

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board (STAFF)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 11

Question(s):

Enbridge Gas has included the following in the target section of the proposed DSM Framework: "It is anticipated that net annual natural gas savings targets (m3), will be set for most resource acquisition type programs offerings."

- a) Please discuss if net annual refers to first-year natural gas savings or if this simply refers to the net savings, which could be cumulative lifetime savings, following the evaluation of program results.

Response

Net annual natural gas savings refers to first-year net natural gas savings.

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Reference:

Exhibit C, Tab 1, Schedule 1, p. 11

Question(s):

Enbridge Gas has proposed that scorecard achievement be set for individual metrics at three levels: one at 50%, 100% and 150%.

- a) Please provide live calculations that compare the earned shareholder incentive over the 2016-2020 program years under the current performance incentive structure with the proposed incentive structure referenced above, which starts at 50% instead of 75%.
- b) Please discuss if, as proposed, shareholder incentive amounts will only begin to be earned after performance passes the 50% threshold, as opposed to 50% of the shareholder incentive designated to that scorecard being earned once the initial threshold is met.

Response

- a) Please see Attachment 1.
- b) Confirmed. Shareholder incentive amounts for the Annual Scorecards and the Low Carbon Transition Scorecard begin to be earned only once the scorecard achieves 50%. Please see Exhibit D, Tab 1, Schedule 2, pages 4 and 13-14 respectively.

Attachment has been provided as an excel.

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Reference:

Exhibit C, Tab 1, Schedule 1, p. 13

Question(s):

- a) Please discuss the impacts of inflation and on the target adjustment mechanism and the process for determining the annual inflation factor should the amount not be fixed for the term of the framework.
- b) Please discuss how the proposed target adjustment mechanism ensures continual growth and increased natural gas savings from the beginning of the term to the end.
- c) Please comment on what impacts and considerations would need to be given to a target adjustment mechanism that could only result in targets equal to or greater than the previous year.
- d) Please discuss how Enbridge Gas's proposed target adjustment mechanism addresses no performance on a particular metric and/or scorecard.
- e) Please discuss if Enbridge Gas considered any alternative target adjustment options or various mechanisms to set targets, including end-of-term targets with annual milestones, similar to the former electricity Conservation First Framework target structure. In your response, please discuss if Enbridge Gas would be open to a structure where it was only required to meet targets at the end of 2027, but had the opportunity to earn annual shareholder incentives based on annual milestones.
- f) Please discuss the considerations and impacts required in the event that the OEB determined it more appropriate to set fixed annual program scorecard targets as opposed to annually adjusted targets based on the prior year performance and future year spend.

Response

- a) Exhibit C, Tab, Schedule 1, section 5.2 describes the target adjustment mechanism (“TAM”). The proposed DSM Framework carries over the previous TAM with one modification in the formula. The proposed modification effectively deflates the previous years costs by an inflation factor such that the costs are stated in real (i.e. inflation adjusted) terms for the purposes of setting targets.

Enbridge Gas proposed that the CPI index be used as the inflation index utilized for determination of the inflation factor. The Company would use the Statistics Canada CPI index to calculate the year over year inflation rate at the beginning of each year and use the previous years annualized inflation to inflate budgets and to calculate the inflation adjustment to be used for the TAM.

According to Statistics Canada,

The Consumer Price Index (CPI) is an indicator of changes in consumer prices experienced by Canadians. It is obtained by comparing, over time, the cost of a fixed basket of goods and services purchased by consumers. Since the basket contains goods and services of unchanging or equivalent quantity and quality, the index reflects only pure price change. The CPI is widely used as an indicator of the change in the general level of consumer prices or the rate of inflation.¹

- b) The purpose of the TAM is not to ensure continual growth. The OEB’s decision for the current multi-year DSM plan stated, “the OEB supports the use of an adjustment mechanism to revise the targets continually for the 2017 to 2020 period relative to results.”² The decision was based on the challenges of setting longer term targets due to several uncertainties that may have had an impact on the market. If anything, uncertainties with respect to forecasting are even greater today.
- c) Enbridge Gas is not clear on what such a mechanism would entail. However, in an environment where forecasting is challenging, having a mechanism that is asymmetrical may have unintended consequences. If, as one example only, a target was set to be exceedingly challenging to meet, and the adjustment mechanism can only go up, reaching such a level as to make it impossible to achieve, then there would no longer be an incentive to continue to try to achieve the performance metric in question. The performance metrics are intended to direct the Companies performance towards aspects deemed most important by the OEB. Enbridge Gas is not aware of such a target adjustment mechanism in other jurisdictions. However, since OEB Staff has hired an expert to provide a

¹ Statistics Canada, Consumer Price Index (CPI), Detailed information for September 2021. [Surveys and statistical programs - Consumer Price Index \(CPI\) \(statcan.gc.ca\)](https://www150.statcan.gc.ca/n1/pub/62-001-x/202109/00001-eng.htm)

² EB-2015-0029 / EB-2015-0049, OEB Decision and Order (January 20, 2016), p. 69.

jurisdictional scan the Company looks forward to reviewing such mechanisms in the Cost Recovery and Performance Incentive Report.

- d) When there is no performance the 100% target is carried forward to the following period with no adjustment. This is consistent with the practice under the current DSM Framework.
- e) Enbridge Gas did not review the former electricity Conservation First Framework target structure during the development of the DSM Plan. Please see response to Exhibit I.9.EGI.STAFF.25g.
- f) Please see response to Exhibit I.5.EGI.STAFF.25g.

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Reference:

Exhibit C, Tab 1, Schedule 1, pp. 13-14

Question(s):

Enbridge Gas proposed that the annual maximum shareholder incentive be consistent with the combined maximum amount of the legacy utilities, which is \$20.9 million. Further, Enbridge Gas has proposed this amount be increased annually for inflation.

- a) Please discuss if Enbridge Gas considered a shareholder incentive that did not include an annual maximum cap, but rather continued so long as Enbridge Gas was able to continue to achieve incremental cost-effective natural gas savings. In your response, please provide Enbridge Gas's assessment of this structure of performance incentive amounts.
- b) Please discuss the impact of lowering the overall annual shareholder incentive amount to something between \$10m-\$15m.

Response

Enbridge Gas would like to correct the assertion in the preamble to the questions. Enbridge Gas proposed that *a portion* of the maximum shareholder incentive be increased annually by an inflation index, while holding the remaining portion constant over the term. The effect is that the total maximum shareholder incentive would increase at a rate lower than inflation over the term of the proposed DSM Plan, which is in effect a real decrease over time.

- a) Enbridge Gas did not consider a shareholder incentive that did not include an annual cap. Since the Company did not consider this approach and is not aware of the details of said approach in other jurisdictions it anxiously awaits the report that OEB Staff has commissioned with Optimal Energy Inc. so that it can understand both the merits and challenges of this approach.

- b) Enbridge Gas does not support lowering the maximum annual shareholder incentive weighting in the DSM Plan. The proposed annual scorecards and annual net benefits incentive mechanisms are intended to provide focus on goals, objectives and principles as outlined by the OEB and are part of the OEB's governance over DSM programming. Lowering the weight of these items would underweight the importance of achieving annual performance goals and optimization of the total net benefits of the DSM portfolio. Additionally, increasing the weighting of the long term shareholder incentives, which are all new proposals that the OEB and interested parties are relatively unfamiliar with, is likely premature until more experience with longer term incentive mechanisms is gained. The Company notes that one of the potential challenges with the long term incentive approaches is the variable impact on rates, with incentive payments for a longer term period being concentrated in one year.

As illustrated in the responses to Exhibit I.8c.EGI.EP.7 and Exhibit I.8a,EGI.LPMA.9, given that budgets have been calculated by Enbridge Gas to drive 100% achievement of targets and the incremental 15% budget accessible through the DSMVA is not nearly sufficient to drive results of 150% across the portfolio necessary to achieve maximum annual shareholder incentive, it will be excessively challenging for Enbridge Gas to achieve close to the maximum annual incentive cap.

As is shown in Exhibit I.8.EGI.STAFF.18a, during the 2015-2020 timeframe with a maximum shareholder incentive of \$20.9 million, the Company has average shareholder incentives of about 45%, and did not achieve shareholder incentives of more than approximately 60% of that cap (combining the two legacy utilities) during that period.

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Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 15

Question(s):

Enbridge Gas has proposed to maintain the budget re-allocation provision that has been included in the OEB's DSM policy frameworks for several terms. This includes the flexibility to transfer up to 30% of approved funding between approved programs during the course of a program year and informing the OEB at the end of the year.

