offering that affect but do not replace natural gas equipment are:

- Attic insulation
- Air sealing
- Basement insulation
- Exterior wall insulation
- Exposed floor insulation
- Window/door/skylight

4.1.1.2 Enbridge evaluation recommendations

Enbridge Gas recommended that verification of project files may be appropriate for this offering. Specifically, a verification would ensure that data being tracked by Enbridge Gas for projects is aligned with the information reported by delivery agents in the field.[6]

[6] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 2, Page 14 of 22. Impact Evaluation and Verification Item 41.

4.1.1.3 Risks, impacts, and targeted evaluation activities

Table 4-2. Risks and impacts – Residential Whole Home

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Modelling inaccuracies in the NRCan HOT2000 software	High	Medium	Desk reviews Billing analysis	Medium
Tracking data may not reflect modelling files	Medium	Medium	Desk reviews	Low
Inaccurate free ridership	High	Medium	Participant survey	Medium
Inaccurate spillover	High	Low	Participant survey	Medium
Inaccurate pre-retrofit building assumptions	High	High	Desk reviews Billing analysis	Medium (combo)
Measures might not be properly installed	Low	Low	Participant survey Billing analysis	Medium
Differences in project documentation due to virtual audits	Low	Low	Desk reviews	Low
Rebound effect and other behaviour changes not captured	High	Low	Billing analysis	Medium
Electricity savings interactions may not be captured	High	Low	Desk reviews	Medium
Enbridge-supported energy savings may not be distinguishable from NRCan support	High	High	Finance-related 'attribution' exercise	Low

For this offering, the EC team recommends the following:

- Billing analysis to measure gross energy savings, which will include effects from rebound and improper installation. The billing analysis should be supplemented with desk reviews to identify systematic errors in modelling inaccuracies and pre-retrofit building assumptions.
- Participant surveys to measure free ridership and spillover. These surveys should also confirm installation and continued operation.
- Desk reviews to confirm that the tracking data matches the modelling results, virtual audit documentation matches in-person audits, and electricity savings interactions are being captured.

The first two recommendations are discussed in greater detail below. The Annual Verification conducted by the EC includes activities to ensure the tracking data matches modelling results. Future Verifications will include activities to monitor the documentation for virtual audits and confirm that electricity savings interactions are captured. For the Residential Whole Home offering, the tracking savings will be enhanced to 'attribute' only a portion of the home's gross savings to Enbridge. Per the Decision & Order, the portion of savings assigned to Enbridge will match the proportion of total incentive provided by Enbridge. The remainder of the savings will be assigned to NRCan. In this situation, attribution does not refer to the influence of the program on the participant's decision, rather it references the portion of the incentive provided by Enbridge.

Billing analysis

Offering gross savings estimates are currently based on building energy modeling using NRCan's Hot2000 (H2K) software. A billing analysis can verify average gross savings relative to the existing equipment baseline, for all offering households, using offering tracking data and historic billing consumption data.

The objectives of the billing analysis would be to:

- Determine the energy savings (using an existing equipment baseline) resulting from offering participation through an econometrics modelling approach on the population of participants.
- Determine a factor that can be used to adjust the simulation savings going forward to reflect the savings one might get from a billing analysis.

The billing analysis should include the following tasks:

- Request, receive, clean, and assemble billing data, tracking data, and energy modelling files for all offering participants.
- Estimate site-level, weather-normalized models for pre- and post-installation periods for participants.
- Construct a comparison group to address non- offering exogenous change.
- Determine the gross average savings per household resulting from offering participation.
- Compare the billing analysis result to the building simulation result and identify the source of the differences, using other evaluation means such as a participant survey and a desk review of modelling files.
- Calculate an adjustment factor that can be used to "correct" the simulation estimates going forward.
- Write a report on the methodology, billing analysis results, comparison results, and recommendations that may help improve offering design.

Participant surveys

Free ridership and spillover have never been measured for this offering. Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to receive an assessment and install energy efficiency measures and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the offering from other potentially overlapping programs offered through Enbridge or other administrators.
- If the billing analysis is not conducted, verify installation and continued operation.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other residential offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Determine the effect of the offering on the decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Distinguish between the impact of the portion of the incentive offered solely by Enbridge vs. the impact of the incentive received by the homeowner, which was enhanced by NRCan
  - Explore any assessment-recommended measures that were potentially installed but not claimed by the offering.

- Identify measures that were installed without an incentive, but that could have resulted from offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.

- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.

- Examine the free ridership and spillover to provide information that may help improve offering design.
- Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

4.1.2 Residential Single Measure

The Residential Single Measure offering is new. It provides incentives for insulation and air sealing without requiring a home assessment.

Program Type	Residential
Relative Size, Portfolio **Relative Size, Program**	1% Benefits, 3% Costs 4% Benefits, 7% Costs
Maturity	New
Target Market	Residential customers with homes heated by natural gas
Past Evaluations	None

4.1.2.1 Summary of offering

Residential Single Measure offers customers a single measure option which encourages broader participation in the Residential Program by reducing barriers that may prevent customers from participating in the Whole Home offering.

Eligible measures included in the Single Measure offering are:

- Wall insulation
- Attic insulation
- Basement insulation
- Professional air sealing

4.1.2.2 Enbridge evaluation recommendations

Enbridge Gas does not recommend impact evaluation for this offering in the near term, as the results of the offering are generally prescribed by the TRM (with the exception of the air sealing measure). As air sealing is a new measure, Enbridge Gas recommended that an assessment of appropriate impact evaluation activities occurs once actual participation levels are better understood. Additionally, verification adjustments to account for the installation (or removal) of single measures may be appropriate in the future.[7]

[7] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 2, Page 18 of 22. Impact Evaluation and Verification Item 58.

4.1.2.3 Risks, impacts, and targeted evaluation activities

Table 4-3. Risks and impacts – Residential Single Measure

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free ridership	High	High	Participant survey	Medium
Inaccurate spillover	High	Low	Participant survey	Medium
Measures might not be properly installed	Low	Low	Participant survey Billing analysis	Medium
Savings do not match TRM estimate	Medium	Low	Billing analysis	Medium
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low
Inaccuracies in measuring or modelling air sealing	High	Medium	Desk reviews	Low
Rebound effect and other behavioural changes not being captured	High	Low	Billing analysis	Medium
Electricity savings interactions may not be captured	High	Low	Desk reviews	Medium

For this offering, the EC team recommends the following:

- Billing analysis to measure gross energy savings, which will include effects from rebound and improper installation.
- Participant surveys to measure free ridership and spillover. These surveys should also confirm installation and continued operation.
- Desk review of the air sealing calculation model.
- Tracking certification to ensure that TRM savings estimates are accurately applied, electricity savings interactions are captured, and air sealing savings are properly modelled.

The first three recommendations are discussed in greater detail below. The Annual Verification conducted by the EC includes a tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured, and air sealing savings are properly modelled.

Billing analysis

Offering gross savings estimates are currently based on prescriptive savings in the TRM. Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions. The industry best-practice for confirming the energy savings from residential building shell measures is a billing analysis, which can verify average gross savings relative to the existing equipment baseline, for all offering households, using offering tracking data and historic billing consumption data.

The objectives of the billing analysis would be to:

- Determine the energy savings (using an existing equipment baseline) resulting from offering participation through an econometrics modelling approach on the population of participants.
- Update the TRM savings for a jurisdiction-specific value that reflects the mix of participants in the Enbridge offering.

The billing analysis should include the following tasks:

- Request, receive, clean, and assemble billing data and tracking data for all offering participants.
- Construct a comparison group to address non- offering exogenous change.
- Determine the gross average savings per household resulting from offering participation.
- Write a report on the methodology, billing analysis results, comparison results, and recommendations that may help improve offering design.
- Update the TRM.

Participant surveys

Free ridership and spillover have never been measured for this offering. Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to install energy efficiency measures and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the offering from other potentially overlapping programs offered through Enbridge or other administrators.
- If the billing analysis is not conducted, verify installation and continued operation.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other residential offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Determine the effect of the offering on the decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

Desk reviews

The program offers four measures, three of which are traditionally based on TRM-defined savings. The fourth measure, air sealing, requires site-specific savings estimation as performed by a certified contractor. Desk reviews of the calculation model and subsequent savings estimates will provide a check to verify the model was used as intended and savings were correctly entered in the tracking database. This activity should be added to Annual Verification tasks going forward.

Desk reviews are expected to include the following tasks:

- Request tracking data to identify the population of participants.
- Design a statistical sample to provide results at 90/10 confidence/precision.
- Request supporting documentation for sampled projects.
- Compare tracked and documented values and, where necessary, identify an adjustment factor to apply to the population to verify savings.

4.1.2.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Savings verification

There are a number of approaches to verifying energy savings for prescriptive measures that could be used instead of billing analysis. The selected approach depends primarily on the most valued study outcome. Billing analysis is the industry best practice for verifying energy savings for residential building shell measures, but it does not provide measure-level results so will not improve the quality of the prospective TRM estimates. If the latter is the more valued outcome, a residential building stock study that looks at the typical existing insulation may be more desirable.

4.1.3 Residential Smart Home

The Residential Smart Home offering is an extension of a previous offering by Enbridge. There are currently no significant changes from the previous offering, though the offering may add additional smart control measures in the future. Enbridge has coordinated with IESO's Energy Affordability Program (EAP) to provide enhanced incentives for moderate income customers.

Program Type	Residential
Relative Size, Portfolio **Relative Size, Program**	7% Benefits, 3% Costs 21% Benefits, 6% Costs
Maturity	7 years
Target Market	Residential customers with homes heated by natural gas who have not participated previously
Past Evaluations	None

4.1.3.1 Summary of offering

The Smart Home offering provides an incentive to purchase qualifying smart thermostats. Incentives are distributed by instant savings through participating retailers or e-commerce sites at the time of purchase, or as a post-purchase rebate for customers who purchase an eligible device through a contractor. An enhanced incentive is also available through IESO for customers who meet the EAP Tier 2 income eligibility criteria.

4.1.3.2 Enbridge evaluation recommendations

Enbridge Gas recommended that verification may be appropriate to confirm the installation of measures purchased by customers through a retail channel.[8]

4.1.3.3 Risks, impacts, and targeted evaluation activities

Table 4-4. Risks and impacts – Residential Smart Home

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free ridership	High	High	Participant survey	Medium
Inaccurate spillover	High	Low	Participant survey	Medium
Measures not installed or operational	Low	High	Ping analysis	Low
Savings do not match TRM estimate	Medium	Medium	Billing analysis	Medium
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low

[8] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 2, Page 22 of 22. Impact Evaluation and Verification Item 72.

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Rebound effect and other behavioural changes not being captured	High	Low	Billing analysis	Medium
Electricity savings interactions may not be captured	High	Low	Desk reviews	Medium

For this offering, the EC team recommends the following:

- Billing analysis to measure gross energy savings, which will include effects from rebound.
- Participant surveys to measure free ridership and spillover.
- A 'ping analysis' to confirm installation and operation.
- Tracking certification to ensure that TRM savings estimates are accurately applied and electricity savings interactions are captured.

The first two recommendations are discussed in greater detail below. The Annual Verification conducted by the EC includes a ping analysis and tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured.

Billing analysis

Offering gross savings estimates are currently based on prescriptive savings in the TRM. Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions. The industry best-practice for confirming the energy savings from residential thermostat programs is a billing analysis, which can verify average gross savings relative to the existing equipment baseline, for all offering households, using offering tracking data and historic billing consumption data.

The objectives of the billing analysis would be to:

- Determine the energy savings (using an existing equipment baseline) resulting from offering participation through an econometrics modelling approach on the population of participants.
- Update the TRM savings for a jurisdiction-specific value that reflects the mix of participants in the Enbridge offering.

The billing analysis should include the following tasks:

- Request, receive, clean, and assemble billing data and tracking data for all offering participants.
- Construct a comparison group to address non-offering exogenous change.
- Determine the gross average savings per household resulting from offering participation.
- Write a report on the methodology, billing analysis results, comparison results, and recommendations that may help improve offering design.
- Update the TRM.

Participant surveys

Free ridership and spillover have never been measured for this offering. Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to receive an assessment and install energy efficiency measures and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other commercial offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Determine the effect of the offering on the decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and quantity of the measure
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

4.2 Low Income Program

The Low Income program consists of two offerings: Home Winterproofing and Affordable Housing Multi-Residential. Each offering has its own energy savings goal.

The Low Income program accounts for:

- 22% of the overall DSMSI Allocation
- 7% of the planned 2023 Portfolio Annual Net Savings
- 16% of the planned 2023 Program Budget (less admin costs)

Table 4-5. Low Income Program 2023 Scorecard

Low Income Program Scorecard			2023 Scorecard Targets		
Offerings	Metric	DSMSI Allocation	Metric Weighting	2023 Target (100%)	Budget
Home Winterproofing	Single Family Net Annual Gas Savings (m3)	22%	50%	2,872,796	$22,987,685
Affordable Housing Multi-Residential	Multi-Residential Net Annual Gas Savings (m3)		50%	5,015,604	

4.2.1 Home Winterproofing

The Home Winterproofing offering is a continuation of a previous offering by Enbridge. The most significant change from previous years is there are no longer incentives for gas-fired water heaters or furnaces.

Program Type	Low Income
Relative Size, Portfolio **Relative Size, Program**	4% Benefits, 11% Costs 43% Benefits, 76% Costs
Maturity	More than 15 years
Target Market	Residential homes meeting income and eligibility criteria.
Past Evaluations	Limited prescriptive measures have been independently verified

4.2.1.1 Summary of offering

Home Winterproofing provides free energy assessments to income qualified customers in an effort to help reduce energy costs. Based on findings of the energy assessment, the following measures are available at low to no cost to the participant:

- Air sealing
- Insulation upgrades
- Low flow showerheads and aerators
- Adaptive thermostats
- Pipe wrap
- Carbon monoxide detector if none are present

4.2.1.2 Enbridge evaluation recommendations

Enbridge Gas recommended that verification of project files may be appropriate for this offering. Specifically, verification would ensure that Enbridge Gas's tracking data for the projects are aligned with the information reported by DA's in the field. Furthermore, verification adjustments may be appropriate to account for the installation (or removal) of prescriptive measures.[9]

4.2.1.3 Risks, impacts, and targeted evaluation activities

Table 4-6. Risks and impacts – Home Winterproofing

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Modelling inaccuracies in the NRCan HOT2000 software	High	Medium	Desk reviews Billing analysis	Medium (combo)
Tracking data may not reflect modelling files	Medium	Medium	Desk reviews	Low

[9] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 3, Page 13 of 20. Impact Evaluation and Verification Item 29.

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Savings do not match TRM estimate	Medium	Low	Participant survey Desk reviews Site visits	High (combo)
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low
Inaccurate pre-retrofit building assumptions	High	High	Desk reviews Billing analysis	Medium (combo)
Measures might not be properly installed or may have been removed	Low	High	Billing analysis	Low
Rebound effect and other behaviour changes not captured	High	Low	Billing analysis	Medium
Electricity savings interactions may not be captured	High	Low	Desk reviews	Low

For this offering, the EC team recommends the following:

- Billing analysis to measure gross energy savings, which will include effects from rebound and improper installation. The billing analysis should be supplemented with desk reviews to identify systematic errors in modelling inaccuracies and pre-retrofit building assumptions.
- Participant surveys, desk reviews, and site visits to verify the energy savings estimate in the TRM and confirm measure installation.
- Desk reviews to confirm that the tracking data matches the modelling results and electricity savings interactions are being captured.
- Tracking certification to ensure that TRM savings estimates are accurately applied.