- a) Please discuss the impacts of revising the terms of the budget allocation provision under the following scenarios:
- i. A maximum of 15% of approved program funds can be transferred between approved programs
 - ii. A maximum of 50% of approved offering funds can be transferred between offerings within the same program
 - iii. No approved program and/or offering budget can fall below 50% of the total approved amount without approval from the OEB

Response

Enbridge Gas would like to first correct the implication in the question that exceeding the budget reallocation threshold is not permitted, rather the current 30% is the threshold for informing the OEB and stakeholders of the funding transfer. The Proposed Framework states the following:

Consistent with OEB direction in the 2015-2020 DSM framework, to help ensure that an appropriate balance among the guiding principles are maintained and that changes to the DSM plan are consistent with the other elements of the DSM framework, Enbridge Gas should apply to the OEB for approval if they decide to re-allocate funds from programs that have been approved as part of the multi-year DSM Plan application to new programs that are not part of their OEB-approved DSM Plan. However, if Enbridge Gas decides to re-allocate funds amongst existing, approved DSM programs,

Enbridge Gas should inform the OEB, as well as stakeholders, in the event that cumulative fund transfers among OEB approved DSM programs exceed 30% of the approved annual DSM budget for an individual DSM program (either the program the funds are being transferred from, or the program the funds are being transferred to). This level of guidance is meant to ensure that adequate flexibility in DSM program and portfolio design is maintained, while recognizing that Enbridge Gas is ultimately responsible and accountable for its actions. This flexibility should ensure that Enbridge Gas can appropriately react to and adapt with current and anticipated market developments.¹

Enbridge Gas believes the current 30% flexibility provided in the 2015-2020 DSM Framework which it proposes to continue in the Proposed Framework remains appropriate. It should be noted that there has not been any instance to date where Enbridge Gas has exceeded the 30% budget guidance and has been required to report to the OEB.

It is also worth noting that in April 2019, in their Decision and Order on the 2016 Clearance, the OEB stated the following:

The OEB agrees with Enbridge Gas that the budget reallocation guidelines apply at a program level and that offerings within a program should not attract sanction where budget increases exceeded 30% have occurred. The direction of the OEB has been to encourage maximum energy savings while maintaining an appropriate level of oversight. The OEB sees no benefit in micro-managing the utility DSM offerings and would expect a significant increase in costs and delay in program delivery if it attempted to do so. Budget reallocations for offerings within a program may exceed 30% but the gas utility must inform the OEB and their stakeholders of reallocations between programs in excess of 30%.²

- a) In response to the scenarios posed by OEB Staff, Enbridge Gas provides the following:
- i) The shareholder incentive as proposed includes a Net Benefits shared savings opportunity. An overly restrictive constraint on budgets (i.e. a maximum of 15% budget transfers between programs) could impact the Company's ability to best optimize the budget across all sectors and programs in order to drive overall net benefits. Also, Enbridge Gas believes the proposed design of the individual scorecards in the Application (as opposed to a single weighted scorecards across all RA scorecards as was the case in the 2015-2020 DSM Plans), whereby each scorecard has a defined weighting and a defined annual shareholder incentive opportunity

¹ EB-2021-0002, DSM Multi-year Plan and Framework Application (Updated: September 29, 2021), Exhibit C, Tab 1, Schedule 1, p. 15.

² EB-2018-0300/EB-2018-0301, OEB Decision and Order, Application for approval of shareholder incentives, lost revenues, and program expenditures related to 2016 natural gas demand side management programs (April 11, 2019), p. 10.

- based on differentiated metrics in each scorecard, provides a structure such that potentially significant budget re-allocations are unlikely as there are obvious impacts to potential performance incentive earnings on a given scorecard in the event of a reduced budget on that scorecard. In addition, the maximum performance incentive attributable to a given scorecard is capped, therefore any potential budget reallocations will have a limit on impacting potential increased performance incentives on a given scorecard.
- ii) An even more restrictive budget reallocation policy (i.e. a maximum of 50% of offering budget transfers within a program) may further hamper the Company's ability to drive net benefits, or pursue successful programs and drive savings at the expense of offerings that may not be performing as well.
 - iii) If spending on a particular program offering actually was trending to be less than 50% of budget, this would likely be due to some new or unforeseen development or change in the market that has resulted in a lack of uptake in the program offering. Enbridge Gas is challenged with understanding how this potential requirement would be practical. If there was lack of uptake, such as a pandemic lockdown as a recent example only, it is not clear what the Company could reasonably be expected to do under an imposed requirement to spend the funds on a program offering. This does not speak to the practical issues with the timing of recognizing any forecast shortfall, the subsequent application to the OEB or the regulatory inefficiency such an application would create. Enbridge Gas does not believe the OEB nor ratepayers would support Enbridge Gas continuing to deliver a program and spending funds in such an instance in order to meet an imposed spending minimum. If a given program offering were not performing well, it would not be in the best interest of ratepayers nor the Company to disregard that in favour of a forced minimum spend.

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Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 24

Question(s):

Enbridge Gas proposed to establish a materiality threshold of \$1 million that will be used to address the reasonableness of re-allocating approved DSM resources to potential IRP activities where there is overlap in the resources required to administer the IRP programs. Enbridge Gas also proposed that if an IRP plan(s) is projected to reduce DSM plan results of any single DSM scorecard by more than 10% in a given year, Enbridge Gas will be required to file an application to adjust the DSM plan targets accordingly.

- a) Please discuss the impact on DSM administration and IRPA design and roll-out of increasing the materiality threshold to \$2m or decreasing the materiality threshold to \$0.5m.
- b) Please clarify how IRP plan(s) may result in a reduction to DSM plan targets/results. In your response, please discuss why the baseline level of achievement wouldn't be the established DSM savings levels with IRP achievement stacked onto DSM savings.
- c) Please discuss the process related to achievement of DSM scorecard targets under the following scenarios:
 - i. If an IRP plan(s) be projected to reduce DSM plan results by less than 10%.
 - ii. f an IRP plan(s) is approved mid-year with projected impacts to DSM scorecard that are greater than 10% but there is insufficient time to file an application to adjust DSM targets.
- d) Please discuss if any changes to a DSM scorecard could potentially be addressed through an IRPA application as opposed to a separate application related to the DSM scorecards.

Response

Enbridge Gas was required to file a DSM Plan prior to the OEB issuing a decision on the IRP Framework. Enbridge Gas included section in the proposed DSM Framework related to IRP as there are some aspects where there may be overlap between the DSM Plan and future IRP activities. The proposal to establish materiality thresholds for the areas where there may be some DSM/IRP overlap in the future was intended as a simple, efficient solution to a possible eventuality. Please see Exhibit C, Tab 1, Schedule 2.

The Company does not believe duplicating or extending the litigation from the IRP Framework proceeding can possibly provide value to Ontarians especially when there is no IRP Plan under consideration. Any further questioning with respect to IRP can and should be reviewed in the context of an actual IRP Plan before the OEB.

- a) Enbridge Gas expects that there would no material impact on the DSM administration and IRPA design and rollout based on a change in the materiality threshold except on hypothetical potential future regulatory costs. The intent of the proposed thresholds is to provide a simple, efficient solution to the possible eventuality of overlap between DSM and IRP activities.
- b) In the pre-filed evidence at Exhibit C, Tab 1, Schedule 2, Enbridge Gas outlines the basis of the DSM Plan with respect to IRP and states;
 - i. Paragraph 2, clearly indicated that, *“Enbridge Gas submitted the DSM Plan with no funding proposed for any IRP or geo-targeted energy efficiency programming,”*
 - ii. Paragraph 13, *“In the IRP framework Decision and Order (“IRP Framework Decision”) issued by the OEB July 22, 2021, the OEB found,” “...that demand-side programming, including geotargeted energy efficiency, and demand response programs, should be part of the IRP Framework.” and “the OEB finds that potential merging of DSM energy efficiency with programs aimed at reducing peak demand to meet system needs is premature.”*
 - iii. Page 15 *“Attribution of results will be based on funding. Any IRP Plan funded ETEE’s will be solely attributed to the IRP Plan in which the ETEE was approved.”*

To summarize, as indicated in the pre-filed evidence, if one or a number of IRP Plans are implemented that include geo-targeted energy efficiency, both the funding and the results would be attributed to the IRP Plan and not to the DSM Plan.

- c) Enbridge Gas suggests any processes related to IRP should be considered when there is an actual IRP Plan proposed before the OEB that can provide real world context rather than exploring hypothetical scenarios that are not germane to the DSM Plan in this proceeding.
- d) Enbridge Gas agrees that this would be feasible in the case where a single IRP Plan results exceed any of the materiality thresholds and would be preferable to a separate DSM application. However, it would not be the case if there were multiple IRP Plans that cumulatively resulted in any of the materiality thresholds being exceeded.

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Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 26

Question(s):

Enbridge Gas has proposed to maintain the reporting date for providing its Draft DSM Annual Report to OEB Staff by April 1st of the year following the DSM program year being reported on.

- a) Please discuss the ability and any limitations or challenges to providing the Draft DSM Annual Report earlier than April 1st, for example, by February 1st or March 1st of the following year. In your response, please discuss an option where Enbridge Gas only provides the draft results to OEB staff and the OEB's Evaluation Contractor and does not provide a full Draft Annual Report.
- b) Please discuss if the new DSM tracking systems and the merger between legacy UG and EGD provide a greater ability to provide program data in a more efficiency and expedited manner.

Response

- a) Once a program year concludes on December 31st, Enbridge Gas requires sufficient time and resources to finalize and prepare all DSM results for external audit. This includes confirming data integrity from multiple offerings consisting of potentially thousands of data points. Furthermore, the development of the Draft Annual Report requires input from several program design and implementation staff, to include information on program changes, lessons learned, and future anticipated program changes, among other components.

Enbridge Gas cannot commit to providing the Draft Annual Report, or raw data, prior to April 1st in a manner that can ensure a high level of quality. As with recent evaluation processes however, Enbridge Gas can commit to working with the Evaluation Contractor and OEB Staff to understand which offerings should be prioritized for finalization. The raw data for those offerings can continue to be provided in piecemeal in the weeks prior to April 1st, when they become finalized and on a best-efforts basis only.

- b) The new tracking and reporting systems have resulted in a number of benefits that could be described as providing program data in a more efficient and expedited manner. A number of these tie to recommendations from the annual verification reports and should provide efficiencies to the evaluation contractor. For example, the upgraded system has played an important part in allowing Enbridge Gas to provide a single flat file to the Evaluation Contractor¹, and in allowing Enbridge Gas to provide a unique premise identifier for each project to the Evaluation Contractor².

While the merger between the two legacy utilities has resulted in some efficiencies, the benefits specific to providing program data has been limited. This is a result of the two scorecards for the legacy utilities continuing to be separate, requiring separate tracking and reporting.

¹ DNV-GL, Ontario Gas DSM Evaluation Contractor – 2017 Natural Gas Demand-Side Management Annual Verification, Ontario Energy Board (March 13, 2020), p. 29, Table 5-1, row O2. <https://www.oeb.ca/sites/default/files/2017-DSM-Annual-Verification-Report.pdf>; and *2017/2018 Summary Responses to the Natural Gas Demand Side Management Annual Verification Recommendations*, Enbridge Gas Inc. (July 17, 2020), EB-2020-0067, Enbridge Gas Inc. 2017/2018 Demand Side Management (DSM) Deferral and Variance Account Disposition Application (July 17, 2020), Exhibit A, Tab 4, Schedule 1, page 4, Section 2.1, Table 1, row O2.

² DNV-GL, Ontario Gas DSM Evaluation Contractor – 2019 Natural Gas Demand-Side Management Annual Verification Report, Ontario Energy Board (December 3, 2020), Section 10.1.1 Overall Annual Verification Recommendations, O1, p. 33. <https://www.oeb.ca/sites/default/files/2019-Natural-Gas-Demand-Side-Management-Annual-Verification-Report.pdf>

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Answer to Interrogatory from
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Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, pp. 27-28

Question(s):

Enbridge Gas has listed the proposed components of the DSM Annual Report.

- a) Please confirm that the DSM Annual Report will include the following information that is currently contained within the DSM Annual Report. If this information cannot be provided, please discuss the reasons:
- i. Annual and long-term DSM budgets at the portfolio, program and offering level dating back 10 years
 - ii. DSM spending as a percentage of distribution revenue dating back 10 years
 - iii. Shareholder incentive amounts available and earned dating back 10 years
 - iv. Annual and long-term natural gas savings targets at the portfolio and scorecard level dating back 10 years
 - v. Total annual and cumulative natural gas savings as a percent of total annual natural gas sales (gross and net) dating back 10 years
 - vi. Actual annual gas operating revenue dating back 10 years
 - vii. Total natural gas sales volumes dating back 10 years
 - viii. Number of customers by customer type and rate class dating back 10 years

Response

Exhibit C, Tab 1, Schedule 1, pages 27 to 28 provides Enbridge Gas's proposed reporting requirements for the DSM Annual Report, which includes components (i) and (iii) listed in the interrogatory.

Enbridge Gas can commit to including components (iv) and (viii), as they are either DSM-related or can be informative to understanding the DSM market in Ontario.

Enbridge Gas can also commit to including component (v). While it includes non-DSM-related reporting information, it has been identified by stakeholders as a valuable figure to report.

Enbridge Gas does not propose including components (ii), (vi), (vii), as they include non-DSM-related reporting information. Enbridge Gas is not aware of any instances where this information provided value to stakeholders in recent years. Furthermore, this non-DSM-related reporting information is not necessarily available at the time of the finalization of the DSM Annual Report.

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Answer to Interrogatory from
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Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 28 and 30

Question(s):

Enbridge Gas has listed the proposed components of the DSM Annual Report.

Enbridge Gas has included the language from the OEB's December 1, 2020 letter that states "...the OEB expects that all process evaluations undertaken by Enbridge Gas will be included in the OEB's EM&V Plan."

- a) Please confirm that at a minimum, Enbridge Gas will discuss all planned process evaluations with OEB staff, the EAC and the EC and will ensure the OEB's EM&V Plan accounts for all process evaluations.
- b) Please provide a list of all process evaluations undertaken by program since 2015 including a brief description, objectives, conclusions, and the actions Enbridge Gas undertook following the process evaluation
- c) Please discuss Enbridge Gas's position regarding the accountability of process evaluations. In your response, please comment on the possibility of the OEB being responsible for both impact and process evaluations throughout the 2022-2027 DSM term.

Response

- a) Confirmed for formal process evaluations. Enbridge Gas notes however that smaller, informal process evaluation activities occur internally on a regular basis by the utility's program design and implementation staff, which are not formally scoped or tracked, and would not engage the EAC. These internal assessments (which lead to the continuous improvement of program design and delivery activities) are a regular part of the day-to-day role of utility staff. Enbridge Gas will continue to report any major outcomes of these learnings within its DSM Annual Report.

b) A total of 6 program offerings had process evaluations completed on them over 3 separate formal process evaluations.

- Home Winterproofing
- EGD/Union Residential
- Commercial Custom
- Commercial Prescriptive
- Commercial Direct Install

See Attachment 1 for DSM Conservation Programs Process Evaluation – Home Energy Conservation & Home Winterproofing. Prepared for Enbridge Gas Distribution by Econoler.

“The process evaluation’s objectives are to assess the HEC and HWP programs’ overall effectiveness over the period from January through June 2016 and identify opportunities for process improvements.”¹

Material reviewed as part of this evaluation:

- Program Database and Document Review
- Benchmarking Study
- Participant Survey
- Interviews with Partial Participants
- Interviews with Contractors
- Interviews with Certified Energy Auditors

Process Evaluation conclusion and recommendations can be found starting on page 32 and page 54, in Attachment 1.

Actions the Company has undertaken since the process evaluation for Home Energy Conservation, in relation to the recommendations, include:

¹ Econoler, DSM Conservation Programs Process Evaluation – Home Energy Conservation & Home Winterproofing, Final Report (January 20, 2017), p. v.

<p>Recommendation No. 1: Define and monitor the program performance indicators</p>	<ul style="list-style-type: none"> • Enbridge Gas transitioned to the tracking/data management web-based solution of Parachute Software which provides built-in reporting functionality to monitor performance indicators in real-time. • On an ongoing basis Enbridge Gas is now monitoring overall satisfaction with the program offering, opportunities for improvement and participant characteristics
<p>Recommendation No. 2: Further improve the program database by introducing better uniformity and some additional participant information</p>	<ul style="list-style-type: none"> • Data entry standardization was provided through the Parachute Software solution. Approved users (e.g. Registered Energy Advisors) now upload the completed HOT2000 file (as an .XML). • Specific examples in the recommendation (such as the participants' email address, the pre-assessment file number etc.) are included with the HOT2000 file and uploaded to the Parachute Software solution at the time of file submission.
<p>Recommendation No. 3: Complete the evaluation plan section of the program plan</p>	<ul style="list-style-type: none"> • Enbridge Gas records previous process, market, impact or other types of evaluations undertaken, their dates, and whether they were completed by in-house staff members or external third parties. This is housed by the Evaluation team. • Plans for future process evaluations, including expected dates and scopes, are assessed on a regular basis. Plans for future impact evaluations are coordinated by the OEB in conjunction with the Evaluation Advisory Committee.
<p>Recommendation No. 4: Perform follow-up with participants as part of HEC's program delivery as the deadline approaches for completing the final energy audit</p>	<ul style="list-style-type: none"> • Enbridge Gas now has an extension request process facilitated through the Parachute software to both provide an opportunity for Registered Energy Advisors to request additional time for participants beyond the 120 day standard time limit in the system based on their unique circumstances, and to provide a timeframe for follow-up with homeowners by the Registered Energy Advisor. • On a periodic basis Enbridge Gas sends Service Organizations a list of open pre-assessments exceeding the 120 day limit from the Parachute system reporting and requests they contact customers on the list to determine whether they plan to proceed with the program offering and require an extension request or will not proceed. Once they confirm with the customer Service Organizations/Registered Energy Advisors in turn update the information in the Parachute software for the customer accordingly. Service Organizations also now have access in the Parachute system to pull a report of participants by pre-assessment date for follow-up on an ongoing basis.