The first two recommendations are discussed in greater detail below. The Annual Verification conducted by the EC includes activities to ensure the tracking data matches modelling results and the TRM savings estimates are accurately applied. Future Verifications will include activities to confirm that electricity savings interactions are captured.

Billing analysis

Offering gross savings estimates are currently based on building energy modeling. A billing analysis can verify average gross savings relative to the existing equipment baseline, for all offering households, using offering tracking data and historic billing consumption data.

The objectives of the billing analysis would be to:

- Determine the energy savings (using an existing equipment baseline) resulting from offering participation through an econometrics modelling approach on the population of participants.
- Determine a factor that can be used to adjust the simulation savings going forward to reflect the savings one might get from a billing analysis.

The billing analysis should include the following tasks:

- Request, receive, clean, and assemble billing data, tracking data, and energy modelling files for all offering participants.
- Estimate site-level, weather-normalized models for pre- and post-installation periods for participants.

- Construct a comparison group to address non-offering exogenous change.
- Determine the gross average savings per household resulting from offering participation.
- Compare the billing analysis result to the building simulation result and identify the source of the differences, using other evaluation means such as a participant survey and a desk review of modelling files.
- Calculate an adjustment factor that can be used to "correct" the simulation estimates going forward.
- Write a report on the methodology, billing analysis results, comparison results, and recommendations that may help improve offering design.

Prescriptive savings verification

Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions.

The industry best-practice for confirming the energy savings from prescriptive programs mirrors the third-party savings verification done for custom programs. The primary differences are in frequency and scope.

- Frequency: custom verification is generally done more frequently than prescriptive verification.
- Scope: rather than verify entire offerings, prescriptive verification is often designed to target specific popular measures or frequently used calculation inputs. This approach limits the cost of verification to the most influential risk areas.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Collect data to verify the input assumptions to the TRM engineering calculation or verify the energy savings, depending on the measure installed.
- Collect data on any electricity or water impacts resulting from measure installation.
- Identify systematic improvements that can increase the accuracy of TRM savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the most influential measures and calculation inputs as well as the size and type of projects installed.
- Identify the targets addressed by the study, whether specific measures or calculation inputs, and narrow the tracking data to the affected records.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, on-site visits, and metering to verify installation, collect calculation inputs, and estimate the measure-level gross energy savings if applicable.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, and the information found during the verification.
- If applicable per the study plan, develop realization rates that show how well the verified savings reflect the TRM savings.
- Develop territory- and measure-specific calculation inputs to use in future TRM savings estimates.
- Write a report that summarizes the results of the study and provides recommendations for improvement.
- Update the TRM.

4.2.1.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Prescriptive savings verification and rebound effects

The cost of the prescriptive savings verification could be greatly reduced by eliminating site visits and metering options and relying on self-report data from participant surveys. The resulting savings estimates would be less accurate.

The same can be said about estimating rebound effects. A billing analysis may not be able to tease out rebound increases within the variation of everyday residential usage. The alternative is a participant survey that asks people to self-report differences in energy control that result from their energy efficiency measures. For example, if their house is more airtight and insulated than before, they may be willing to raise the temperature setting on their furnace. The participant survey would likely produce less accurate data, but the billing analysis may not be able to produce a result at all.

4.2.2 Affordable Housing Multi-Residential

The Affordable Housing Multi-Residential offering is a continuation of a previous offering by Enbridge. The most significant change from previous years is that there are no longer prescriptive incentives for gas-fired furnaces or boilers. Custom incentives may still encompass boiler replacements or upgrades.

Program Type	Low Income
Relative Size, Portfolio **Relative Size, Program**	5% Benefits, 5% Costs 57% Benefits, 33% Costs
Maturity	More than 10 years
Target Market	All social and assisted housing providers and owners/managers of privately owned multi-residential buildings that meet eligibility criteria
Past Evaluations	Custom measures (last completed 2018) and limited prescriptive measures (last completed 2017) have been independently verified

4.2.2.1 Summary of offering

Affordable Housing Multi-Residential offers a mix of prescriptive, custom, and direct install measures to help reduce natural gas consumption and improve energy efficiency for multi-residential buildings in the affordable housing market. In addition to custom measures, the following prescriptive and direct install measures are available through the offering:

- Energy recovery ventilators
- Heat recovery ventilators

4.2.2.2 Enbridge evaluation recommendations

Enbridge Gas recommended that third-party verification (CPSV) studies are appropriate for this offering since most gross measurement claims are developed by Enbridge Gas. However, since Enbridge Gas has been effectively and reasonably calculating project savings for several years as evidenced by minimal verification adjustments made to the low income results

through the course of repeated annual audits, Enbridge Gas submits that less rigorous and multi-year CPSV studies are appropriate in an effort to reduce participant survey fatigue and manage evaluation costs.[10]

4.2.2.3 Risks, impacts, and targeted evaluation activities

Table 4-7. Risks and impacts – Affordable Housing Multi-Residential

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Measures not installed or operational	Low	High	Participant survey	Medium
Savings do not match TRM estimate	Medium	Low	Participant survey Desk reviews Site visits	High (combo)
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low
Interactions with Custom measures	Medium	Medium	Desk reviews Tracking data review	Low (combo)
Electricity savings interactions may not be captured	High	Low	Desk reviews	Medium
Rebound effect and other behaviour changes not captured	High	Low	Billing analysis	Medium
Inaccurate custom savings estimates	Medium	Low	Custom savings verification	High
Inaccurate free-ridership assumptions	Low	High	Participant survey	Medium
Inaccurate spillover assumptions	Low	Medium	Participant survey	Medium

For this offering, the EC team recommends the following:

- Custom project savings verification (including participant surveys, desk reviews, and site visits) to verify custom project gross savings estimates and electricity savings interactions.
- Participant surveys to estimate free ridership and spillover and confirm measure installation for prescriptive measures.
- Verification of energy savings estimates in the TRM using participant surveys, desk reviews, and site visits.
- Billing analysis to estimate the rebound effect and other behaviour changes that result from greater system efficiencies.
- Tracking certification to ensure that TRM savings estimates are accurately applied, electricity savings interactions are captured, and the savings estimates for prescriptive and custom measures account for system interactions.

The first four recommendations are discussed in greater detail below. The Annual Verification conducted by the EC includes a tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured for prescriptive measures and the savings estimates for prescriptive and custom measures account for system interactions.

[10] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 3, Page 20 of 20. Impact Evaluation and Verification Item 50.

Custom savings verification

Offering gross savings are currently based on estimates developed by utility representatives in conjunction with trade allies and offering participants. Custom project claims reflect individual savings estimates calculated for each project associated with the specific equipment, operating conditions, and baseline conditions for that project. Custom savings have traditionally been verified through a third-party contractor, overseen by the utility or OEB, with results incorporated into the EC's Annual Verification report. Third-party verification is the industry best-practice for confirming the energy savings realized through custom programs.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Verify the natural gas energy savings resulting from the installed energy efficiency measures.
- Identify and account for any interactions with prescriptive measures installed at the same location.
- Quantify any electricity or water impacts resulting from measure installation.
- Identify systematic offering improvements that can increase the accuracy of offering-produced energy savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed, as well as any services received through, or projects promoted by, other Enbridge offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, and on-site visits to verify installation and confirm the gross energy savings.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, the information found during the verification, and any changes to the energy savings estimate.
- Write a report that summarizes the results of the study and provides recommendations for improvement.

Participant NTG surveys

Low Income programs are typically exempt from NTG studies because program participants do not have the economic capital to install energy efficiency measures without program assistance. However, the Multi-Residential offering provides incentives to building owners who likely do not qualify as low income and therefore may have the necessary means to update their buildings. In addition, the owners may have other buildings in their portfolio that do not qualify for Low Income incentives but are updated based on their experience with this offering.

Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to install an energy efficient measure and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other industrial offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.

- Write a telephone survey and deliver it to:
  - Determine the effect of the offering on the company's decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Notify the interviewer of the services received through or projects promoted by other offerings so the interviewer can properly account for them during the customer data collection.
  - Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from the organization's participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

Prescriptive savings verification

Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions.

The industry best-practice for confirming the energy savings from prescriptive programs mirrors the third-party savings verification done for custom programs. The primary differences are in frequency and scope.

- Frequency: custom verification is generally done more frequently than prescriptive verification.
- Scope: rather than verify entire offerings, prescriptive verification is often designed to target specific popular measures or frequently used calculation inputs. This approach limits the cost of verification to the most influential risk areas.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Collect data to verify the input assumptions to the TRM engineering calculation or verify the energy savings, depending on the measure installed.
- Collect data on any electricity or water impacts resulting from measure installation.
- Identify systematic improvements that can increase the accuracy of TRM savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the most influential measures and calculation inputs as well as the size and type of projects installed.
- Identify the targets addressed by the study, whether specific measures or calculation inputs, and narrow the tracking data to the affected records.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, on-site visits, and metering to verify installation, collect calculation inputs, and estimate the measure-level gross energy savings if applicable.

- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, and the information found during the verification.
- If applicable per the study plan, develop realization rates that show how well the verified savings reflect the TRM savings.
- Develop territory- and measure-specific calculation inputs to use in future TRM savings estimates.
- Write a report that summarizes the results of the study and provides recommendations for improvement.
- Update the TRM.

4.2.2.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Prescriptive savings verification and billing analysis rebound effects

The cost of the prescriptive savings verification could be greatly reduced by eliminating site visits and metering options and relying on self-report data from participant surveys. The resulting savings estimates would be less accurate.

The same can be said about estimating rebound effects. A billing analysis may not be able to tease out rebound increases within the variation of everyday residential usage. The alternative is a participant survey that asks people to self-report differences in energy control that result from their energy efficiency measures. For example, if their building is more airtight and insulated than before, they may be willing to raise the temperature setting on their furnace. The participant survey would likely produce less accurate data, but the billing analysis may not be able to produce a result at all.

4.3 Commercial Program

The Commercial program consists of four offerings: Commercial Custom, Prescriptive Downstream, Direct Install, and Prescriptive Midstream. The savings metrics for the Commercial program are divided into Large Customer Net Annual Gas Savings and Small Customer Net Annual Gas Savings.

The Commercial program accounts for:

- 22% of the overall DSMSI Allocation
- 21% of the planned 2023 Portfolio Annual Net Savings
- 16% of the planned 2023 Program Budget (less admin costs)

Table 4-8. Commercial Program 2023 Scorecard

<table>
<tr><th colspan="3">Commercial Program Scorecard</th><th colspan="3">2023 Scorecard Targets</th></tr>
<tr><th>Offerings</th><th>Metric</th><th>DSMSI Allocation</th><th>Metric Weighting</th><th>2023 Target (100%)</th><th>Budget</th></tr>
<tr><td>Commercial Custom</td><td rowspan="2">Large Customer Net Annual Gas Savings (m3)</td><td rowspan="4">22%</td><td rowspan="2">50%</td><td rowspan="2">15,441,281</td><td rowspan="4">$25,262,775</td></tr>
<tr><td>Prescriptive Downstream</td></tr>
<tr><td>Direct Install</td><td rowspan="2">Small Customer Net Annual Gas Savings (m3)</td><td rowspan="2">50%</td><td rowspan="2">8,914,062</td></tr>
<tr><td>Prescriptive Midstream</td></tr>
</table>

4.3.1 Commercial Custom

The Commercial Custom offering is a continuation of a previous offering by Enbridge. There are no significant changes from previous years.

Program Type	Commercial
Relative Size, Portfolio **Relative Size, Program**	17% Benefits, 9% Costs 78% Benefits, 55% Costs
Maturity	More than 15 years
Target Market	Commercial customers including MURBs, MUSH and other non-industrial customers
Past Evaluations	Custom project savings verification and net-to-gross evaluation last completed in 2018

4.3.1.1 Summary of offering

The Commercial Custom offering provides technical and financial support for more complex projects, taking into account facility specific energy saving opportunities. Commercial Custom provides financial incentives, technical expertise, and guidance with respect to energy related decision making and business justification, helping customers to prioritize energy efficiency projects and demonstrating the competitive advantage customers can gain through efficiency upgrades.

4.3.1.2 Enbridge evaluation recommendations

The most recent NTG study examining the Commercial Custom offering conducted by the Evaluation Contractor ("EC") was for the 2018 program year and was conducted for the separate EGD and Union Gas rate zone offerings. Enbridge Gas recommended that the EC conduct a NTG study (including both free ridership and spillover) for this offering ideally following the first year of program implementation.[11]

Enbridge Gas also recommended that repeated NTG studies are conducted for the offering throughout the term of the plan. However, Enbridge Gas recommended that such studies are not conducted any more frequently than every 2 years in an effort to minimize participant survey fatigue. The focus of the studies should be based on areas where the offering design has been changed.[12]

Furthermore, NTG studies should provide detailed and transparent information at a segment level in order to provide Enbridge Gas with program design information that can be actioned. Enbridge Gas also submits that it is critical that NTG studies are executed as close to project completion as practical to ensure relevant and timely customer feedback information is obtained. When the execution of NTG studies are delayed, employee turnover at the project site can impact the quality of the responses and the study.[13]

Enbridge Gas also recommended that third-party verification (CPSV) studies are appropriate for this offering since most gross measurement claims are developed by Enbridge Gas. Since Enbridge Gas has been conducting gross measurement claims

[11] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 4, Page 20 of 36. Impact Evaluation and Verification Item 58.

[12] Ibid., 59

[13] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 4, Page 21 of 36. Impact Evaluation and Verification Item 60.

for several years and has been engaged in the EC's review of the utility's gross measurement savings claims, Enbridge Gas submits that less rigorous, multi-year CPSV evaluations are appropriate in an effort to reduce participant survey fatigue and lower evaluation costs. The EC provided similar recommendations in its 2021-2022 DSM EM&V Plan:[14] [15]

> *"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 EC recommends that future evaluations implement a multi-year rolling sample methodology to determine custom C&I gross savings."*[16]

4.3.1.3 Risks, impacts, and targeted evaluation activities

Table 4-9. Risks and impacts – Commercial Custom

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate savings estimates	Medium	Low	Custom savings verification	High
Inaccurate free-ridership assumptions	High	High	Participant survey	Medium
Inaccurate spillover assumptions	Medium	Low	Participant survey	Medium
Electricity savings interactions may not be captured	Medium	Low	Custom savings verification	High

For this offering, the EC team recommends the following:

- Custom project savings verification (including participant surveys, desk reviews, and site visits) to verify gross savings estimates and electricity savings interactions.
- Participant surveys to estimate free ridership and spillover.

Each recommendation is discussed in greater detail below. Where it is possible to reduce respondent burden or achieve evaluation cost efficiencies, study activities should be combined to achieve multiple objectives.

Savings verification

Offering gross savings are currently based on estimates developed by utility representatives in conjunction with trade allies and offering participants. Custom project claims reflect individual savings estimates calculated for each project associated with the specific equipment, operating conditions, and baseline conditions for that project. Custom savings have traditionally been verified through a third-party contractor, overseen by the utility or OEB, with results incorporated into the EC's Annual Verification report. Third party verification is the industry best-practice for confirming the energy savings realized through custom programs.

The objectives of the third-party verification are to:

[14] Ibid., 61
[15] 2021-2022 Natural Gas Demand Side Management Evaluation, Measurement, and Verification (EM&V) Plan, DNV GL (February 4, 2021), pp. 6-7.
[16] Ibid.

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Verify the natural gas energy savings resulting from the installed energy efficiency measures.
- Identify and account for any interactions with prescriptive measures installed at the same location.
- Verify any electricity or water impacts resulting from measure installation.
- Identify systematic offering improvements that can increase the accuracy of offering-produced energy savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed, as well as any services received through, or projects promoted by, other Enbridge offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, and on-site visits to verify installation and confirm the gross energy savings.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, the information found during the verification, and any changes to the energy savings estimate.
- Write a report that summarizes the results of the study and provides recommendations for improvement.

Participant NTG surveys

The net-to-gross factors used by this offering do not reflect recent changes, namely the merger of legacy Enbridge and Union programs, the division between Commercial and Industrial offerings, and increases in incentive levels to account for shifts in incremental costs. Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to install an energy efficient measure and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the Custom offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other commercial offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Determine the effect of the offering on the company's decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Notify the interviewer of the services received through or projects promoted by other commercial offerings so the interviewer can properly account for them during the customer data collection.
  - Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.

- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

4.3.2 Prescriptive Downstream

The Prescriptive Downstream offering is a continuation of a previous offering by Enbridge. Enhanced services have been added to increase engagement and help mitigate the decrease in participation and cost-effectiveness due to advancement in codes and standards.

Program Type	Commercial
Relative Size, Portfolio **Relative Size, Program**	1% Benefits, 2% Costs 7% Benefits, 11% Costs
Maturity	More than 10 years
Target Market	All commercial and industrial customers
Past Evaluations	Limited prescriptive measures last evaluated in 2017

4.3.2.1 Summary of offering

The Prescriptive Downstream offering provides customers with a list of recommended technologies that have pre-determined incentive and savings amounts, defined by facility type and equipment size. Measures included in this offering are:

- Air Curtains
- Dock door seals
- Condensing make-up air unit
- Demand control kitchen ventilation unit
- Ozone laundry
- Destratification fans
- Demand control ventilation
- Energy recovery ventilator
- Heat recovery ventilator

4.3.2.2 Enbridge evaluation recommendations

Enbridge Gas recommended that the EC conduct a NTG study (inclusive of both free ridership and spillover) for this offering. The most recent NTG study conducted by the EC was for the 2017 program year and was conducted for the separate EGD and Union rate zone offerings. Changes to the offering have been made since then to improve NTG. The recommended area of focus for the study includes:

- Demand Control Ventilation
- Energy Recovery Ventilators
- Air curtains and dock door seals
- Measures that were not assessed in the 2017 study

Enbridge Gas also recommended that regular NTG studies are conducted for the offering throughout the term of the plan. The focus of the studies should be based on areas where the offering design has been changed.[17]

4.3.2.3 Risks, impacts, and targeted evaluation activities

Table 4-10. Risks and impacts – Prescriptive Downstream

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free ridership assumptions	Medium	Medium	Participant survey	Medium
Inaccurate spillover assumptions	Medium	Low	Participant survey	Medium
Measures not installed or operational	Low	High	Participant survey	Medium
Savings do not match TRM estimate	Medium	Low	Participant survey Desk reviews Site visits	High
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low
Interactions with Custom measures	Medium	Medium	Desk reviews Tracking data review	Low (combo)
Electricity savings interactions may not be captured	Medium	Low	Desk reviews	Medium

For this offering, the EC team recommends the following:

- Participant surveys to confirm measure installation and measure free ridership and spillover.
- Verification of the energy savings estimates in the TRM through participant surveys, desk reviews, and site visits.
- Tracking certification to ensure that TRM savings estimates are accurately applied, electricity savings interactions are captured, and the savings estimates for prescriptive and custom measures account for system interactions

The first two recommendations are discussed in greater detail below. Where it is possible to reduce respondent burden or achieve evaluation cost efficiencies, study activities should be combined to achieve multiple objectives.

The Annual Verification conducted by the EC includes a tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured, and the savings estimates for prescriptive and custom measures account for system interactions.

Participant NTG surveys

Participant surveys will use industry-standard data collection methods to identify the influence the offering had on the participant's decision to install an energy efficient measure for a sample of offering participants. Free ridership and spillover are likely to be measure-specific, based on the technology, market conditions and specific program offering at specific times. Participant surveys can also collect other data to increase the accuracy of the energy savings result, as discussed in the next section.

[17] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 4, Page 31-32 of 36. Impact Evaluation and Verification Item 98-99.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the Prescriptive offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other prescriptive offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Confirm continued measure installation.
  - Determine the effect of the offering on the company's decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Notify the interviewer of the services received through or projects promoted by other commercial offerings so the interviewer can properly account for them during the customer data collection.
  - Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall measure free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

Savings verification

Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions.

The industry best-practice for confirming the energy savings from commercial prescriptive programs mirrors the third-party savings verification done for custom programs. The primary differences are in frequency and scope.

- Frequency: custom verification is generally done more frequently than prescriptive verification.
- Scope: rather than verify entire programs, prescriptive verification is often designed to target specific popular measures or frequently used calculation inputs. This approach limits the cost of verification to the most influential risk areas.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Collect data to verify the input assumptions to the TRM engineering calculation or verify the energy savings, depending on the measure installed.

- Collect data on any electricity or water impacts resulting from measure installation.
- Identify systematic improvements that can increase the accuracy of TRM savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the most influential measures and calculation inputs as well as the size and type of projects installed.
- Identify the targets addressed by the study, whether specific measures or calculation inputs, and narrow the tracking data to the affected records.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, on-site visits, and metering to verify installation, collect calculation inputs, and estimate the measure-level gross energy savings if applicable.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, and the information found during the verification.
- If applicable per the study plan, develop adjustment factors that show how well the verified savings reflect the TRM savings.
- Develop territory- and measure-specific calculation inputs to use in future TRM savings estimates.
- Write a report that summarizes the results of the study and provides recommendations for improvement.
- Update the TRM.

4.3.2.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Prescriptive savings verification

The cost of the prescriptive savings verification could be greatly reduced by eliminating site visits and metering options and relying on self-report data from participant surveys. The resulting savings estimates would be less accurate.

4.3.3 Direct Install

The Direct Install offering is a continuation of a previous program offered by Enbridge. There are no significant changes from previous years.

Program Type	Commercial
Relative Size, Portfolio **Relative Size, Program**	2% Benefits, 3% Costs 11% Benefits, 22% Costs
Maturity	7 years
Target Market	Smaller commercial and industrial customers
Past Evaluations	None

4.3.3.1 Summary of offering

Direct Install is designed to engage small commercial and industrial customers through contracted service providers. Incentives are paid directly to the service provider to reduce upfront costs making it easier for small business to participate. The following measures will be available through the expanded offering.

- Air curtains – shipping & pedestrian doors
- Dock door seals
- Demand control kitchen ventilation
- Destratification fans
- Add-on ventilation measures

4.3.3.2 Enbridge evaluation recommendations

Enbridge Gas recommended that the EC conduct a NTG study (inclusive of both free ridership and spillover) for this offering, ideally following the third year of program implementation (and no earlier than the second year), to allow time for new offering components to be implemented.

Enbridge Gas also recommended that regular NTG studies are conducted for the offering throughout the term of the plan. The focus of the studies should be based on areas where the offering design has been changed.[18]

4.3.3.3 Risks, impacts, and targeted evaluation activities

Table 4-11. Risks and impacts – Direct Install

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free ridership assumptions	Low	Low	Participant survey	Medium
Inaccurate spillover assumptions	Medium	Low	Participant survey	Medium
Measures no longer installed or operational	Medium	High	Participant survey	Low
Savings do not match TRM estimate	Medium	Low	Participant survey Desk reviews Site Visits	High (combo)
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low
Electricity savings interactions may not be captured	Medium	Low	Desk reviews	Medium

For this offering, the EC team recommends the following:

- Participant surveys to confirm measure installation and measure free ridership and spillover.
- Verification of the energy savings estimates in the TRM through participant surveys and desk reviews.

[18] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 4, Page 26 of 36. Impact Evaluation and Verification Item 80-81.

- Tracking certification to ensure that TRM savings estimates are accurately applied and electricity savings interactions are captured.

The first two recommendations are discussed in greater detail below. Where it's possible to reduce respondent burden or achieve evaluation cost efficiencies, study activities should be combined to achieve multiple objectives.

The Annual Verification conducted by the EC includes a tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured for prescriptive measures and the savings estimates for prescriptive and custom measures account for system interactions.

Participant NTG surveys

Participant surveys will use industry-standard data collection methods to identify the influence the offering had on the participant's decision to accept an energy efficient measure for a sample of offering participants. Free ridership and spillover are likely to be measure-specific, based on the technology, market conditions and specific program offering at specific times. Participant surveys can also collect other data to increase the accuracy of the energy savings result, as discussed in the next section.

The objectives of the participant survey are to:

- Confirm that measures are still installed and operational.
- Determine the free ridership and spillover associated with the installation of the measures.
- Distinguish the effects of the Direct Install offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other commercial offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Confirm continued measure installation.
  - Determine the effect of the offering on the company's decision to accept an energy efficiency measure; whether they would have installed the measure on their own.
  - Notify the interviewer of the services received through or projects promoted by other commercial offerings so the interviewer can properly account for them during the customer data collection.
  - Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall measure free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

Savings verification

Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions.

The industry best-practice for confirming the energy savings from direct install programs mirrors the third-party savings verification done for custom programs. The primary differences are in frequency and scope.

- Frequency: custom verification is generally done more frequently than direct install verification.
- Scope: rather than verify entire programs, prescriptive verification is often designed to target specific popular measures or frequently used calculation inputs. This approach limits the cost of verification to the most influential risk areas.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Collect data to verify the input assumptions to the TRM engineering calculation or verify the energy savings, depending on the measure installed.
- Collect data on any electricity or water impacts resulting from measure installation.
- Identify systematic improvements that can increase the accuracy of TRM savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the most influential measures and calculation inputs as well as the size and type of projects installed.
- Identify the targets addressed by the study, whether specific measures or calculation inputs, and narrow the tracking data to the affected records.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, on-site visits, and metering to confirm installation, collect calculation inputs, and estimate the measure-level gross energy savings if applicable.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, and the information found during the verification.
- If applicable per the study plan, develop realization rates that show how well the verified savings reflect the TRM savings.
- Develop territory- and measure-specific calculation inputs to use in future TRM savings estimates.
- Write a report that summarizes the results of the study and provides recommendations for improvement.
- Update the TRM.

4.3.3.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Prescriptive savings verification

The cost of the prescriptive savings verification could be greatly reduced by eliminating site visits and metering options and relying on self-report data from participant surveys. The resulting savings estimates would be less accurate.

4.3.4 Prescriptive Midstream

Prescriptive Midstream is a new offering delivered in coordination with IESO to promote high-efficiency equipment to commercial and industrial customers.

Program Type	Commercial
Relative Size, Portfolio **Relative Size, Program**	1% Benefits, 2% Costs 5% Benefits, 11% Costs
Maturity	4 years
Target Market	Distributors, retailers, and other mid-market actors
Past Evaluations	None

4.3.4.1 Summary of offering

Prescriptive Midstream contracts with vendors to identify and enroll eligible distributors and retailers and provide training and marketing materials to promote and upsell select energy efficient equipment. Vendors also support administration of offerings through an online portal which is used to validate eligibility, process incentives, and track performance. Measures available through this offering are as follows:

- Condensing Water Heaters
- Condensing Unit Heaters
- ENERGY STAR® fryers
- ENERGY STAR® steam cookers
- High-efficiency under-fired broilers
- ENERGY STAR® convection oven
- ENERGY STAR® single and double rack ovens

4.3.4.2 Enbridge evaluation recommendations

Enbridge Gas recommended that the EC conduct a NTG study (inclusive of both free ridership and spillover) for this offering, ideally following the third year of program implementation, and no earlier than the second year of program implementation. This will allow time for new offering components to be implemented and ramped up.

Enbridge Gas also recommended that regular NTG studies are conducted for the offering throughout the term of the plan. The focus of the studies should be based on areas where the offering design has been changed.

While the details of a NTG study for this offering requires attention and discussion with the EC and EAC, Enbridge Gas submits that the focus of a study for this type of mid-market offering must be based on vendors, rather than customers/end-users. This offering is designed to interact with and influence vendors, and as such, a traditional NTG study focused on customers/end-users would not be supported by Enbridge Gas.[19]

[19] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 4, Page 35-36 of 36. Impact Evaluation and Verification Item 113-115.

4.3.4.3 Risks, impacts, and targeted evaluation activities

Table 4-12. Risks and impacts – Prescriptive Midstream

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free-ridership assumptions	High	High	Vendor survey End user survey	Medium
Inaccurate spillover assumptions	High	Medium	Vendor survey End user survey	Medium
Measures not installed or operational	Low	High	End user survey	Medium
Savings do not match TRM estimate	Medium	Low	Participant survey Desk reviews Site visits	High (combo)
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking data review and certification	Low
Interactions with Custom measures	Medium	Medium	Desk reviews Tracking data review	Low
Electricity savings interactions may not be captured	Medium	Low	Desk review	Medium

For this offering, the EC team recommends the following:

- Vendor surveys to contribute to free ridership and spillover.
- Participant (end-user) surveys to confirm measure installation and contribute to free ridership and spillover.
- Verification of the energy savings estimates in the TRM through participant surveys, desk reviews, and site visits.
- Tracking certification to ensure that TRM savings estimates are accurately applied, electricity savings interactions are captured, and the savings estimates for prescriptive and custom measures account for system interactions.

The first three recommendations are discussed in greater detail below. Where it's possible to reduce respondent burden or achieve evaluation cost efficiencies, study activities should be combined to achieve multiple objectives.

The Annual Verification conducted by the EC includes a tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured and the savings estimates for prescriptive and custom measures account for system interactions.

Vendor and end-user NTG surveys

NTG surveys will use industry-standard data collection methods to identify the influence the offering had on the vendor's sales practices and the end-user's decision to install an energy efficient measure for a sample of vendors. Free ridership and spillover are likely to be measure-specific, based on the technology, market conditions and specific program offering at specific times. End-user surveys can also collect other data to increase the accuracy of the energy savings result, as discussed in the next section.

The objectives of the vendor survey are to:

- Contribute to NTG by determining the influence of the offering on the vendor's energy efficiency knowledge and sales and stocking practices.

- Contribute to spillover by identifying whether the changes have resulted in an increase in measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover).

The objectives of the participant survey are to:

- Contribute to NTG by determining the influence of the vendor on the end-user's decision to install the measure.
- Contribute to spillover by identifying measures that were installed without an incentive, but that could have resulted from the end-user's offering participation.
- Distinguish the effects of the offering from other potentially overlapping programs offered through Enbridge or other administrators.