<p>Recommendation No. 5: Improve homes' energy performance information delivery to HEC participants</p>	<ul style="list-style-type: none"> • Enbridge Gas now monitors participants stated recall of receiving the EnerGuide report, the participant's experience with their Registered Energy Advisor's ability to answer their questions, offering suggestions for work that could improve the energy efficiency of the home etc. to inform the program offering on an ongoing basis.
<p>Recommendation No. 6: Provide an additional incentive to encourage participants to implement more than two energy-efficiency upgrades.</p>	<ul style="list-style-type: none"> • Enbridge Gas introduced a multi-measure bonus for implementing 3 or more upgrades, with an escalating bonus for completing 3, 4 or 5+ upgrades.
<p>Recommendation No. 7: Provide a brief program description leaflet for contractors to hand out to potential participants</p>	<ul style="list-style-type: none"> • Enbridge Gas provides a brochure to Service Organizations to distribute to customers and contractors as required.
<p>Recommendation No. 8: Further increase the program micro-website's contents and keep the CEAs' websites up-to-date</p>	<ul style="list-style-type: none"> • Enbridge Gas has enhanced its website and adopted many of the specific recommendations, including: <ul style="list-style-type: none"> – Adding explanatory videos to the program's website, walking the customer through the program process and providing testimonials – Clarifying the incentive structure and eligibility – Names of the approved Service Organizations listed as hotlinks leading to their respective websites.
<p>Recommendation No. 9: Consider relying on channels or networks other than contractors to recruit participants</p>	<ul style="list-style-type: none"> • Enbridge Gas has enhanced its marketing activities for the offering by scaling up mass marketing initiatives such as radio and digital campaigns to increase awareness. To increase the value of insulation in the mind of customers insulation and air sealing 101 videos, and authentic customer testimonials that feature insulation were developed and utilized. • The Company has reduced the emphasis on the furnace in its rebate structure (e.g. reduced the furnace rebate relative to the time of the process evaluation, increased the furnace minimum efficiency required, required furnace to be completed with a minimum of two other upgrades to be eligible for a rebate).

Actions the Company has undertaken since the process evaluation for Home Winterproofing include:

<p>Recommendation No. 1: Define and monitor program performance indicators</p>	<ul style="list-style-type: none"> • As of 2016, the program aligned on a standardized a number of reports and/or forms: <ul style="list-style-type: none"> ○ Create a standardized Monthly Master report for all Delivery Agents to upload Standardized customer application and participant forms <ul style="list-style-type: none"> ○ Standardized Back up documentation requirements
<p>Recommendation No. 2: Further complement the program database with some additional participant information</p>	<ul style="list-style-type: none"> • The program further improved the database contents by including additional information such as participants email address, account numbers, the pre and post audit gas saving values, pre and post audit KWH data and basic measures info (showerheads, aerators, and smart thermostat)
<p>Recommendation No. 3: Make SHP buildings pass a pre-application test for screening purposes.</p>	<ul style="list-style-type: none"> • Health and Safety concerns for social housing- at the time of pre-audit the program identifies any H&S concerns and communicates to the homeowner or Social Housing provider. The program is only budgeted to assist with small health and safety issues such as bathroom fans, installation of vents in attic, vermiculite testing, removal of pests. Some of the larger concerns such has Asbestos, mold, and knob and tube are not covered under the program but are communicated to the customer at the time of completion of the pre-audit.

See Attachment 2 for Home Reno Rebate Offering (Process Evaluation). Prepared for Union Gas by Econoler.

“This evaluation covers the 2018 program year from January 1 to December 31 inclusively. The main objectives of the HRR process evaluation are to:

- Identify opportunities to improve the efficacy of the program offerings and implementation efforts;
- Determine whether the data entry and quality assurance processes are sufficiently robust, efficiencies can be gained, or enhancements need to be made.”²

Material reviewed as part of this evaluation:

- Program Database and Documentation Review;
- Interviews with Union program staff;
- Interviews with service organizations (SOs) and certified energy auditors (CEAs);
- A Union market research survey results review.

² Econoler, Home Reno Rebate Program Offering – Process Evaluation, Final Report (October 10, 2019), p. v.

Process Evaluation conclusion and recommendations can be found starting at page 33, in Attachment 2.

Actions the Company has undertaken since the process evaluation for Home Reno Rebate, in relation to the recommendations, include:

<p>Recommendation No. 1: Define additional performance indicators to correspond with the adjusted logic model and track all performance indicators linked to program objectives.</p>	<ul style="list-style-type: none"> Performance indicators are monitored on an ongoing basis. This includes indicators noted in the process evaluation, such as the number of E assessments completed, number of energy efficiency measures installed per participant, participant satisfaction as well as additional indicators the Company monitors such as the frequency of individual upgrades completed by participants.
<p>Recommendation No. 2: Investigate current practices among contractors for pairing air sealing with furnace replacements to assess what target of air sealing should remain incentivized by the program and counted in the minimum number of upgrades to be implemented.</p>	<ul style="list-style-type: none"> At the time of the process evaluation 88% of projects included a furnace upgrade, and furnace and air sealing was the most frequent measure combination. Enbridge Gas has reduced the emphasis on the furnace in its rebate and eligibility structure (e.g. reduced the furnace rebate relative to the time of the process evaluation, increased the minimum furnace efficiency eligible for rebate, required furnace to be completed with a minimum of two other upgrades to be eligible for a rebate). A homeowner who upgrades only their furnace and air sealing is no longer eligible for rebates through the program offering.
<p>Recommendation No. 3: When assessing free-ridership as part of the net impact evaluation, measure the influence of recommendations made by program partners (contractors and CEAs) on the types of upgrades installed by participants.</p>	<ul style="list-style-type: none"> The methodology and scope of all impact evaluation would be determined through the Evaluation Advisory Committee process. Enbridge Gas is a member of the committee and would provide input to the process.
<p>Recommendation No. 4: Track and monitor the number of unconverted assessments.</p>	<ul style="list-style-type: none"> Unconverted assessments are monitored in the Parachute system and remain low.
<p>Recommendation No. 5: Provide CEAs with an additional tool(s) to better communicate the benefits of recommended measures, such as an online tool that allows participants to analyze the costs, rebates and benefits of the measures.</p>	<ul style="list-style-type: none"> An online virtual assessment tool has been introduced in My Account, the Company's online account management tool, to support homeowners to quantify the financial energy savings they could realize from upgrades to their home and see the available rebates.
<p>Recommendation No. 6: Consider ways to increase uptake in insulation upgrades, such as increasing the rebate amount or better communicating the benefits of installing insulation (as per Recommendation 5 above).</p>	<ul style="list-style-type: none"> Enbridge Gas has enhanced the focus on insulation upgrades through adjustments to the rebate structure and an enhanced focus on building envelope improvements in its promotional strategy for the offering. The majority of participants now undertake insulation upgrades.

<p>Recommendation No. 7: Continue to monitor participant satisfaction among SOs to respond quickly to any changes in satisfaction levels.</p>	<ul style="list-style-type: none"> The Company continues to monitor overall satisfaction with the program offering, satisfaction with the Registered Energy Advisers and the participant's experience with the program offering.
<p>Recommendation No. 8: Consider ways to identify the correct program participant to avoid delays in processing applications, for example, by validating participant information earlier in the participation process (i.e. during the D assessment).</p>	<ul style="list-style-type: none"> The company has created a process that requires a Property Tax Bill or other supporting documentation (such as a bill or proof of residence) to be uploaded to the Parachute software system at the time the application is received by the Company. This allows the Tracking & Reporting team to validate the participant information when it does not align with the customer information system. This new process reduces the need to contact the Service Organization / Registered Energy Advisor for supporting documentation – the Company can immediately move to processing the application. With this change in process there has been a significant reduction in the amount of time to process the application for these customers.
<p>Recommendation No. 9: Provide customers with notices when their project application is received and approved.</p>	<ul style="list-style-type: none"> Enbridge Gas has not instituted outbound notices and has focused on ensuring timely submission, processing, and rebate payment for customers to mitigate follow-up and contribute to high satisfaction in the process, including: <ul style="list-style-type: none"> ensuring timely submission of project applications. enhancements to procedures over time which has improved the overall timing to process and facilitate customer payment in a timely fashion. Where a participant does enquire about their application, through an enhancement, the Company updated the dashboard to include more pertinent details related to the customer's rebate status (i.e. expected arrival date for cheque).
<p>Recommendation No. 10: Make SO practices for NRCan file approval consistent. If the program data is inputted into Union's Parachute system prior to NRCan approval, monitor a sample of project files and NRCan-approved files, sampled over at least a year, to confirm that the difference between the two groups of files is minor and no adjustment is needed.</p>	<ul style="list-style-type: none"> Service Organizations upload the HOT2000 xml file to the Parachute system at the time it is submitted to NRCan prior to NRCan approval to ensure timely processing and rebate payment. On an annual basis, a sample of project files is assessed by the OEB's Evaluation Contractor to compare the program savings claims with NRCan approved files. Any adjustment is applied as an adjustment factor to the population of program offering participants, and has historically been minor (savings confirmed 95% - 100%)
<p>Recommendation No. 11: Add information to the master database to support program monitoring and planning, as well as a future program strategy.</p>	<ul style="list-style-type: none"> Enbridge Gas gathers data to inform program planning on an ongoing basis, including the percentage of participants that complete all recommended measures, intentions to complete recommended measures not yet implemented, main reasons for participating in the program offering and suggestions to enhance the program offering.

<p>Recommendation No. 12: Add safeguards in the master database to reduce the risk of introducing errors. Consider locking formulas in the spreadsheet so that they cannot be tampered with accidentally (e.g. locking the savings formulas in Columns DV and DZ).</p>	<ul style="list-style-type: none"> • The Company has enhanced the master database format and process to safeguard against accidental errors through reducing the amount of information stored in this Excel workbook. Where previously columns DV and DZ were once included in the master database, the company has reduced the information to only include Columns A to CX. • Furthermore, verification of formulas and outputs occurs on a monthly basis through the reconciliation between the monthly tracker and system of record to ensure accuracy.
<p>Recommendation No. 13: Ensure that SOs consistently follow the QA guidelines in SO agreements and that practices for making corrections based on QA audits are consistent among SOs.</p>	<ul style="list-style-type: none"> • The Company's agreements with Service Organizations require adherence to NRCan's requirements. Registered Energy Advisors are affiliated with NRCan-licensed Service Organizations, with the expectation that NRCan protocols/standards are being followed given that this is a licensing requirement. Failure to follow these protocols/standards could result in suspension or loss of license by NRCan, which would in turn render Energy Advisors ineligible to participate in Enbridge Gas's program. • The project files are submitted to the Company consistently at the time it is submitted to NRCan prior to NRCan approval to ensure timely processing and rebate payment. The process was harmonized across Enbridge Gas following amalgamation. On an annual basis a sample of project files is assessed by the OEB's Evaluation Contractor to compare the program savings claims with NRCan approved files and any variance would be applied as an adjustment factor.

See Attachment 3 for 2019 Commercial Offerings – Process Evaluation Report.
 Prepared for Enbridge Gas Inc by Nexant.

“The overall objectives of the process evaluation include:

- Assisting program and offering designers and managers to continuously improve programs and offerings.
- Providing pertinent input for the development of next-generation programs and offerings based on the performance assessment of previous programs and offerings.”³

The Commercial Offerings covered in this process evaluation included the Prescriptive, Direct Install and Custom offerings.

³ Van Rensburg, Henri, et.al., Nexant, 2019 Commercial Offerings - Process Evaluation Report (May 19, 2021), p. 5.

Material reviewed as part of this evaluation:

- Review of offering material
- Review of offering data
- Sampling, interviews and surveys to obtain perspectives from:
 - Program managers and sales staff
 - Contractors – Direct Install Offering
 - Participant contractors
 - Participants

Process Evaluation conclusion and recommendations can be found starting page 97, in Attachment 3.

Since this process evaluation was just completed in May of 2021, Enbridge Gas is still reviewing and considering the recommendations in the report for consideration in its 2022 program offering updates.

- c) Impact evaluation refers to the post-implementation assessment and evaluation of DSM programs. More specifically, impact evaluation is directly related to understanding the quantitative outcomes of DSM programs, which impacts shareholder incentive amounts. As such, impact evaluation overseen by the OEB and independent non-utility firms can be warranted.

Process evaluation refers to the assessment of program design and implementation components of ongoing DSM programs. For example, a process evaluation could assess the effectiveness of an incentive level or outreach campaign, from the customer perspective. Learnings from process evaluations are assessed by program design and implementation staff, to understand where improvements can be made to increase the effectiveness of the program. Process evaluations are appropriately managed by utility program design and implementation staff, rather than the OEB or external firms, because:

- The utility is accountable for the design and implementation of its DSM programs (and ultimately the effectiveness of its programs), and therefore requires the ability to focus process evaluations in the areas its staff believes are most important to improve the program; and
- Process evaluations are generally subjective and qualitative, and therefore require the utility's program design and delivery staff's knowledge and judgement on how to scope any evaluations and execute any of the findings in practice. Only the utility is able to enforce program design and implementation changes, and therefore placing process evaluations outside of the utility's control would not be constructive.

While process evaluations are appropriately scoped and managed by the utility for the reasons mentioned above, it should be noted that expert consultants can and are involved to support some formal process evaluations, based on the utility's needs. Furthermore, as described at Exhibit C, Tab 1, Schedule 1, page 30, and the utility's proposed Evaluation Governance Terms of Reference,⁴ Enbridge Gas will engage the EAC for input on the scope and deliverable of formal process evaluations, and will provide its planned process evaluations to the Evaluation Contractor for insertion into the broader EM&V Plan.

⁴ EB-2021-0002, Multi-year Plan and Framework Application (Updated September 29, 2021), Appendix 1 – Ontario Demand Side Management Evaluation Governance Terms of Reference, Exhibit C, Tab 1, Schedule 1, pp. 55 – 66.

DSM CONSERVATION PROGRAMS PROCESS EVALUATION HOME ENERGY CONSERVATION & HOME WINTERPROOFING

ENBRIDGE GAS DISTRIBUTION

Final Report

January 20, 2017



ECONOLER



ABBREVIATIONS

CCM	Cumulative Cubic Meters
CEA	Certified Energy Auditors
CRA	Corporate Research Associates
DA	Delivery Agent
DWHR	Domestic Water Heat Recovery System
EGD	Enbridge Gas Distribution
HEC	Home Energy Conservation
HVAC	Heating, ventilation and air-conditioning
HWP	Home Winterproofing
IESO	Independent Electricity System Operator
LDC	Local Distribution Company
OEB	Ontario Energy Board
OESP	Ontario Electricity Support Program
PG&E	Pacific Gas and Electricity Company
SHP	Social Housing Providers
SO	Service Organization
SRM	Supplier Relationship Management
TAPs	Thermostats, Aerators, Pipe Insulation and Shower Heads
TRC	Total Resource Cost



TABLE OF CONTENTS

INTRODUCTION	1
1 HOME ENERGY CONSERVATION PROGRAM	2
1.1 Program Overview	2
1.2 Evaluation Methodology	3
1.2.1 Methodological Model	3
1.2.2 Program Database and Document Review	4
1.2.3 Benchmarking against Similar Programs.....	4
1.2.4 Participant Survey	5
1.2.5 Interviews with Partial Participants	5
1.2.6 Interviews with Contractors and Certified Energy Auditors	5
1.3 Process Evaluation	6
1.3.1 Program Participation.....	6
1.3.2 Program Database and Document Review	8
1.3.3 Benchmarking against Similar Programs.....	11
1.3.4 Participant Survey	12
1.3.5 Interview with Partial Participants.....	20
1.3.6 Interviews with Contractors	24
1.3.7 Interviews with Certified Energy Auditors	27
1.4 Conclusions and Recommendations	32
2 HOME WINTERPROOFING PROGRAM.....	37
2.1 Program Overview	37
2.2 Evaluation Methodology	38
2.2.1 Methodological Model	38
2.2.2 Program Database and Documentation Review	38
2.2.3 Benchmarking against Similar Programs.....	38
2.2.4 Participant Survey	39
2.2.5 Interviews with Delivery Agents and Social Housing Providers	39
2.3 Process Evaluation	40
2.3.1 Program Participation.....	40
2.3.2 Program Database and Document Review	40
2.3.3 Benchmarking against Similar Programs.....	43
2.3.4 Participant Survey	44
2.3.5 Interviews with Delivery Agents.....	49
2.3.6 Interviews with Social Housing Providers	52
2.4 Conclusions and Recommendations	54
APPENDIX I HEC BENCHMARKING TABLE	57
APPENDIX II HWP BENCHMARKING TABLE.....	63