The vendor and end-user surveys should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the participating vendors, the end-users they served, and size and type of projects installed as well as any services received through this offering.
- Design a vendor sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Where necessary for vendors with large participation, design an end-user sample that supports an overall offering NTG precision of 90/10.
- Write a vendor telephone survey and deliver it to:
  - Confirm the offering services received.
  - Determine the effect of the offering on the vendor's energy efficiency knowledge and sales and stocking practices.
  - Identify whether the changes have resulted in an increase in measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover).
  - Ask about internal approaches to energy efficiency product sales and the distribution of Enbridge incentives to individual sales staff.
  - Probe for non-energy benefits used to sell the energy efficient equipment.
  - If necessary, ask for the names and contact information of end-users who purchased the energy efficient equipment.
- Write a participant telephone survey and deliver it to:
  - Verify the equipment purchased and its continued installation and operation.
  - Determine the effect of the vendor on the end-user's decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Notify the interviewer of the non-energy benefits used to sell the energy efficient equipment for use as probes to remind end-users of the sales process.
  - Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
  - Identify any energy efficiency measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall measure free ridership and spillover, assembled into a representative NTG rate. Examine the free ridership and spillover to provide information that may help improve offering design.

Savings verification

Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not

represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions.

The industry best-practice for confirming the energy savings from prescriptive programs mirrors the third-party savings verification done for custom programs. The primary differences are in frequency and scope.

- Frequency: custom verification is generally done more frequently than prescriptive verification.
- Scope: rather than verify entire programs, prescriptive verification is often designed to target specific popular measures or frequently used calculation inputs. This approach limits the cost of verification to the most influential risk areas.

Midstream measures may not offer the same "paper trail" of documentation or tracking as downstream measures, adding an extra step to the installation verification exercise.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Collect data to verify the input assumptions to the TRM engineering calculation or verify the energy savings, depending on the measure installed.
- Collect data on any electricity or water impacts resulting from measure installation.
- Identify systematic improvements that can increase the accuracy of TRM savings estimates going forward.

The third-party verification should include the following tasks:

- Where data is available from the offering, request and receive tracking data files and project documentation sufficient to identify the most influential measures and calculation inputs as well as the size and type of projects installed. Where data is not available, contact participating vendors to ask for the names and contact information of end-users who purchased the energy efficient equipment.
- Identify the targets addressed by the study, whether specific measures or calculation inputs, and narrow the tracking data to the affected end-users.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, on-site visits, and metering to verify installation, collect calculation inputs, and estimate the measure-level gross energy savings if applicable.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, and the information found during the verification.
- If applicable per the study plan, develop realization rates that show how well the verified savings reflect the TRM savings.
- Develop territory- and measure-specific calculation inputs to use in future TRM savings estimates.
- Write a report that summarizes the results of the study and provides recommendations for improvement.
- Update the TRM.

4.3.4.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Prescriptive savings verification

The cost of the prescriptive savings verification could be greatly reduced by eliminating site visits and metering options and relying on self-report data from participant surveys. The resulting savings estimates would be less accurate.

4.4 Industrial Program

The Industrial program consists of one offering, Industrial Custom, with one savings target.

The Industrial program accounts for:

- 22% of the overall DSMSI Allocation
- 44% of the planned 2023 Portfolio Annual Net Savings
- 10% of the planned 2023 Program Budget (less admin costs)

Table 4-13. Industrial Program 2023 Scorecard

Industrial Program Scorecard			2023 Scorecard Targets		
Offering	Metric	DSMSI Allocation	Metric Weighting	2023 Target (100%)	Budget
Industrial Custom	Net Annual Gas Savings (m3)	22%	100%	50,376,897	$17,828,114

4.4.1 Industrial Custom

The Industrial Custom offering is a continuation of a previous offering by Enbridge. There are no significant changes from previous years.

Program Type	Industrial
Relative Size, Portfolio **Relative Size, Program**	35% Benefits, 10% Costs 100% Benefits, 100% Costs
Maturity	More than 15 years
Target Market	Industrial customers excluding Large Volume rate class T2 and R100
Past Evaluations	Custom project savings verification and net-to-gross evaluation last completed in 2018

4.4.1.1 Summary of offering

Industrial Custom provides customers with technical engineering support and financial incentives to assist with energy-efficiency projects tailored to facility specific needs. Financial incentives are also available for energy audits, studies, sub-metering, and Energy Management Information System (EMIS) to further aid customers in identifying and measuring opportunities for savings.

4.4.1.2 Enbridge evaluation recommendations

The most recent NTG study examining the Industrial program conducted by the EC was for the 2018 program year and was conducted for the separate EGD and Union rate zone offerings. Enbridge Gas recommended that the EC conduct a NTG study (including both free ridership and spillover) for this offering ideally following the first year of program implementation.

Enbridge Gas also recommended that repeated NTG studies are conducted for the offering throughout the term of the plan. However, Enbridge Gas recommended such studies are not conducted more frequently than every 2 years in an effort to

minimize participant survey fatigue. The focus of the studies should be based on areas where the offering design has been changed.

Furthermore, NTG studies should provide detailed and transparent information at a segment level in order to provide Enbridge Gas with program design information that can be actioned. Enbridge Gas also submits that it is critical that NTG studies are executed as close to project implementation as practical to ensure relevant and timely customer feedback is obtained. When the execution of NTG study is delayed, employee turnover at the project site can impact the quality of the responses and the study.

Enbridge Gas recommended that third-party verification (CPSV) studies are appropriate for this offering given that most gross measurement claims are developed by the utility. Since Enbridge Gas has been conducting gross measurement claims for several years and has been engaged in the ECs review of the utility's gross measurement savings claims, Enbridge Gas submits that less rigorous, multi-year CPSV evaluations are appropriate in an effort to reduce participant survey fatigue and lower evaluation costs. The EC provided similar recommendations in the 2021-2022 DSM EM&V Plan:[20]

> *"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 EC recommends that future evaluations implement a multi-year rolling sample methodology to determine custom C&I gross savings."*[21]

4.4.1.3 Risks, impacts, and targeted evaluation activities

Table 4-14. Risks and impacts – Industrial Custom

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate savings estimates	Medium	Low	Custom savings verification	High
Inaccurate free-ridership assumptions	High	High	Participant survey	Medium
Inaccurate spillover assumptions	Medium	Low	Participant survey	Medium
Electricity and water savings interactions may not be captured	Medium	Low	Custom savings verification	High

For this offering, the EC team recommends the following:

- Custom project savings verification (including participant surveys, desk reviews, and site visits) to verify gross savings estimates and electricity savings interactions.
- Participant surveys to estimate free ridership and spillover.

[20] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 5, Page 15-16 of 17. Impact Evaluation and Verification Item 48-51.

[21] 2021-2022 Natural Gas Demand Side Management Evaluation, Measurement, and Verification (EM&V) Plan, DNV GL (February 4, 2021), pp. 6-7. https://www.oeb.ca/sites/default/files/2021-2022-DSM-EMV-Plan-Addendum-20210204.pdf

Each recommendation is discussed in greater detail below. Where it is possible to reduce respondent burden or achieve evaluation cost efficiencies, study activities should be combined to achieve multiple objectives.

Savings verification

Offering gross savings are currently based on estimates developed by utility representatives in conjunction with trade allies and offering participants. Custom project claims reflect individual savings estimates calculated for each project associated with the specific equipment, operating conditions, and baseline conditions for that project. Custom savings have traditionally been verified through a third-party contractor, overseen by the utility or OEB, with results incorporated into the EC's Annual Verification report. Third party verification is the industry best-practice for confirming the energy savings realized through custom programs.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Verify the natural gas energy savings resulting from the installed energy efficiency measures.
- Identify and account for any interactions with prescriptive measures installed at the same location.
- Quantify any electricity or water impacts resulting from measure installation.
- Identify systematic offering improvements that can increase the accuracy of offering-produced energy savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed, as well as any services received through, or projects promoted by, other Enbridge offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, and on-site visits to verify installation and confirm the gross energy savings.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, the information found during the verification, and any changes to the energy savings estimate.
- Write a report that summarizes the results of the study and provides recommendations for improvement.

Participant NTG surveys

The net-to-gross factors used by this offering do not reflect recent changes, namely the merger of legacy Enbridge and Union programs, the division between Commercial and Industrial offerings, and increases in incentive levels to account for shifts in incremental costs. Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to install an energy efficient measure and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the Custom offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other industrial offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:

- Determine the effect of the offering on the company's decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
- Notify the interviewer of the services received through or projects promoted by other industrial offerings so the interviewer can properly account for them during the customer data collection.
- Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
- Probe for non-energy benefits "sold" by the offering when measuring influence.
- Explore any audit-recommended measures that were potentially installed but not claimed by the offering.
- Identify measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.

- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.

- Examine the free ridership and spillover to provide information that may help improve offering design.
- Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

4.5 Large Volume Program

The Large Volume program consists of one offering, Direct Access, with one savings target.

The Large Volume program accounts for:

- 3% of the overall DSMSI Allocation
- 8% of the planned 2023 Portfolio Annual Net Savings
- 2% of the planned 2023 Program Budget (less admin costs)

Table 4-15. Large Volume Program 2023 Scorecard

Large Volume Program Scorecard			2023 Scorecard Targets		
Offering	Metric	DSMSI Allocation	Metric Weighting	2023 Target (100%)	Budget
Direct Access	Net Annual Gas Savings (m3)	3%	100%	9,300,000	$2,766,624

4.5.1 Direct Access

The Direct Access offering is the continuation of a previous offering from Union. The offering has been revised to exclude customers that are gas-fired electricity generators.

Program Type	Large Volume
Relative Size, Portfolio **Relative Size, Program**	2% Benefits, 3% Costs 100% Benefits, 100% Costs
Maturity	10 years
Target Market	Union rate zones: Rate T2 and Rate 100
Past Evaluations	Custom project savings verification and net-to-gross evaluation last completed in 2018

4.5.1.1 Summary of offering

This offering uses a direct access budget mechanism for the customer for Rate T2/Rate 100 customers. This mechanism grants each customer direct access to the customer incentive budget they pay in rates. Customers must use these funds to identify and implement energy efficiency projects or lose the funds which will consequently become available for use by other customers in the same rate class. This "use it or lose it" approach ensures each customer has first access to the amount of incentive budget funded by their rates.

4.5.1.2 Enbridge evaluation recommendations

Enbridge Gas recommended that third-party verification (CPSV) studies are appropriate for this offering since most gross measurement claims are developed by Enbridge Gas. Since Enbridge Gas has been conducting gross measurement claims for several years and has been engaged in the EC's review of the utility's gross measurement savings claims, Enbridge Gas submits that multi-year (e.g., every other year) CPSV processes may be more appropriate in an effort to reduce participant survey fatigue and lower evaluation costs.

Enbridge Gas submits that NTG studies for this offering, inclusive of both free ridership and spillover elements, need to consider the unique offering design. As a direct access model, participants use their own funding to execute energy efficiency with support from Enbridge Gas. Therefore, traditional NTG approaches may not be appropriate. If NTG studies are conducted, Enbridge Gas submits they should be conducted infrequently, as the offering is not large in terms of the number of customers potentially participating.[22]

4.5.1.3 Risks, impacts, and targeted evaluation activities

Table 4-16. Risks and impacts – Direct Access

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free-ridership assumptions	Medium	Low	Participant survey	Medium
Inaccurate spillover assumptions	Medium	Low	Participant survey	Medium
Prescriptive Measures not installed or operational	Low	Low	Participant survey	Medium

[22] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 1, Schedule 6, Page 9 of 9. Impact Evaluation and Verification Item 27-28.

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Savings do not match TRM estimate	Medium	Low	Participant survey Desk reviews Site visits	High (combo)
Inaccuracies in tracking TRM-based savings	Low	Low	Tracking review and certification	Low
Electricity savings interactions may not be captured	Medium	Low	Desk reviews	Medium
Inaccurate custom savings estimates	Medium	Low	Custom savings verification	High

For this offering, the EC team recommends the following:

- Custom project savings verification (including participant surveys, desk reviews, and site visits) to verify custom project gross savings estimates and electricity savings interactions.
- Participant surveys to estimate free ridership and spillover and confirm measure installation for prescriptive measures.
- Verification of the energy savings estimates in the TRM through participant surveys, desk reviews, and site visits.
- Tracking certification to ensure that TRM savings estimates are accurately applied and electricity savings interactions are captured.

The first three recommendations are discussed in greater detail below. Where it's possible to reduce respondent burden or achieve evaluation cost efficiencies, study activities should be combined to achieve multiple objectives.

The Annual Verification conducted by the EC includes a tracking certification to ensure that TRM savings estimates are accurately applied and recorded. Future Verifications will include activities to confirm that electricity savings interactions are captured for prescriptive measures.

Custom savings verification

Offering gross savings are currently based on estimates developed by utility representatives in conjunction with trade allies and offering participants. Custom project claims reflect individual savings estimates calculated for each project associated with the specific equipment, operating conditions, and baseline conditions for that project. Custom savings have traditionally been verified through a third-party contractor, overseen by the utility or OEB, with results incorporated into the EC's Annual Verification report. Third party verification is the industry best-practice for confirming the energy savings realized through custom programs.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Verify the natural gas energy savings resulting from the installed energy efficiency measures.
- Identify and account for any interactions with prescriptive measures installed at the same location.
- Quantify any electricity or water impacts resulting from measure installation.
- Identify systematic offering improvements that can increase the accuracy of offering-produced energy savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed, as well as any services received through, or projects promoted by, other Enbridge offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, and on-site visits to verify installation and confirm the gross energy savings.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, the information found during the verification, and any changes to the energy savings estimate.
- Write a report that summarizes the results of the study and provides recommendations for improvement.

Participant NTG surveys

The most recent Direct Access offering NTG assessment is approximately five years old and does not reflect increases in incentive levels to account for shifts in incremental costs. Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to install an energy efficient measure and identify any additional energy savings actions they took as a result of their participation.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Distinguish the effects of the Direct Access offering from other potentially overlapping programs offered through Enbridge or other administrators.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the size and type of project installed as well as any services received through, or projects promoted by, this or other industrial offerings.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Write a telephone survey and deliver it to:
  - Determine the effect of the offering on the company's decision to install an energy efficiency measure; particularly the effect on the timing, efficiency, and size/quantity of the measure.
  - Notify the interviewer of the services received through or projects promoted by other industrial offerings so the interviewer can properly account for them during the customer data collection.
  - Probe for the influence of the direct access funding mechanism and long-term utility relationships on the decision to install.
  - Ask about internal policies on simple payback or rate of return for approving energy and non-energy projects.
  - Probe for non-energy benefits "sold" by the offering when measuring influence.
  - Identify measures that were installed without an incentive, but that could have resulted from the company's offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.
- Conduct a ratio estimation analysis to expand the sample results to the population.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.
  - Examine the free ridership and spillover to provide information that may help improve offering design.
  - Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

Prescriptive savings verification

Prescriptive savings are determined by utility and evaluation professionals using engineering calculations. They include input assumptions that are typically based on secondary source data collected in other jurisdictions, which may or may not

represent customers participating in this offering. These savings estimates are collected in a TRM and reviewed and updated approximately every three years to replace outdated assumptions.

The industry best-practice for confirming the energy savings from commercial prescriptive programs mirrors the third-party savings verification done for custom programs. The primary differences are in frequency and scope.