LIST OF TABLES

Table 1: Upgrades Implemented	21
Table 2: Satisfaction with Certified Energy Auditors	22
Table 3: Satisfaction with HEC.....	23
Table 4: HEC Program Benchmarked against Other Utilities’ Similar Programs.....	58
Table 5: HWP Program Benchmarked against Other Utilities’ Similar Programs.....	63

LIST OF FIGURES

Figure 1: HEC Program Methodological Model	4
Figure 2: Breakdown of HEC Projects by Number of Upgrades in Each Project.....	6
Figure 3: Breakdown of Participant Proportions by Type of Two-measure-pairing across the HEC Projects Implemented	7
Figure 4: Awareness of the HEC Program	13
Figure 5: Reasons for Participating in the Program	14
Figure 6: Reasons Influencing Decision-making on Home Upgrades.....	15
Figure 7: Barriers to Participation.....	16
Figure 8: Reasons for Choosing Not to Implement the Upgrades Recommended.....	17
Figure 9: Satisfaction with the Certified Energy Auditor.....	18
Figure 10: Satisfaction with Aspects of Program Participation.....	19
Figure 11: HWP Program Methodological Model	38
Figure 12: Projects by Type of Participant.....	40
Figure 13: Types of Building Envelope Upgrades Installed	40
Figure 14: Awareness of the Home Winterproofing Program	45
Figure 15: Reasons for Participating in the Program	46
Figure 16: Reasons Influencing Decision-making on Program Participation.....	46
Figure 17: Satisfaction with the Delivery Agent	48



EXECUTIVE SUMMARY

This report presents the results of the process evaluation of the Enbridge Gas Distribution (EGD) Home Energy Conservation (HEC) and Home Winterproofing (HWP) programs. The programs were designed to help residential customers in Ontario improve their homes' natural gas energy efficiency. Specifically, the HEC program offers (1) a rebate to conduct pre-retrofit and post-retrofit energy audits in homes and (2) financial incentives based on the modelled energy savings achieved by implementing two or more eligible energy-efficiency upgrades. The HWP program offers free energy audits and direct install of basic energy-efficiency upgrades (i.e., insulation and air sealing) as well as health and safety measures as warranted to eligible low-income households.

SUMMARY OF EVALUATION MANDATE

The process evaluation's objectives are to assess the HEC and HWP programs' overall effectiveness over the period from January through June 2016 and identify opportunities for process improvements. To do so, Econoler (hereinafter the "Evaluator") completed the following evaluation activities:

- › A program database and documentation review.
- › A benchmarking study of similar programs.
- › Interviews with partial participants, certified energy auditors (CEAs), contractors, delivery agents (DAs), and social housing providers (SHPs).
- › A survey with participants.

SUMMARY OF PROCESS EVALUATION FINDINGS

Home Energy Conservation Program

From January through June 2016, a total of 2,372 households participated in the HEC program. Each household installed on average 2.2 eligible upgrades. The typical projects consisted of a furnace upgrade and air sealing improvement (83%). The overall average natural-gas savings achieved was 1,316 m³ per home.

Main Findings from the Program Database and Document Review

- › The program database review indicated that the database works well overall and contains the main information necessary for the process evaluation and program-monitoring.
- › The overall level of consistency among the various database entry fields was good, but irregularities were found regarding audit date entries and formats.
- › Additional participant information could be relevant to track in the database.



- › The program plan was found to be well structured and contained relevant information useful for both the program staff and the Evaluator.
- › The program plan included a logic model, which shows how the program is expected to work and how it contributes to the intended or observed outcomes.
- › Defining and monitoring performance indicators would improve program management.
- › The program's micro-website provided a concise description of the participation process and the incentives available. However, the Evaluator suggests that some elements be better clarified. The CEAs' websites did not all present the most up-to-date information about the program.

Main Findings from the Benchmarking Study

- › The benchmarking study revealed that residential energy assessment programs use either a performance-based design (based on the energy savings) or a prescriptive design (with rebates associated with energy-efficiency measures). Some programs benchmarked use a combination of both types of design.
- › The upgrades, eligibility criteria, and incentives available vary among the programs:
 - Some programs offer more than one program path depending on a customer's type of home and ownership.
 - Most programs' incentives are based on the energy savings achieved or have prescriptive rebates associated with specific energy-efficiency measures. One program provides an incentive that covers a certain percentage of the overall project cost. One program adjusts the incentive amount allowed for a specific upgrade depending on the total number of upgrades implemented.
 - Some utilities offer additional financial support for conducting upgrades through a low-interest loan granted to participants who apply and are eligible.

Main Findings from the Participant Survey

- › HEC participants found out about the program mostly through word of mouth (36%) and contractors (29%). These results are not surprising given that HVAC contractors play a central role in recruiting participants. Promotional activities conducted by EGD also contribute to raising awareness about the program: 27 percent of the participants heard about the program through EGD's communication tools.
- › When asked to rate the importance of different reasons for participating in the program, participants primarily cited the reduction of their energy bills, the increased comfort at home, and the incentive or money back offered by the program. These survey results indicate the appropriateness of the messages conveyed by EGD's in promoting the HEC program.
- › As for the information participants received through the program:
 - 90 percent recalled having received information from a CEA about their homes' energy consumption and recommendations on energy-efficiency upgrades they could install.
 - 72 percent recalled having received an audit report from the CEA.



- 37 percent recalled having received a new energy-efficiency rating for their home after having implemented the upgrades.
- › Many participants (43%) did not install more than two upgrades for financial reasons and quite a percentage of participants (26%) thought that their homes did not need any other upgrade.
- › After taking part in the program, the majority of participants knew more about energy efficiency (87%) and were influenced to change how they use energy at home (75%). Three quarters of the participants (77%) also noticed an improvement in the comfort level at home.
- › Nearly all the participants (96%) were satisfied with the HEC program primarily because of their lowered energy bills (28%) and program incentives (28%). All the participants were also satisfied with their overall experience with CEAs.
- › Nearly all the participants (97%) would recommend the program offered by EGD to others.

Main Findings from the Interviews with Partial Participants

- › Partial participants are those customers who did not complete an Audit E after their Audit D. They represent only five percent of the program participants,¹ which is a very low drop-out rate.
- › Most partial participants found the participation process easy and were satisfied about their experience with CEAs and what they learned about their potential energy savings. However, about one half of the partial participants were dissatisfied with the time allowed to complete the upgrades and the responsiveness of the CEA to their requests.
- › Of the six respondents, five said that they had implemented or were implementing some of the recommended energy-efficiency upgrades. The respondent who decided not to install any of them was skeptical about their validity and wanted some assurance that he would definitely receive the rebate after completing the upgrades.
- › The participants who had implemented upgrades explained they did not complete the second audit because they did not install all the recommended upgrades and questioned whether having the second audit conducted was worthwhile or had difficulty scheduling the second audit.

Main Findings from the Interviews with Contractors

- › Contractors first learned about the HEC from EGD, a CEA, or by word of mouth from other contractors. All the contractors interviewed were either very or somewhat satisfied with HEC overall and its different aspects. A few contractors asked to take part in the evaluation process were however dissatisfied with the program and refused to answer the Evaluator's questions.
- › One half of the contractors interviewed promote the HEC program among all their customers. The other half promote the program only among those customers that could potentially qualify.
- › Overall, once a customer learned about the existence of HEC, contractors relied on CEAs to provide detailed information about the program and other energy-efficiency upgrades.

¹ This proportion was calculated by dividing the number of participants (563) who completed only an Audit D in 2014 or 2015 by the total number of participants who completed an Audit E during the same period (5,213 in 2014 and 5,646 in 2015).



- › One half of the contractors mentioned that some customers are concerned about the possibility of their energy savings failing to meet program requirements.
- › The contractors interviewed indicated that they were very satisfied with their relationship with the CEAs, who are described as available, professional, knowledgeable, and able to complete their work on time.
- › The contractors all received information from CEAs about the program, mostly regarding the eligibility criteria or the changes to the program. One half of the contractors said they would like to receive additional information on the HEC program.
- › According to one half of the contractors, raising awareness about the program among customers before they meet with a contractor would help improve their understanding of the HEC program as a whole-house approach.