- Frequency: custom verification is generally done more frequently than prescriptive verification.
- Scope: rather than verify entire programs, prescriptive verification is often designed to target specific popular measures or frequently used calculation inputs. This approach limits the cost of verification to the most influential risk areas.

The objectives of the third-party verification are to:

- Verify that the energy efficiency measures were installed as reported and continue to operate as designed.
- Collect data to verify the input assumptions to the TRM engineering calculation or verify the energy savings, depending on the measure installed.
- Collect data on any electricity or water impacts resulting from measure installation.
- Identify systematic improvements that can increase the accuracy of TRM savings estimates going forward.

The third-party verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the most influential measures and calculation inputs as well as the size and type of projects installed.
- Identify the targets addressed by the study, whether specific measures or calculation inputs, and narrow the tracking data to the affected records.
- Design a sample, ensuring that it represents the offering and achieves a precision of 90/10.
- Conduct telephone calls, desk reviews, on-site visits, and metering to verify installation, collect calculation inputs, and estimate the measure-level gross energy savings if applicable.
- Produce site-level reports that describe the measure, the savings calculation, the assumptions used in the calculation, and the information found during the verification.
- If applicable per the study plan, develop realization rates that show how well the verified savings reflect the TRM savings.
- Develop territory- and measure-specific calculation inputs to use in future TRM savings estimates.
- Write a report that summarizes the results of the study and provides recommendations for improvement.
- Update the TRM.

4.5.1.4 Other options

The EC team has identified activities that could replace some of those outlined above for a different cost. This section outlines the other options and where they can be implemented.

Alternate prescriptive savings verification approach

The cost of the prescriptive savings verification could be greatly reduced by eliminating site visits and metering options and relying on self-report data from participant surveys. The resulting savings estimates would be less accurate.

4.6 Energy Performance Program

The Energy Performance program consists of one offering, Whole Building Pay For Performance. The offering has two metrics: one for the number of participants and one for the energy savings achieved under the offering. The offering is not

expected to achieve savings in its inaugural year; therefore, in 2023 the metric targets are weighted 100% to the number of participants. In subsequent years, the metrics are equally weighted.

The Energy Performance program accounts for:

- 1% of the overall DSMSI Allocation
- 0% of the planned 2023 Portfolio Annual Net Savings. In subsequent years, energy savings are not expected to exceed 1%.
- 1% of the planned 2023 Program Budget (less admin costs)

Table 4-17. Energy Performance Program 2023 Scorecard

Energy Performance Program Scorecard			2023 Scorecard Targets		
Offering	Metric	DSMSI Allocation	Metric Weighting	2023 Target (100%)	Budget
Whole Building Pay for Performance (P4P)	Number of Participants	1%	100%	25	$1,221,656
	Net Annual Gas Savings (m3)		0%	0	

4.6.1 Whole Building Pay for Performance

The Whole Building Pay-for-Performance offering is a multi-year engagement targeting primary and secondary schools.

Program Type	Energy Performance
Relative Size, Portfolio **Relative Size, Program**	Unquantified Benefits, <1% Costs 100% Benefits, 100% Costs
Maturity	New
Target Market	Primary and secondary schools
Past Evaluations	None

4.6.1.1 Summary of offering

Whole Building Pay-for-Performance is a multi-year program spanning a three-year period. There are three stages for which incentives are available. These are:

- Start-up Period - This offering provides funds to cover the initial set up costs, technical assistance to identify opportunities, and meter upgrades if necessary.
- Pay-for-Performance Period (Multi-Year – 3 years) - Participants can earn annual performance incentives based on incremental gas savings at the meter compared to the baseline model. Incentives are distributed annually at the end of each Pay-for-Performance period.
- Participation Completion - A final bonus incentive can be earned upon completion of the final Pay-for-Performance period. Bonus Incentives are awarded if a performance target of 20% has been achieved by the end of the three-year term.

4.6.1.2 Enbridge evaluation recommendations

Enbridge Gas recommended limited impact evaluation and verification for this offering in the near term, due to the offerings nascency and scope. Verification could include a review of project files. Increased impact evaluation could be assessed for appropriateness in the longer term.[23]

4.6.1.3 Risks, impacts, and targeted evaluation activities

Table 4-18. Risks and impacts – Whole Building Pay for Performance

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Inaccurate free ridership	Medium	High	Participant survey	Medium
Non-routine events affect baseline and/or performance period models	High	High	Participant survey Desk reviews	Medium
Inaccurate spillover	High	Medium	Participant survey	Medium
Inaccuracies in baseline or year-over-year treatment	Low	High	Desk reviews	Low

For this offering, the EC team recommends the following:

- Participant surveys to measure free ridership and spillover and identify non-routine events that could affect the offering baseline or performance period models.
- Desk reviews to identify inaccuracies in the year-over-year savings estimates and apply corrections based on the information gathered during the participant survey.

Each recommendation is discussed in greater detail below.

Participant surveys

Participant surveys can use industry-standard data collection methods to identify the influence Enbridge had on the participant's decision to participate in the program and identify any additional energy savings actions they took as a result of their participation. Participant surveys can also be used to inform the site-level consumption analysis.

The objectives of the participant survey are to:

- Determine the free ridership and spillover associated with the installation of energy efficiency measures.
- Identify non-routine events that could affect the baseline and/or performance period consumption

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the participant and the measures they installed during participation.
- Write a telephone survey to:
  - Determine Enbridge's effect on the decision to participate in the program and install the identified measures.
  - Identify non-routine events that could affect the baseline and/or performance period consumption.

[23] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 2, Schedule 1, Page 10 of 10. Impact Evaluation and Verification Item 24.

- Explore any recommended measures that were or might be installed after program participation, without an incentive, that could have resulted from offering participation (spillover). Gather the data necessary to estimate the energy savings resulting from the spillover measure installed.

- Attempt to deliver the survey to all program participants.
- Conduct a ratio estimation analysis to expand the sample results to the population, if necessary.
- Write a comprehensive report on the overall offering free ridership and spillover, assembled into a representative NTG rate.

- Examine the free ridership and spillover to provide information that may help improve offering design.
- Make recommendations to improve the quality of the offering's energy savings calculations in future offering years.

Desk reviews

The program supports projects that involve continuous and strategic energy management initiatives over multiple years. Savings performance is measured through normalized meter-based energy comparisons with continually evolving baselines. Desk reviews will verify the energy savings estimated by program staff.

The objectives of the desk reviews are to:

- Identify inaccuracies in the baseline or year-over-year savings treatment.
- Correct for non-routine events that could affect the meter-based energy consumption and associated impacts.

Desk reviews should include the following activities:

- Request and process program tracking data.
- If sufficient participation, design a statistical sample (90/10 confidence and precision) to assess the presence of non-routine events or baseline issues.
- Review the energy savings calculation for errors in weather normalization or consumption data treatment.
- Apply non-routine event corrections.
- If necessary, expand the results to the population.
- Write a report explaining the results of the review.

4.7 Building Beyond Code Program

The Building Beyond Code program consists of four offerings: Residential Savings By Design, Commercial Savings By Design, Affordable Housing Savings By Design, and Commercial Air Tightness Testing. The Commercial Savings By Design and Affordable Housing Savings By Design offerings each have one metric for the number of participants.

The Residential Savings By Design offering has two metrics: one for the number of Energy Star homes built and one for the number of Net Zero Ready homes built. The offering is not expected to achieve Net Zero Ready homes in its inaugural year; therefore, in 2023 the metric targets are weighted 100% to the number of Energy Star homes. In subsequent years, the metrics are equally weighted.

The Commercial Air Tightness offering also has two metrics: one for the number of participants and one for the number of qualified agents.

The most significant change in this program is that participants are no longer required to connect their project to the natural gas system. The removal of this requirement allows customers the freedom of choice and supports better understanding of energy efficiency and natural gas reduction for builders.

The Building Beyond Code program accounts for:

- 8% of the overall DSMSI Allocation
- 0% of the planned 2023 Portfolio Annual Net Savings. These offerings will not be measured against natural gas savings targets.
- 6% of the planned 2023 Program Budget (less admin costs)

Table 4-19. Building Beyond Code Program 2023 Scorecard

Building Beyond Code Program Scorecard		2023 Scorecard Targets			
Offerings	Metric	DSMSI Allocation	Metric Weighting	2023 Target (100%)	Budget
Residential Savings by Design	Number of Energy Star Homes	8%	30%	1,450	$8,437,503
	Number of Net Zero Ready Homes		0%	0	
Commercial Savings by Design	Number of Participants		30%	28	
Affordable Housing Savings by Design	Number of Participants		30%	18	
Commercial Air Tightness Testing	Number of Participants		5%	5	
	Number of Qualified Agents		5%	10	

4.7.1 Residential Savings by Design

The Residential Savings By Design offering is the continuation of a previous program offered by Enbridge. The most significant change from previous years is a Net Zero Energy Ready (NZER) discovery home path which allows builders to take on the challenge of designing and building a NZER home. Builders are no longer required to connect buildings to the natural gas system.

Program Type	Building Beyond Code
Relative Size, Portfolio **Relative Size, Program**	Unquantified Benefits, 3% Costs Unquantified Benefits, 51% Costs
Maturity	More than 10 years
Target Market	Residential new construction building contractors
Past Evaluations	None

4.7.1.1 Summary of offering

Residential Savings by Design works with new construction building contractors and offers two paths for participation.

The ENERGY STAR for New Homes (ESNH) or Equivalent Path offers incentives for homes constructed, at minimum, to the ESNH version 17 standard or equivalent performance of at least 20% better than OBC SB12 2017. In order to be eligible, the home must be built in a municipality in which the penetration level of ESNH homes has been 15% or less in the past three years.

The NZER Discovery Home Path considers new approaches and technologies to energy efficient construction, working with builders to design and construct a discovery home to NZER standards. Builders may only participate once and are limited to a single incentive.

4.7.1.2 Enbridge evaluation recommendations

Enbridge Gas recommended impact evaluation focus on the offering objective of avoiding lost opportunities in the new construction market. Verification should focus on ensuring homes built met the eligibility criteria for the ESNH offering and builders met the eligibility criteria for the NZER offering.[24]

4.7.1.3 Risks, impacts, and targeted evaluation activities

Table 4-20. Risks and impacts – Residential Savings by Design

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Homes do not meet performance criteria	Low	High	End-user survey Desk reviews Site visits	High (combo)
Builders would have changed building practices without the program	Low	Medium	Participant survey	Medium
Builders do not change non-participating homes	Medium	High	Participant survey Market study	Medium (PS) Medium (MS)

For this offering, the EC team recommends the following:

- Participant surveys to measure free ridership (i.e., whether builders would have changed their practices in the absence of the program) and spillover (i.e., whether builders are applying their education to non-participating homes).
- Desk reviews and, if necessary, site visits to ensure that homes built and tracked within the program meet the performance criteria.
- A market study to compare the efficiency of participating builders' homes to those built by non-participants to show early adoption by participants.

Each recommendation is discussed in greater detail below.

Participant surveys

Participant surveys will use industry-standard data collection methods to identify the influence the offering had on the participant's decision and ability to build energy efficient homes. They will also ask about builder practices when constructing non-participant homes, such as those without gas service or those constructed after program participation, and whether those homes follow the same or similar energy guidelines.

The objectives of the participant survey are to determine the free ridership and spillover associated with the building of high efficiency homes.

The participant survey should include the following tasks:

[24] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 2, Schedule 2, Page 16 of 33. Impact Evaluation and Verification Item 48.

- Request and receive tracking data files and project documentation sufficient to identify the builder, the number of homes built, and any services received through this or other offerings, such as those administered by other organizations.
- Design a sample, ensuring that it represents the offering.
- Write a telephone survey and deliver it to:

  – Confirm the number of homes built.
  – Confirm the energy efficient aspects of the homes built.
  – Determine the energy efficiency knowledge of the company prior to participating in the Savings By Design program and whether the company would have pursued the same education elsewhere.
  – Identify the energy efficiency practices of the company outside of program participation.
  – Ask about the changes in and drivers of the market's awareness and practices related to energy efficiency in residential new construction since the program began.
  – Notify the interviewer of the services received through or projects promoted by other program administrators so the interviewer can properly account for them during the customer data collection.
  – Ask about internal policies on the incremental cost of energy efficient measures and the ability to recoup that cost in home sales.
  – Probe for non-energy benefits "sold" by the offering when measuring influence and "sold" by the builder when marketing homes.
  – Explore any energy efficiency measures that were installed in the building but not promoted by the program, such as electricity or water measures.

- Write a comprehensive report on the influence of the program on builders and the changes to their building practices as a result of program participation. If possible, quantify the resulting energy savings, including estimates of free ridership and spillover. Make recommendations to improve the quality of the offering in the future.

Home performance verification

The Savings By Design program does not measure energy savings, but it does purport to transform the new construction market by educating and encouraging builders to improve the energy efficiency of the buildings they construct. There are a number of ways that one might verify whether the performance standards were followed.

- Desk Reviews: If available, the lowest cost option is a review of documentation from the builder or a third-party verifier that displays the standards used. This documentation could include equipment and materials specifications, blueprint details, invoices, or marketing material used to sell the home. The documentation can be compared to the program specifications to confirm the performance standard was achieved.
- End-user Survey: There is a small risk that the documentation provided for the desk review does not match the actual building constructed. The final product can be verified through an end-user (e.g., homebuyer) survey using questions about the visible performance elements, such as equipment efficiency or window types. However, the end-user contact information is likely not available.
- Site Visits: An alternative to the end-user survey is a site visit to the homes or developments constructed by the builder. The verification agent(s) can request access to homes to verify visible performance elements and confirm they match the documentation. Site visits represent the highest cost option to verify home performance.

If end-user surveys or site visits are conducted, additional information can be gleaned from the current occupant on the importance of energy efficiency in their decision to purchase a home, and their willingness to pay a premium for a high-performance building.

For all of these options, the verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify verification targets and the performance elements that will be visible after construction is complete.
- Design a sample, ensuring that it represents the offering.
- Conduct some or all of the verification activities outlined above.
- Write a report that summarizes the results of the study and provides recommendations for improvement.

Market study

The Savings By Design program is intended to create market transformation. By educating builders and creating a market for energy efficiency homes, the goal is to create market demand for the more efficient product, resulting in changes outside of program influence.

A market study can review the energy performance of non-participating builders and the homes they construct to identify changes (unrelated to updated building codes) since the program was first offered. Depending on the information available, a number of approaches could be employed.

- Desk Reviews: If available, the energy performance of homes could be assessed based on information collected by permitting agents or code compliance agencies. Desk reviews may reveal changes in standard practice over time, correcting for recent updates in building code requirements.
- Nonparticipant surveys: An alternative method is to survey non-participating builders to identify their current building practices and how those practices have changed over time. Information can be collected on buyer preference and interest in energy efficient buildings.

4.7.2 Commercial Savings by Design

The Commercial Savings by Design offering is a continuation of a previous program offered by Enbridge. One significant change from the previous framework is builders are no longer required to connect buildings to the natural gas system.

Program Type	Building Beyond Code
Relative Size, Portfolio **Relative Size, Program**	Unquantified Benefits, 1% Costs Unquantified Benefits, 16% Costs
Maturity	More than 10 years
Target Market	Commercial and multi-residential building contractors
Past Evaluations	None

4.7.2.1 Summary of offering

Commercial Savings by Design focuses on influencing builders and developers during the design phase to construct new buildings that exceed the efficiency requirements of the Ontario Building Code standards. This offering provides learning opportunities and financial assistance to commercial builders and developers throughout the building design process. Efforts to increase participation have been made by reducing the square footage requirement from 50,000 sq. ft. to 25,000 sq. ft.

4.7.2.2 Enbridge evaluation recommendations

Enbridge Gas recommended impact evaluation focus on the offering objective of educating participants. Verification could include ensuring program participants met the eligibility criteria.[25]

4.7.2.3 Risks, impacts, and targeted evaluation activities

Table 4-21. Risks and impacts – Commercial Savings by Design

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Buildings do not meet performance criteria	Low	High	Desk reviews Site visits	Low
Builders would have changed building practices without the program	Low	Medium	Participant survey	Medium
Builders do not change non-participating buildings.	Medium	High	Participant survey Market study	Medium

For this offering, the EC team recommends the following:

- Participant surveys to measure free ridership (i.e., whether builders would have changed their practices in the absence of the program) and spillover (i.e., whether builders are applying their education to non-participating buildings).
- Desk reviews and site visits to ensure that buildings built and tracked within the program meet the performance criteria.
- A market study to compare the efficiency of participating builders' buildings to those built by non-participants to show early adoption by participants.

Each recommendation is discussed in greater detail below.

Participant surveys

Participant surveys will use industry-standard data collection methods to identify the influence the offering had on the participant's decision and ability to build energy efficient buildings. They will also ask about builder practices when constructing non-participant buildings, such as those without gas service or those constructed after program participation, and whether those buildings follow the same or similar energy guidelines.

The objectives of the participant survey are to determine the free ridership and spillover associated with the building of high efficiency buildings.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the builder, the number of buildings built, and any services received through this or other offerings, such as those administered by other organizations.
- Design a sample, ensuring that it represents the offering.
- Write a telephone survey and deliver it to:

[25] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 2, Schedule 2, Page 21 of 33. Impact Evaluation and Verification Item 68.

- Confirm the number of buildings built.
- Confirm the energy efficient aspects of the buildings built.
- Determine the energy efficiency knowledge of the company prior to participating in the Savings By Design program and whether the company would have pursued the same education elsewhere.
- Identify the energy efficiency practices of the company outside of program participation.
- Ask about the changes in and drivers of the market's awareness and practices related to energy efficiency in commercial new construction since the program began.
- Notify the interviewer of the services received through or projects promoted by other program administrators so the interviewer can properly account for them during the customer data collection.
- Ask about internal policies on the incremental cost of energy efficient measures and the ability to recoup that cost in buildings sales or higher rent.
- Probe for non-energy benefits "sold" by the offering when measuring influence and "sold" by the builder when marketing buildings.
- Explore any energy efficiency measures that were installed in the building but not promoted by the program, such as electricity or water measures.

- Write a comprehensive report on the influence of the program on builders and the changes to their building practices as a result of program participation. If possible, quantify the resulting energy savings, including estimates of free ridership and spillover. Make recommendations to improve the quality of the offering in the future.

Building performance verification

The Savings By Design program does not measure energy savings, but it does purport to transform the new construction market by educating and encouraging builders to improve the energy efficiency of the buildings they construct. There are a number of ways that one might verify whether the performance standards were followed.

- Desk Reviews: If available, the lowest cost option is a review of documentation from the builder that displays the standards used. This documentation could include equipment and materials specifications, blueprint details, invoices, or marketing material used to sell the buildings. The documentation can be compared to the program specifications to confirm the performance standard was achieved.
- End-user Survey: There is a small risk that the documentation provided for the desk review does not match the actual building constructed. The final product can be verified through an end-user (e.g., building owner or tenant) survey using questions about the visible performance elements, such as equipment efficiency or window types. However, the end-user contact information is likely not available.
- Site Visits: An alternative to the end-user survey is a site visit to the buildings constructed by the builder. The verification agent(s) can request access to buildings to verify visible performance elements and confirm they match the documentation. Site visits represent the highest cost option to verify buildings performance.

If end-user surveys or site visits are conducted, additional information can be gleaned from the current occupant on the importance of energy efficiency in their decision to purchase or rent, and their willingness to pay a premium for a high-performance building.

For all of these options, the verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify verification targets and the performance elements that will be visible after construction is complete.
- Design a sample, ensuring that it represents the offering.
- Conduct some or all of the verification activities outlined above.

- Write a report that summarizes the results of the study and provides recommendations for improvement.

Market study

The Savings By Design program is intended to create market transformation. By educating builders and creating a market for energy efficient buildings, the goal is to create market demand for the more efficient product, resulting in changes outside of program influence.

A market study can review the energy performance of non-participating builders and the buildings they construct to identify changes (unrelated to updated building codes) since the program was first offered. Depending on the information available, a number of approaches could be employed.

- Desk Reviews: If available, the energy performance of buildings could be assessed based on information collected by permitting agents or code compliance agencies. Desk reviews may reveal changes in standard practice over time, correcting for recent updates in building code requirements.
- Nonparticipant surveys: An alternative method is to survey non-participating builders to identify their current building practices and how those practices have changed over time. Information can be collected on buyer and tenant preference and interest in energy efficient buildings.

4.7.3 Affordable Housing Savings by Design

The Affordable Housing Savings By Design offering is a continuation of a previous program offered by Enbridge. The most significant change from previous years is that education is based on modelling results relative to the National Energy Code of Canada for Buildings, which supports the participant's application requirements for government funding programs. Builders are also no longer required to connect to the natural gas system.

Program Type	Building Beyond Code
Relative Size, Portfolio **Relative Size, Program**	Unquantified Benefits, 2% Costs Unquantified Benefits, 27% Costs
Maturity	7 years
Target Market	Single family and multi-family affordable housing building contractors
Past Evaluations	None

4.7.3.1 Summary of offering

Affordable Housing Savings by Design focuses on influencing builders and developers during the design phase to construct new buildings that exceed the efficiency requirements of the Ontario Building Code standards. This offering provides learning opportunities and financial assistance to commercial builders and developers throughout the building design process.

Affordable Housing Savings by Design differs from the Residential and Commercial Savings by Design offerings by the communities it is designed to serve. In order to qualify for this offering, the project must be classified as either social and assisted housing, or multi-residential housing in which the applicant has declared at least 30% of the units are intended for low income households.

4.7.3.2 Enbridge evaluation recommendations

Enbridge Gas recommended impact evaluation focus on the offering objective of educating participants. Verification could include ensuring program participants met the eligibility criteria.[26]

4.7.3.3 Risks, impacts, and targeted evaluation activities

Table 4-22. Risks and impacts – Affordable Housing Savings by Design

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Homes do not meet performance criteria	Low	High	Desk reviews Site visits	Low
Builders would have changed building practices without the program	Low	Medium	Participant survey	Medium
Builders do not change non-participating homes	Medium	High	Participant survey Market study	Medium

For this offering, the EC team recommends the following:

- Participant surveys to measure free ridership (i.e., whether builders would have changed their practices in the absence of the program) and spillover (i.e., whether builders are applying their education to non-participating homes)
- Desk reviews and site visits to ensure that homes built and tracked within the program meet the performance criteria.
- A market study to compare the efficiency of participating builders' homes to those built by non-participants to show early adoption by participants.

Each recommendation is discussed in greater detail below.

Participant surveys

Participant surveys will use industry-standard data collection methods to identify the influence the offering had on the participant's decision and ability to build energy efficient buildings. They will also ask about builder practices when constructing non-participant buildings, such as those without gas service or those constructed after program participation, and whether those buildings follow the same or similar energy guidelines.

The objectives of the participant survey are to determine the free ridership and spillover associated with the building of high efficiency buildings.

The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify the builder, the number of buildings built, and any services received through this or other offerings, such as those administered by other organizations.
- Design a sample, ensuring that it represents the offering.
- Write a telephone survey and deliver it to:
  - Confirm the number of buildings built.

[26] Enbridge Gas Inc. Ontario Energy Board File: EB-2021-0002 Multi-Year Demand Side Management Plan (2022-2027) September 29, 2021 Updated Evidence. Exhibit E, Tab 2, Schedule 2, Page 27 of 33. Impact Evaluation and Verification Item 85.

  - Confirm the energy efficient aspects of the buildings built.
  - Determine the energy efficiency knowledge of the company prior to participating in the Savings By Design program and whether the company would have pursued the same education elsewhere.
  - Identify the energy efficiency practices of the company outside of program participation.
  - Ask about the changes in and drivers of the market's awareness and practices related to energy efficiency in residential new construction since the program began.
  - Notify the interviewer of the services received through or projects promoted by other program administrators so the interviewer can properly account for them during the customer data collection.
  - Ask about policies on the incremental cost of energy efficient measures and the ability to recoup that cost in building sales or rent.
  - Probe for non-energy benefits "sold" by the offering when measuring influence and "sold" by the builder when marketing buildings or applying for assistance.
  - Explore any energy efficiency measures that were installed in the building but not promoted by the program, such as electricity or water measures.

- Write a comprehensive report on the influence of the program on builders and the changes to their building practices as a result of program participation. If possible, quantify the resulting energy savings, including estimates of free ridership and spillover. Make recommendations to improve the quality of the offering in the future.

Building performance verification

The Savings By Design program does not measure energy savings, but it does purport to transform the new construction market by educating and encouraging builders to improve the energy efficiency of the buildings they construct. There are a number of ways that one might verify whether the performance standards were followed.

- Desk Reviews: If available, the lowest cost option is a review of documentation from the builder that displays the standards used. This documentation could include equipment and materials specifications, blueprint details, invoices, or marketing material used to sell the building. The documentation can be compared to the program specifications to confirm the performance standard was achieved.
- End-user Survey: There is a small risk that the documentation provided for the desk review does not match the actual building constructed. The final product can be verified through an end-user (e.g., occupant) survey using questions about the visible performance elements, such as equipment efficiency or window types. However, the end-user contact information is likely not available.
- Site Visits: An alternative to the end-user survey is a site visit to the buildings constructed by the builder. The verification agent(s) can request access to buildings to verify visible performance elements and confirm they match the documentation. Site visits represent the highest cost option to verify home performance.

For all of these options, the verification should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify verification targets and the performance elements that will be visible after construction is complete.
- Design a sample, ensuring that it represents the offering.
- Conduct some or all of the verification activities outlined above.
- Write a report that summarizes the results of the study and provides recommendations for improvement.

Market study

The Savings By Design program is intended to create market transformation. By educating builders and creating a market for energy efficient buildings, the goal is to create market demand for the more efficient product, resulting in changes outside of program influence.

A market study can review the energy performance of non-participating builders and the buildings they construct to identify changes (unrelated to updated building codes) since the program was first offered. Depending on the information available, a number of approaches could be employed.

- Desk Reviews: If available, the energy performance of buildings could be assessed based on information collected by permitting agents or code compliance agencies. Desk reviews may reveal changes in standard practice over time, correcting for recent updates in building code requirements.
- Nonparticipant surveys: An alternative method is to survey non-participating builders to identify their current building practices and how those practices have changed over time. Information can be collected on buyer preference and interest in energy efficient buildings.

4.7.4 Commercial Air Tightness Testing

Commercial Air Tightness is a new offering.

Program Type	Building Beyond Code
Relative Size, Portfolio **Relative Size, Program**	Unquantified Benefits, <1% Costs Unquantified Benefits, 6% Costs
Maturity	New
Target Market	Commercial and Multi-family Building Contractors
Past Evaluations	None

4.7.4.1 Summary of offering

This is a new program with two objectives: advancing the adoption of air tightness testing in commercial and multi-family new construction buildings by providing technical and financial support, and expanding the capacity of commercial air tightness testing agents through training and the development of standard commercial air tightness testing requirements.

4.7.4.2 Enbridge evaluation recommendations

Enbridge Gas recommended impact evaluation focus on the offering objective of enrolling participants and increasing the number of practitioners. Verification could include ensuring program participants met the eligibility criteria.

4.7.4.3 Risks, impacts, and targeted evaluation activities

Table 4-23. Risks and impacts – Commercial Air Tightness Testing

Risk Description	Likelihood	Impact	Evaluation Activity	Relative Evaluation Cost
Participants or practitioners may not have met eligibility criteria	Low	High	Desk reviews	Low
Recipients may be regular commercial air-tightness practitioners	Low	High	Participant survey	Low

For this offering, the EC team recommends the following:

- Participant surveys to identify whether program recipients were conducting qualified commercial air-tightness testing prior to the program.
- Desk reviews to ensure that participants and practitioners meet eligibility criteria.

Each recommendation is discussed in greater detail below. These activities will be adopted as part of the EC's Annual Verification.

Participant surveys

Participant surveys will use industry-standard data collection methods to assess participants' commercial air-tightness knowledge and practice prior to participating in the program. The participant survey should include the following tasks:

- Request and receive tracking data files and project documentation sufficient to identify participant and the services they received.
- Design a sample, ensuring that it represents the offering.
- Write a telephone survey and deliver it to:
  - Confirm the participant's eligibility to participate in the program.
  - Confirm the training received.
  - Determine the commercial air tightness knowledge of the participant prior to engaging with the program.
  - Identify instances of air tightness testing that were implemented outside of the program and without an incentive.
- Report on the results within the Annual Verification report.

Desk reviews

In the absence of participant surveys, desk reviews can be conducted to confirm the eligibility of practitioners and air tightness recipients to participate in the program. The EC will request tracking data sufficient to identify the practitioners and the buildings they tested along with documentation on their eligibility. The documentation will be compared to the program requirements and the results reported within the Annual Verification report.

5 ADDITIONAL CONSIDERATIONS

This section addresses cost efficiencies that can be gained by combining evaluation activities across programs and offerings. It also addresses evaluation activities that aren't tied directly to ratepayer costs or benefits.

5.1 Cross-Cutting Considerations

Section 4 identified the evaluation risks and mitigations by program and offering; however, conducting these evaluations can be done more cost-effectively when certain activities are combined with similar activities from other programs and offerings. This section identifies areas where such efficiencies can be gained.

5.1.1 Custom Project Savings Verification and NTG

5.1.1.1 Custom Project Savings Verification (CPSV)

The process for verifying the energy savings for custom projects is consistent across all programs and offerings affected. Each custom project savings verification has a relatively fixed 'base' cost related to evaluation plans, data requests, sample design, analysis, and report writing regardless of the number of projects or sites verified. Therefore, assembling all of the relevant custom project offerings into a single evaluation activity will produce cost efficiencies.

The custom savings verification process is the most costly evaluation activity proposed and each data point verified does add a measurable cost. Therefore, data points should not be added to the process without careful consideration to ensure that the activity represents the best use of evaluation funds.

5.1.1.2 Net-to-Gross (NTG)

Both the CPSV and NTG studies require surveys with program participants. These studies can be combined to reduce respondent burden and save the cost of repeat survey attempts. However, there are drawbacks to this approach.

- Free ridership surveys should be conducted as close to the decision point as possible. The decision to proceed is, by definition, very early in the process; therefore, the ideal time to conduct a NTG survey may be before the project is even completed.
- CPSV studies require the project to be installed and operational to gather the data needed to verify energy savings. The operational point is, by definition, very late in the process; therefore, the ideal time to conduct a CPSV study is one or two months after project completion.