Main Findings from the Interviews with Certified Energy Auditors

- › All the CEAs were very satisfied with their communication and relationship with EGD, which offered plenty of opportunities for CEAs to provide input on the program.
- › All the CEAs were either very or somewhat satisfied with the HEC's incentive structure and eligibility requirements. One CEA was very satisfied with the marketing and outreach activities initiated by EGD, while two CEAs were somewhat dissatisfied. The opinions expressed were that the program is mainly driven by HVAC contractors instead of having EGD target customers directly. Also, the traditional marketing channels are highly saturated and may not be the best way to promote the program.
- › The CEAs work with a large number of contractors and generally have a satisfying experience working with them. The CEAs mentioned, however, the issue that some contractors impart the wrong expectations among homeowners by describing the incentive as automatically available.
- › The CEAs generally faced the challenges to effectively delivering the program in its whole-house approach. Indeed, contractors are the main drivers of the HEC program, but since they promote a specific type of measure, this can easily lead to the impression among homeowners that HEC is more of a prescriptive program featuring the installation of high-efficiency furnaces.
- › According to the CEAs, those participants that contacted a CEA after hearing about the program from EGD's marketing activities or materials (instead of from HVAC contractors) were generally more receptive to recommendations about additional upgrades beyond those they were initially considering.

Overall, the Evaluator found the HEC program effectively managed and delivered. The program is satisfying for all the parties involved (participants, contractors, and CEAs) and generates strong interest and high participation in the residential market. In order to improve the program, the Evaluator has made some recommendations, as presented in Section 1.4.



Home Winterproofing Program

From January through June 2016, a total of 334 households participated in the HWP program. Most projects (80%) were conducted in low-income private homes and the remaining projects took place in homes managed by social housing providers. The average natural gas savings achieved was 868 m³ in low-income private home and 688 m³ in social housing.

Main Findings from the Database and Documentation Review

- › The program database review indicated that the database is clear and effective and that the level of consistency among the various entry fields is good.
- › The database contained the main information necessary for process evaluation and monitoring, but additional participant information could be relevant to track.
- › The program plan was found to be well structured and contained relevant information useful for both the program staff and the Evaluator.
- › The program has a logic model which shows how the program is expected to work and how it contributes to the intended or observed outcomes.
- › Defining and monitoring performance indicators would improve program management.
- › The program website presents clear and concise information that summarizes well the eligibility criteria and participation process.

Main Findings from the Benchmarking Study

- › A benchmarking study was conducted to provide general insight on how other programs similar to HWP are being delivered elsewhere. Although the upgrades offered and the eligibility criteria vary among the programs, the HWP's program design and delivery were found to be largely consistent with similar programs offered by other jurisdictions, as summarized below:
 - Most jurisdictions offer free upgrades following an energy audit, although some prefer to offer prominent rebates to facilitate implementation of energy-efficient upgrades in low-income households.
 - The range of upgrades offered varies from one program to another, but overall, most utilities offer at least insulation and air sealing.
 - Upgrades which do not require renovation work are often given or installed during the energy audit (efficient lighting, appliance replacement, water-saving devices, smart power bars, and CO detectors).
 - Most programs target homeowners, tenants, and landlords, while others include apartment building owners or social housing providers.
 - In general, eligibility requirements include at least the criteria on the household income level (income or assistance program participation) and pertain to one or more of the following elements: the house (type, age, size, value, and/or year-round occupation), the applicant



(bill payer, tenant, active account with the utility, and previous participation), and the energy source.

Main Findings from the Participants Survey

- › HWP participants found out about the program mostly through word of mouth (27%) and bill inserts (27%). EGD's promotional activities contributed to program awareness: 52 percent of the participants heard about the HWP program through EGD's communication tools.
- › The main reasons for participants to take part in the HWP included improving house insulation (39%), saving money/reducing the energy bill (29%), increasing comfort in the home (10%) and receiving the service at no cost (10%).
- › Speaking about the barriers pertaining to energy-efficiency upgrades in general, 54 percent of the participants identified the financial constraint as the major barrier and 10 percent mentioned a lack of information, which proves the importance of a program such as HWP to offer free upgrades and information about energy efficiency to participants.
- › Most of the participants (80%) recalled having received information from the DA about the upgrades implemented in their homes and about the impact it could have on their energy bills. These participants found the information provided by the DA useful and easy to understand.
- › 74 percent of the participants reported knowing more about their homes' energy efficiency after participating in the program. Moreover, for 56 percent of the participants surveyed, the information received through the program changed in some way their perspective on how to use energy at home.
- › The satisfaction level among participants surveyed was extremely high, with 77 percent of them saying they were "very satisfied" and 19 percent "somewhat satisfied". The main reasons for high satisfaction were the improvement in comfort at home (30%), work or upgrades of high quality (26%) and money saved (22%).
- › Nearly all the participants (97%) would recommend the program to others.

Main Findings from the Interviews with the Delivery Agents

- › In general, the two DAs interviewed were very satisfied with the overall program and considered their involvement in the program as straightforward.
- › The DAs were very satisfied with their communication and relationship with EGD.
- › The DAs' relationship and experience with the SHPs was usually described as positive, though both DAs agreed that bureaucracy and time required to go through the process requires patience and "hand-holding". The experience with contractors was also described as positive overall.
- › According to the DAs, successful outreach strategies vary over time and from one region to another, but referrals, postal drops, and bill inserts were mentioned as tools consistently sparking interest. The program website was also mentioned as a useful communication tool.



- › It was mentioned that EGD understands the importance of keeping the program's participation process as easy and simple as possible, and develops friendly and attractive communication, which is a great advantage when engaging with a high-barrier group such as the low-income households.
- › The DAs considered that the HWP had an impact on each participating household by improving their comfort and financial situation and increased awareness about energy efficiency among program participants.

Main Findings from the Interviews with the Social Housing Providers

- › The two SHPs interviewed were very satisfied with the HWP. One mentioned being very familiar with the program while the other was somewhat familiar.
- › The SHPs decided to participate in the HWP since it provided a very interesting opportunity for energy savings and for retrofitting buildings of a certain age. They both also found the program very informative and said it was easy to have tenants participate in the program.
- › Some tenants were uncomfortable about letting people come into their homes; others were concerned about the dust that would be created by the work; others were worried about health-related consequences of the work to be done. However, overall, all the eligible units in the two SHPs interviewed participated in the program.
- › The two SHPs were satisfied with their overall experience with the DAs, the responsiveness of the DA to the requests and enquiries in a timely manner, the time to complete the work and the quality of the work completed. The DAs were described as very helpful.
- › Both SHPs were very positive about their experience with the program and would recommend the program to other organizations without hesitation.

Overall, the Evaluator found the HWP program to be effectively managed and delivered. Low-income customers are recognized as a hard-to-reach customer group. The HWP program had succeeded in reaching out to this group by partnering with experienced DAs to deliver the program. The program is satisfying for all the parties involved (DAs, private participants and SHPs). In order to improve the program, the Evaluator makes some recommendations in Section 2.4.



INTRODUCTION

Evaluation Scope

Econoler (hereinafter the “Evaluator”) was mandated by Enbridge Gas Distribution (EGD) to perform the process evaluation of its Home Energy Conservation (HEC) and Home Winterproofing (HWP) programs. The evaluation involved conducting a review of program documentation and databases, benchmarking against similar programs, in-depth interviews and surveys to achieve the following key research objectives:

- › Evaluate the programs’ offerings and delivery.
- › Evaluate the programs’ database and documentation.
- › Identify the programs’ sources of awareness and evaluate their customer recruitment efforts.
- › Determine the levels of program satisfaction.
- › Identify the barriers and motives influencing and affecting program performance and attitudes toward the programs.
- › Provide recommendations on how to improve the HEC and HWP programs.

This evaluation covers the period from January 2016 through June 2016.

Presentation of the Team

To complete this evaluation, Econoler worked together with Corporate Research Associates (CRA). The tasks were divided as follows:

- › Econoler served as the team leader and was responsible for coordinating and supervising all the evaluation activities, developing the data-collection instruments, as well as preparing and reviewing the evaluation report. Econoler conducted the database and documentation reviews, benchmarking against similar programs and the interviews with contractors and program partners.
- › CRA conducted the participant survey and interviews with unconverted participants.



1 HOME ENERGY CONSERVATION PROGRAM

This chapter describes the HEC program, the evaluation methodology and the process evaluation results for the January-June 2016 period.