Because of this tension, the decision to combine NTG and CPSV studies should be carefully weighed to optimally balance data accuracy, customer burden, and evaluation costs.

5.1.2 Savings By Design

The process for verifying the market transformation for Savings By Design is consistent across all three offerings with minor differences for the target market of each. It is also possible that builders participating in one offering (such as Commercial) may also participate in another offering (such as Affordable Housing). As a result, cost efficiencies can be achieved by conducting all three offering evaluations simultaneously.

5.1.3 Residential Whole Home Billing Analysis

Similar to the CPSV study but more pronounced, billing analyses have a relatively fixed base cost that is unaffected by the number of data points analysed. The base cost is associated with developing an evaluation plan, submitting data requests, receiving and cleaning billing data, creating the econometric model necessary to analyse the data, and writing the final report. Adding additional same-program data points to the analysis is cost-negligible, and adding similar program categories has a very low incremental cost relative to the overall study. Therefore, significant efficiencies can be gained by combining the two

residential whole home programs, Residential Whole Home and Low Income Winterproofing, into a single study that would produce two results. Since both studies verify the accuracy of the HOT2000 modelling program, their results could also be combined into a single realization rate with greater precision applied across all HOT2000 modelling results.

5.2 Additional Evaluation Activities

There are additional risks to the oversight of the Enbridge portfolio that aren't tied directly to ratepayer costs and benefits. These risks affect cost effectiveness inputs (such as incremental cost, non-energy impacts, and utility avoided cost), the weighted average measure life, and overall energy reductions.

5.2.1 Cost Effectiveness Inputs

Incremental cost, non-energy impacts, utility avoided costs, and measure life are all inputs to the cost effectiveness test. All programs except Low Income must pass the Total Resource Cost Plus (TRC+) cost effectiveness test to be a viable part of the portfolio.

- **Incremental cost:** For prescriptive measures, incremental cost is updated as part of the regular TRM process. Custom measure incremental cost is collected on a case-by-case basis. However, incremental cost does not receive the same attention as energy savings for either type of measure, and using secondary sources (which is common for TRM updates) is more difficult because of geographical differences in the market. The impact of changes in incremental cost can be high, because it makes up the majority of the costs in the TRC+ test, and the likelihood of errors is high. However, the price of an incremental cost study based on primary data collection is also high, and it's difficult to determine an accurate number.
- **Non-energy impacts:** Currently, non-energy benefits are added to energy benefits using a stipulated 15% factor. The Stakeholder Advisory Group was tasked in the Decision and Order with reviewing the adder and determining its accuracy.
- **Measure life:** Custom measure life was most recently reviewed in 2016. Prescriptive measure life is updated as part of the regular TRM process, but as with incremental cost, measure life does not receive the same attention as energy savings. Inaccurate measure life can have a medium impact on cost effectiveness results, and a study using primary data collection can be expensive.
- **Utility avoided costs:** Utility avoided costs are used to monetize the value of energy savings. They represent the utility cost avoided when energy use is reduced. Traditionally, these values are provided by Enbridge and are not independently verified. Inaccuracies in the utility avoided cost could have a high impact on the overall results. The OEB indicated that the Stakeholder Advisory Group consider reviewing key avoided costs for inclusion in Enbridge's next plan application.

A secondary-source study of recent literature and the results of research done in other jurisdictions or for other utility programs can prove a cost-effective method for reviewing and updating incremental cost, non-energy impacts, and measure life. IESO has recently invested in non-energy impact studies that can be adapted where applicable to gas measures, and other values can be obtained from other jurisdictions and modified if necessary to be more applicable to Ontario. This process is less costly than primary data collection but will also produce less accurate results.

The secondary-source study should include the following activities:

- Identify industry papers and reports for information on incremental cost, measure life, and non-energy impacts for measures in the Enbridge offerings.
- Prioritize sources that are more recent, are from jurisdictions more relevant to Ontario, used rigorous methods, and apply most closely to the measures and program design employed by Enbridge.

- Identify the best value for each measure by either selecting the one from the most applicable and rigorous study or combining results across multiple studies.
- Write a report showing the sources reviewed, the values selected, and the reasoning behind the decisions. Update the TRM or reference documentation with the incremental cost and measure life and archive the non-energy benefits for inclusion in the cost effectiveness analysis.

A market research study would conduct primary research to estimate incremental cost, measure life, and non-energy impacts. Primary research is directly applicable to the market from which it is collected. Conducting primary research allows the OEB to control and direct the level of rigour associated with the study and apply the research where it is most impactful for Ontario programs.

Market research studies are relatively costly and dependent on the information that can be gathered from market actors. As a result, they can introduce more risk to the evaluation process than impact or process evaluations. Secondary source studies produce results that are less accurate but are also less costly and are more likely to produce a result.

Utility avoided costs rely on utility-provided data and are difficult to independently verify. We recommend that the Evaluation Advisory Committee and/or the Stakeholder Advisory Group discuss options for investigating the factors that are included in this value.

5.2.2 Weighted Average Measure Life

With the most recent Decision and Order, the Enbridge programs have moved from a lifetime savings metric to an annual savings metric. To alleviate concerns that the program would resort to measures with a shorter measure life, the OEB established a minimum weighted average measure life, or WAML. The WAML must be verified and reported annually and included in the annual verification report produced by the Evaluation Contractor. As such, it will be added to the Annual Verification activities.

5.2.3 Overall Energy Reduction

The OEB has introduced a new End-of-Term Natural Gas Reduction Incentive (ETRI). Enbridge can earn the full incentive if the total volume of natural gas sold to their Ontario customers in 2025 is 1.5% less than the total volume of natural gas sold to their Ontario customers in 2022, on a weather-normalized basis. Enbridge can earn a partial incentive if the total volume of gas reduced is at least 1.125%, or 75% of 1.5%, over the same period. Per the Decision and Order, “The new End-of-Term Natural Gas Reduction Incentive will be allocated to rate classes in a generally equal manner, consistent with the approved shareholder incentive related to program scorecards.”

We recommend that the Evaluation Advisory Committee work with the OEB and Evaluation Contractor to determine a method for estimating the ETRI. This method must be in place in time to be implemented as part of the final Annual Verification of this term.

6 ENBRIDGE PROCESS EVALUATION PLANS

DNV reviewed and commented on the following Enbridge Process Evaluation Plan. Enbridge was responsive to our recommendations.

Enbridge Gas DSM Process Evaluation Workplan

Submitted to the Evaluation Advisory Committee

May 25, 2023

1. Introduction

Enbridge Gas Inc. ("Enbridge Gas") is delivering this Process Evaluation Workplan to the Evaluation Advisory Committee (EAC) in accordance with the OEB Decision and Order for the Multi-Year Demand Side Management Plan (2022-2027), and in response to the OEB's findings, as follows.

"Enbridge Gas will continue to lead process evaluations for the upcoming 2023-2025 DSM term. However, the OEB expects that Enbridge Gas will share a full process evaluation plan with OEB staff, the EAC and EC for integration into the broader EM&V plan developed for the OEB by the EC for the 2023 to 2025 DSM Plan term."[1]

2. Process Evaluation Plan

In order to create a Process Evaluation Plan for the 2023-2025 DSM term, Enbridge Gas analyzed the program offerings based on a number of factors including:

- The date of previous process evaluations
- Whether the offer was new in the market
- Whether there were recent or anticipated changes in the design or delivery of the offering
- Whether the offering was the subject of debate during the Multi-Year Natural Gas Demand Side Management Plan Proceeding
- Whether the process evaluations would help evaluators interpret findings from the impact evaluations

The result of this analysis is presented in the Process Evaluation Summary Table, below. A justification is provided for each offering to support the suggested process evaluation timeline. The timeline is dependent on the bullets above and available resources. Some process evaluations may be prioritized earlier or later as program delivery evolves. Routine ongoing customer satisfaction surveys are not included in this Workplan.

Table 1: Process Evaluation Summary Table

2023 Programs / Offerings	Previous Process Evaluation	Suggested Process Evaluation Timeline	Justification
Residential			
Whole Home	2021 (HER)	2024	As a joint Enbridge Gas/NRCan offering, HER+ is new to the market, with a large budget and target. An early process evaluation can help identify areas for improvement, however, there should be ample time to stand up the offering prior to starting a process evaluation.
Smart Home	Not Previously Evaluated	2023	Enbridge Gas is interested in better understanding and improving the customer journey for installing adaptive thermostats. As this offering has not been previously evaluated, it would be reasonable to conduct a process evaluation in the current Plan.
Single Measure	N/A	N/A	This offer is not yet in market.

[1] EB-2021-0002, Decision and Order, November 15, 2022, p. 81.

2023 Programs / Offerings	Previous Process Evaluation	Suggested Process Evaluation Timeline	Justification
Low Income			
Home Winterproofing	2022 (Ongoing)	Next Framework	Currently undergoing process evaluation.
Affordable Housing Multi-Residential	2022 (Ongoing)	Next Framework	Currently undergoing process evaluation.
Commercial Program			
Commercial Custom	2019 (Final Report 2021)	2023	While this offering recently underwent process evaluation, Enbridge Gas would like to conduct a Utility Influence Study on this offering immediately to help support the upcoming Net-to-Gross (NTG) study and provide insight into how the 2023 commercial custom offering is delivered. As a result of its recent process evaluation, it is not necessary to conduct a subsequent full process evaluation unless there are significant changes to the design or delivery of the offering.
Prescriptive Downstream	2019 (Final Report 2021)	Next Framework	This offering recently underwent process evaluation and there have not been sufficient changes to justify a process evaluation in the short term.
Direct Install	2019 (Final Report 2021)	Next Framework	This offering recently underwent process evaluation and there have not been sufficient changes to justify a process evaluation in the short term.
Prescriptive Midstream	2022 (Final Report 2022)	Next Framework	This offering recently underwent process evaluation and there have not been sufficient changes to justify a process evaluation in the short term.
Industrial Program			
Industrial Custom	2022 (ongoing)	2024/2025	Enbridge Gas is currently conducting a Utility Influence Study. Once it is completed, Enbridge Gas believes another process evaluation should be completed on this offering to gather customer feedback and better understand customer satisfaction, for example, as it relates to incentive design, value of technical support, and relationship with the Energy Solution Advisor. This evaluation should not be in the same year as the NTG study to prevent participant fatigue.
Large Volume Program			
Direct Access	Not previously evaluated	2023	This offering has not been previously evaluated and was a topic of discussion during the DSM Plan Application

2023 Programs / Offerings	Previous Process Evaluation	Suggested Process Evaluation Timeline	Justification
			Proceeding. A process evaluation would help understand participant sentiments toward the offering.
Energy Performance Program			
Whole Building Pay for Performance	New Offering	2025	2023 will be the first year in market for the Whole Building Pay for Performance offering. As it is a multi-year offering, it is reasonable to conduct a process evaluation after two years of delivery, in 2025.
Building Beyond Code Program			
Residential Savings by Design	Not Previously Evaluated	2025	While there was a Residential Savings by Design offering in market, the current offering has significant changes. As it is a multi-year offering, it is reasonable to conduct a process evaluation after two years of delivery, in 2025.
Commercial Savings by Design	Not Previously Evaluated	2024	This offering has not been previously evaluated and a process evaluation would align with EAC Priority Items identified in the Decision and Order.[2]
Affordable Housing Savings by Design	Not Previously Evaluated	2024	This offering has not been previously evaluated and a process evaluation would align with EAC Priority Items identified in the Decision and Order.[3]
Commercial Air Tightness Testing	Not Previously Evaluated	2025	2023 will be the first year in market for this offering. It is reasonable to conduct a process evaluation after two years of delivery.

3. Scopes of Work for Highest Priority Evaluations

In this section, Enbridge Gas will provide a high-level scope for the process evaluations anticipated to begin in 2023. These high-level scopes are subject to change and are provided as an indication of what a useful process evaluation would be at this time. In accordance with the OEB's Decision, Enbridge Gas will share all process evaluation work plans and draft reports with OEB staff, the EAC and EC for review and comment, with Enbridge Gas (or its consultant) providing responses to all comments.

3.1 Custom Commercial Utility Influence Study

Similar to the Custom Industrial Utility Influence Study that is currently underway, the objectives of the Custom Commercial Utility Influence Study will be to conduct participant and Energy Solution Advisor (ESA) interviews to better understand:

[2] EB-2021-0002, Decision and Order, November 15, 2022, Schedule D
[3] EB-2021-0002, Decision and Order, November 15, 2022, Schedule D

- What Enbridge Gas activities or services are considered to be influential by customers
- What Enbridge Gas activities or services are considered to be influential by ESAs
- What additional activities or services can help influence customers

The results of this process evaluation will be qualitative only, a net-to-gross value is not an expected outcome of the study.

3.2 Residential Smart Home

The objective of the Residential Smart Home process evaluation would be to understand why a certain percentage of participants are either not installing their newly purchased adaptive thermostat device and/or not connecting it to Wi-Fi per manufacturer specifications. It is intended that the study will result in recommendations of how Enbridge Gas can further influence participants to improve the rate of installation and Wi-Fi connection.

3.3 Large Volume Direct Access Process Evaluation

The objective of a Large Volume Direct Access process evaluation would be to focus on the customer's experience in the offer. In response to discussions in the EB-2021-0002 proceeding, Enbridge Gas would like to better understand the following:

- The customer's perceived value of the relationship with their ESA
- The customer's perceived barriers to greater participation
- If the offering is sufficiently flexible to accommodate the customer's energy efficiency goals
- How the offer could best support the customer's capital planning processes
- How the offering could be improved

4. Schedule

Enbridge Gas is anticipating that the Process Evaluations outlined in this plan will follow the schedule shown below. There are factors that might change the proposed schedule, including:

- Overlap of process evaluation and net-to-gross studies: In order to reduce participant study fatigue, these studies should not be concurrent
- Staff turnover: In the event that there is turnover of positions that are critical to the study

The anticipated schedule is presented in Table 2.

Table 2: Process Evaluation Schedule

	2023				2024				2025				Next Framework
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Custom Industrial[1]													
Residential Smart Home													
Custom Commercial													
Large Volume Direct Access													
Residential Whole Home													
Commercial and Affordable Housing Savings by Design[2]													
Whole Building Pay for Performance[3]													
Residential Savings By Design[3]													
Commercial Air Tightness Testing[3]													
Home Winterproofing													
Affordable Housing Multi-Residential													
Prescriptive Midstream													
Prescriptive Downstream													
Direct Install													

1 The process evaluation in 2024/2025 should alternate years with an EC-led Net-to-gross study

2 This process evaluation should alternate years with an EC-led impact evaluation

3 Specific timing to be determined

7 CONCLUSION AND RECOMMENDATIONS

By applying the value of information framework, we have identified a number of new evaluation activities that should be incorporated into the annual verification process or be conducted as stand-alone studies. Table 7-1 shows the recommended activities that are already part of or will be added to the Annual Verification process conducted by the Evaluation Contractor or the custom project savings verification (CPSV). It also shows whether the recommended evaluation activities are currently part of the Annual Verification or CPSV scope of work. This table includes Annual Verification activities identified in Section 5.

Table 7-2 shows the recommended stand-alone studies, grouped for efficiency.

In addition to the studies and activities in the tables below, DNV acknowledges the following, consistent with the OEB's Decision and Order on Enbridge as, Inc.'s 2023-2025 DSM Plan (EB-2021-0002):

- The OEB's Demand Side Management Stakeholder Advisory Group should discuss the accuracy of the 15% non-energy impact adder in coordination with IESO.
- The OEB's Demand Side Management Stakeholder Advisory Group should discuss options for investigating the components of utility avoided cost.

Table 7-1. Evaluation activities to add or maintain in the Annual Verification or the Custom Project Savings Verification

Program Offering(s)	Evaluation Activities	Justification	Current AV or CPSV Activity?
Incorporate into Annual Verification			
All Non-Custom Offerings	• Tracking data review and certification	• Low-cost solution for a medium risk with low impact potential	• Yes
Residential Whole Home	• Ensure tracking data matches modelling results • Review documentation for virtual audits • Confirm electricity savings interactions are captured	• Tracking review and virtual documentation are low-cost solutions • Savings interactions are medium cost but high likelihood and growing impact potential	• Yes • No • No
Residential Single Measure	• Review air sealing calculator • Confirm air sealing savings are properly modelled • Confirm electricity savings interactions are captured	• New calculator with high likelihood, medium impact potential and low cost • Savings interactions are medium cost but high likelihood and growing impact potential	• No • No • No
Residential Smart Home	• Ping Analysis • Confirm electricity savings interactions are captured	• Ping analysis is low cost • Savings interactions are medium cost but high likelihood and growing impact potential	• Yes • No
Home Winterproofing	• Ensure tracking data matches modelling results • Confirm electricity savings interactions are captured	• Tracking review is low-cost solution • Savings interactions are medium cost but high likelihood and growing impact potential	• Yes • No
Affordable Multi-Residential **Prescriptive Downstream** **Direct Install** **Prescriptive Midstream** **Direct Access**	• Confirm that savings estimates for prescriptive and custom measures account for interactions	• Savings interactions are medium cost but high likelihood and growing impact potential	• Yes
Whole Building Pay for Performance	• Desk review	• Low-cost solution for a risk with high impact potential	• No
Commercial Air Tightness	• Confirm eligibility	• Low-cost solution for a risk with high impact potential	• No

Program Offering(s)	Evaluation Activities	Justification	Current AV or CPSV Activity?
Weighted Average Measure Life	• Calculate and report the annual WAML	• Required by OEB's November 2022 Decision & Order	• No
End-of-Term Reduction Incentive	• Calculate and report the end-of-term reduction incentive	• Required by OEB's November 2022 Decision & Order	• No

Table 7-2. Recommended stand-alone studies

Program Offering(s)	Evaluation Activities	Justification
Top Priority Group		
Commercial Custom **Industrial Custom** **Large Volume Direct Access** **Affordable Housing Multi-Residential** **(All Custom Measures)**	• NTG analysis	• Programs cover more than 50% of portfolio savings • NTG has a larger effect on net savings than CPSV • NTG last studied in 2018 program year
Residential Savings by Design **Commercial Savings by Design** **Affordable Housing Savings by Design**	• Desk review • Participant surveys • Market research	• Required by OEB's November 2022 Decision & Order • Confirm post-program market transformation of builder education • Confirm buildings meet performance criteria
Residential Whole Home	• NTG analysis	• Residential programs are allocated 50% of total DSM portfolio budgets
Residential Whole Home **Low Income Winterproofing**	• Billing analysis	• Residential programs are allocated 50% of total DSM portfolio budgets. • Billing analysis can address multiple dimensions, including measure interaction and rebound
Smart Home	• NTG analysis	• Residential programs are allocated 50% of total DSM portfolio budgets • Free ridership is characterized as high likelihood and high impact
Mid-Level Priority Group		
Commercial Custom **Industrial Custom** **Large Volume Direct Access**	• Custom Project Savings Verification	• Programs cover more than 50% of portfolio savings

Program Offering(s)	Evaluation Activities	Justification
Affordable Housing Multi-Residential (All Custom Measures)		• Lower priority than NTG because recent evaluations have shown small adjustment • Cost is high so should be conducted as infrequently as possible
Commercial Prescriptive Downstream **Commercial Prescriptive Midstream** **Commercial Direct Install**	• NTG analysis • Installation confirmation	• Last NTG study is outdated • Last installation rate study is outdated
Low Income Home Winterproofing **Commercial Direct Install** **(Direct Install Measures)**	• Continued installation and operation	• When stand-alone, low-cost solution to high impact risk potential
Lowest Priority Group		
Whole Building Pay for Performance	• Deeper energy savings verification	• Medium cost solution for offering with relatively low benefit and shareholder incentive impact
Residential Single Measure **Residential Smart Home** **Low Income Winterproofing** **Low Income Affordable Housing Multi-Residential** **Commercial Prescriptive Downstream** **Commercial Direct Install** **Commercial Prescriptive Midstream** **Large Volume Direct Access** **(Prescriptive Measures)**	• TRM savings verification	• Low impact risk with high cost to mitigate.
Residential Single Measure	• NTG analysis	• Single Measure offering is new. Depending on offering size, a NTG analysis could be elevated to Mid-Level priority.
All Program Offering Measures	• Electricity, water impacts • Rebound effect	• Electricity and water impacts have a low impact until/unless fuel switching becomes more prevalent • Rebound effect can be difficult to measure (unless in conjunction with another study) and impact is low

APPENDIX A. GLOSSARY OF KEY TERMS AND CONCEPTS

Adjustment factor	The adjustment factors are ratios of savings that allow evaluation findings from a sample of projects to be applied to and "adjust" the population of program savings. Realization rates, and ratios are other common terms.
Attribution	The energy savings or other benefits that are the result of a utility energy program's influence, including free ridership and spillover effects (see definitions in this Glossary).
Baseline, base case	Energy used / equipment in place if the program measure had not been done.
Building envelope	Exterior surfaces (e.g., walls, windows, roof, and floor) of a building that separate the conditioned space from the outdoors.
C&I	Commercial and industrial
Code	An action or standard required by local or federal laws for safety, environmental, or other reasons. For example, a building code that requires a minimum fuel efficiency for furnaces.
Cost effectiveness	Refers to the analysis that determines whether or not the benefits of a project/measure (see Glossary) are greater than the costs. It is based on the net present value of savings over the equipment life of the measure.
Cost effectiveness test - PAC	A test that compares the utility's avoided cost benefits with energy efficiency program expenditures (incentives plus administrative costs).
Cost effectiveness test – TRC-Plus	A test that compares benefits to society as a whole (avoided cost benefits plus non-energy benefits) with the participant's cost of installing the measure plus the cost of incentives and program administration.
Custom project savings verification (CPSV)	Activities related to the collection, analysis, and reporting of data for purposes of measuring gross custom program impacts.
Customer	Unique customers can be identified based on the account number and the contact information provided by Enbridge. A customer may have multiple site addresses, decision makers, and account numbers. Customers can only be identified for records for which we received contact information. (I.E. records associated with account numbers that have measures in the sample or backup sample).
Customer Incentive	An incentive is a transfer payment from the utility to participants of a DSM program. Incentives can be paid to customers, vendors or other parties as part of a DSM program.
Demand side management (DSM)	Modification of perceived customer demand for a product through various methods such as financial incentives, education, and other programs
Domain	Grouping of like projects. A domain may be defined as projects within a specific sector or a category of measure types, end uses or other.
Dual baseline	Savings calculation approach which addresses or combines the savings associated with early replacement and the savings after the early replacement period. This concept is relevant to the measurement of lifetime gas savings (CCM) but not first-year annual savings.
Early replacement (ER)	Measure that replaces a piece of equipment that is not past EUL and in good operating condition.
Early replacement period (ER Period)	Years that the existing equipment would have continued to be in use. This is the same as RUL. This concept is relevant to the measurement of lifetime gas savings (CMM) but not first-year annual savings.
Effective useful life (EUL)	The length of time that a measure (see definition in Glossary) is expected to provide its estimated annual gas savings. EUL depends on equipment lifetime and measure persistence (see Glossary definition).
Energy solutions advisors	Energy Solutions Consultants (ESA) work with customers on a one-to-one basis to address the unique processes and opportunities within each customer facility, identify energy savings opportunities and promote Enbridge's DSM offerings.
Estimated useful life (EUL)	Typically, the median number of years that the measure will remain in service.

Ex ante	Program claimed or reported inputs, assumptions, savings, etc.
Ex post	Program inputs, assumptions, savings, etc. which are verified after the claimed savings are finalized. Does not include assessment of program influence.
Free rider	A customer who would install or perform the same energy-saving measure (see definition in Glossary) without utility influence.
Free ridership	The portion of a program's verified energy savings that would naturally occur without the utility program.
Free ridership-based attribution	The portion of a program's verified energy savings that the utility influenced if one only considers free ridership and not spillover. Free ridership-based attribution is the complement of free ridership. (free ridership-based attribution = 100% - free ridership).
Gross savings	Gross savings are changes in energy consumption and/or demand directly caused by program-related actions by participants, regardless of reasons for participation (savings relative to baseline, defined above).
In situ	Existing measure, conditions, and settings.
In-depth interviews	Structured technical interviews administered by evaluation engineers and market researchers either in person or more frequently, over the phone, IDIs offer more flexibility than CATIs and are best leveraged for complex projects and topics.
Incentive	An incentive is often a payment from the utility to participants of a DSM program. Incentives can be paid to customers, vendors, or other parties.
Incremental cost	The difference in purchase price (and any differences in related installation or implementation costs), at the time of purchase, between the energy-saving measure (see Glossary definition) and the base case measure. In some early retirements and retrofits, the full cost of the efficient technology is the incremental cost.
Industry standard practice (ISP)	Common measure implemented within the industry.
Input assumptions	A common practice used within an industry but not formally defined by code or regulation.
Lifetime cumulative savings	Total natural gas savings (CCM) over the life of a DSM measure. It can be claimed, gross, or net. Sometimes referred to as just "cumulative" or "lifetime."
Maintenance (Maint.)	Repair, maintain, or restore to prior efficiency.
Measure	Equipment, technology, practice, or behavior that, once installed or working, results in a reduction in energy use. Measures are identified in the tracking data as unique line items for which savings within a custom project are quantified. Multiple measures may belong to the same project.
Measure persistence	How long a measure remains installed and performs as originally predicted in relation to its EUL. This considers events like business turnover, early retirement of installed equipment, and other reasons measures might be removed or discontinued.
Measurement and Verification (M&V)	Verification of savings using methods not including attribution/free ridership assessment.
Metric	This is a term used by the OEB to measure a utility's program achievement. Under the DSM framework, programs are grouped into categories, called scorecards. Each program within a scorecard is assigned at least one metric that is used to measure utility performance. The metric for many programs is CCM savings, or a reduction in natural gas consumption, while other programs have non-savings metrics such as the number of program participants. Within each scorecard, various metrics are combined to produce an overall scorecard achievement.
MF	Multifamily (multi-residential)
Net-to-gross	The ratio of net energy savings to gross savings. The NTG ratio is applied to gross program savings to convert them into net program savings.
New construction (NC)	New buildings or spaces.
Non-early replacement period (non-ER period)	Years after the ER period up to the EUL.

Non-energy impacts	Sometimes called non-energy benefits, these are the wider socio-economic or environmental outcomes that arise from energy efficiency improvements, aside from energy savings. NEIs can include but are not limited to impacts such as improved safety, improved health, and job creation. For example, offering participants may benefit from increased property value, and improved health and comfort. The TRC-Plus test includes a 15% adder to the benefits calculation to account for NEIs.
Normal replacement (NR)	Measure that replaces a piece of equipment that is past EUL and in good operating condition.
Offering	One or more DSM activities or measures which a utility may use to affect a specifically identified target market in their choices around the amount and timing of energy consumption.
Persistence	The extent to which a DSM measure remains installed and performing as originally predicted in relation to its EUL.
Portfolio	A group of DSM programs which have been selected and combined in order to achieve the objectives of a utility's DSM Plan.
Program	The programs outlined in Enbridge's Multi-Year Plan are comprised of one or more offerings and address the needs of a subset of Enbridge's customer base.
Program evaluation	Activities related to the collection, analysis, and reporting of data for purposes of measuring program impacts from past, existing, or potential program impacts.
Program spending	The amount spent running energy-savings programs, not including the costs of running (called overhead costs) the larger portfolio of programs. This value can be divided into spending for program measures and incentives, as well as program-specific costs.
Project	Projects are identified in the tracking data based on the project code. A project may have multiple measures as indicated by sub-codes in the current data tracking system.
Rate class	The OEB establishes distribution rate classes for Enbridge. Distribution rate classes group customers with similar energy profiles.
Realization rate	A combination of adjustment factors, which represents ratios between two savings values. For example, the final realization rate is the ratio between evaluated savings and program claimed savings.
Remaining useful life (RUL)	The number of years that the existing equipment would have remained in service and in good operating condition had it not been replaced. This is the same as the ER period.
Replace on burnout (ROB)	Measure that replaces a failed or failing piece of equipment.
Retrofit add-on (REA)	Measure that reduces energy use by modifying an existing piece of equipment.
Scorecard	A scorecard allows for multiple different kinds of metrics such as cumulative natural gas savings and/or participants enrolled to be used simultaneously to measure annual utility performance. Each utility has a scorecard identified for each program year, which can be found in the Ontario Energy Board Decision and Order EB-2021-0002.
Scorecard Achievement	The verified value for program-specific metric targets (CCM, applications, etc.) of each scorecard identified by the Annual Scorecard. This is the value that is verified as the achieved value by the Annual Verification report and used for calculation of the shareholder incentive.
Shareholder Incentive	As part of the current DSM Framework, an annual performance incentive is available to the gas utilities in the event program performance is at or above 75% of the OEB-approved targets up to a maximum of 150%.
Site	Sites are identified based on unique site addresses provided by Enbridge through the contact information data request. A site may have multiple units of analysis, measures, and projects. Sites can be identified by the evaluation only for records for which we receive a site id.

Spillover effects	These are reductions in energy consumption and/or demand that occur as a result of the presence of a utility DSM program, but are beyond program-related savings and are not part of the utility's verified savings. These effects could result from many factors including additional efficiency actions that program participants take outside the program as a result of having participated, changes in store availability of energy-using equipment, and changes in energy use by program non-participants as a result of utility program advertising.
System optimization (OPT)	Improve system or system settings to exceed prior efficiency.
TRM	Technical Resource Manual, which is a document that identifies standard methodologies and inputs for calculating energy savings.
TSER	Telephone-supported engineering review.
Unit of analysis	The level at which the data are analyzed, which in 2023 will likely be a "measure" or sub-project level for Enbridge.
Vendors	Program trade allies, business partners, contractors, and suppliers who work with program participants to implement energy saving measures.

About DNV

DNV is a global quality assurance and risk management company. Driven by our purpose of safeguarding life, property and the environment, we enable our customers to advance the safety and sustainability of their business. We provide classification, technical assurance, software and independent expert advisory services to the maritime, oil & gas, power and renewables industries. We also provide certification, supply chain and data management services to customers across a wide range of industries. Operating in more than 100 countries, our experts are dedicated to helping customers make the world safer, smarter and greener.