1.1 PROGRAM OVERVIEW

The HEC program aims to improve natural gas energy efficiency among Ontario households. Specifically, HEC offers incentives to eligible customers to motivate them to complete a pre-retrofit energy audit, install the requisite energy efficiency upgrades to qualify for further incentives, and finally conduct a post-retrofit energy audit. Launched in 2012, the program is overseen by an EGD program manager. So far, the program's results have been largely driven by the program's approved Certified Energy Auditors (CEAs) and HVAC companies (which provide referrals in the EGD franchise area). HEC uses Natural Resources Canada's ecoENERGY program as its foundation and strives to follow a holistic approach to upgrading energy efficiency in residential homes. The financial incentives offered depend on the modelled natural gas consumption savings achieved by participants following implementation of energy-efficiency upgrades.

The interested customer must first contact one of the program's Certified Energy Auditors (CEAs). The CEA asks the customer a set of questions over the phone to complete a pre-screening process. A pre-retrofit energy audit (Audit D) is then booked if the house has sufficient natural gas reduction potential to meet the program's minimum savings requirements. Based on the pre-retrofit energy audit, the customer receives a report recommending applicable energy upgrades, the customer then hires an HVAC or an insulation contractor to implement at least two of the upgrades recommended. Upon completion of the upgrades, the customer contacts the same CEA that completed the pre-retrofit energy audit to conduct a post-retrofit energy audit (Audit E) to determine the level of gas savings achieved. The CEA then sends an email informing the participant about their new home's energy rating, using the Natural Resources Canada's EnerGuide Rating System. An EnerGuide rating is a standard measure of the home's energy performance.

Participants must install at least two of the following nine energy upgrades or products:

- › Attic insulation
- › Wall insulation
- › Basement wall insulation
- › Exposed floor insulation
- › Air sealing (minimum reduction of at least 10 percent in the air leakage of the home as determined by a blower door test)
- › Window replacements
- › High-efficiency space heating system installation (natural gas furnace or boiler)



- › High-efficiency water heating system installation (natural gas)
- › Drain water heat recovery system installation

Whether a customer is living in or renting out a home, he or she can participate. The HEC program is only available for detached residential homes, townhouses and semi-detached homes and is not available to multi-residential buildings or condos. To qualify, the following criteria must be met:

- › Reside in one of the designated communities specified for 2016.
- › Have an active EGD account in good standing (no arrears) and their primary source of heat must be natural gas.
- › Use an EGD-approved CEA.²
- › Complete a pre- and post-energy audit.
- › Complete the installation of two or more eligible measures recommended by the CEA, striving to achieve at least 15 percent savings. The program offers \$500 covering the full (pre and post) energy audit costs (not including HST). An instant \$150 rebate is offered at the time of the pre-retrofit energy audit. The remaining \$350 is reimbursed when the final incentive is paid out following the upgrade completion. The first incentive tier is \$500 for achieving 15 to 24 percent energy savings (for a total of \$1,000 including the audit rebate). The program funds up to \$1,100 to help cover the retrofit for a house achieving between 25 and 49 percent natural gas savings as per the final energy audit (for a total of \$1,600 including the audit rebate). The highest incentive tier is \$1,600 and is obtained if a house achieves 50 percent or more energy savings (for a total of \$2,100, including the audit rebate).

The average annual gas savings across all participants in the HEC program achieve at least 25% of combined baseline space heating and water heating usage.

1.2 EVALUATION METHODOLOGY

1.2.1 Methodological Model

Figure 1 illustrates the research strategy used to conduct the HEC program process evaluation. The data-collection activities carried out in the evaluation are then further described in detail.

² Visit the HEC website for an up-to-date list of the eligible CEAs: <http://knowyourenergyscore.ca/home-energy-conservation/>

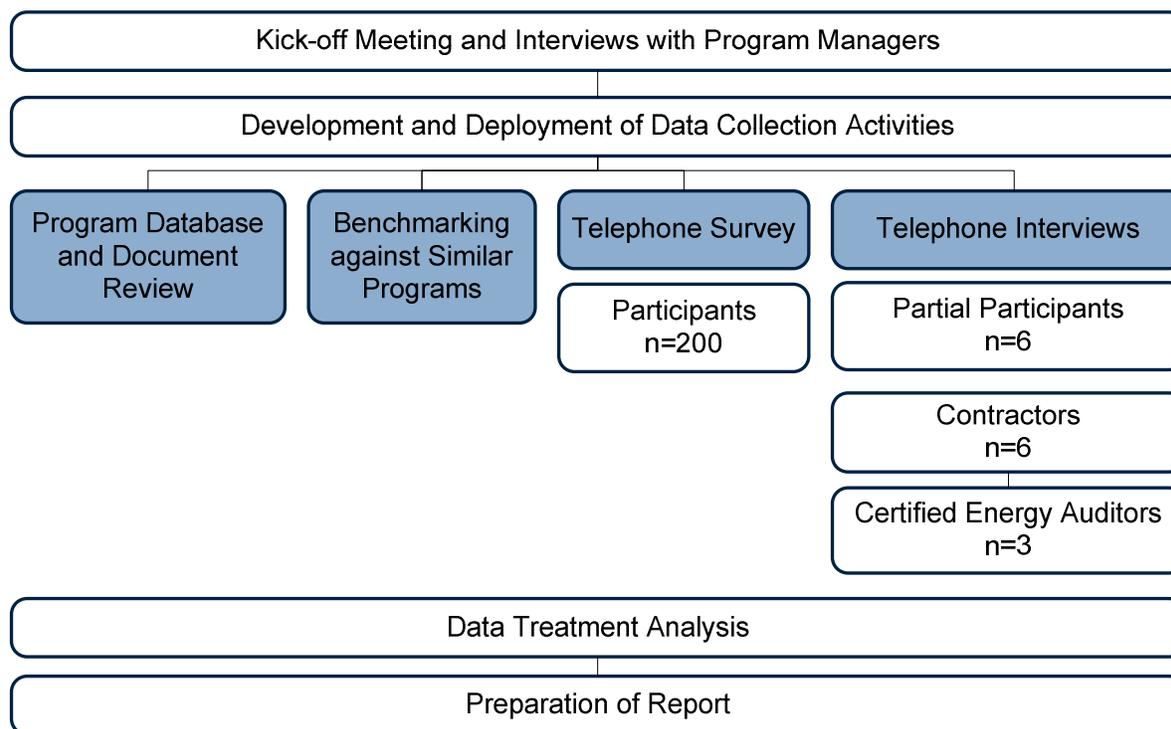


Figure 1: HEC Program Methodological Model

1.2.2 Program Database and Document Review

As part of the evaluation, the Evaluator reviewed the HEC’s program database to assess its components and mechanisms. More specifically, the review was done to achieve the following objectives:

- › To verify whether it provides the complete information needed for program monitoring and evaluation by following the industry’s best practices.
- › To assess the level of consistency among the various data-entry fields and detect abnormalities that need to be addressed.

The Evaluator also reviewed such HEC documentation as the marketing and outreach guidelines and brochures, the program’s website, logic model, and process map and participant pre-screening script.

1.2.3 Benchmarking against Similar Programs

The Evaluator conducted a benchmarking study to compare the HEC program with other similar North American residential audit programs by focusing on key design elements, such as the eligibility criteria, the incentive levels, and the measures and products rebated. The benchmarking study included an overview of the practices and approaches employed by those programs similar to HEC and the differences among these practices and approaches.



1.2.4 Participant Survey

In December 2016, CRA conducted a telephone survey with a total of 200 participants, using computer-assisted telephone interviewing technology. The average length of the survey was 16.5 minutes.

The participant survey was meant to collect feedback on the following aspects of the HEC program:

- › Sources of program awareness
- › Reasons for participation
- › Information received and upgrades recommended
- › Barriers to participation
- › Impact of the program
- › Satisfaction with the program
- › Recommendations for improvements

With 200 respondents, the corresponding margin of error at a 90 percent confidence level is ± 5.8 percent.

1.2.5 Interviews with Partial Participants

In December 2016, CRA conducted six phone interviews with HEC participants, who each had a pre-retrofit energy audit conducted for their homes more than 18 months ago, but did not complete a post-retrofit energy audit. These customers either decided not to implement any of the recommended upgrades or implemented them outside the program. These interviews were meant to collect feedback regarding the following aspects:

- › Sources of program awareness
- › Information received
- › Upgrades implemented and barriers to participation
- › Satisfaction with the program
- › Recommendations for improvements

1.2.6 Interviews with Contractors and Certified Energy Auditors

In December 2016, Econoler conducted interviews with program partners, including six contractors and three representatives of CEA organizations, to collect feedback regarding the following aspects of the HEC program:

- › Involvement in the program and satisfaction with it
- › Communication among the contractors, CEAs and EGD



- › Interaction with customers and program outreach
- › Barriers and program delivery
- › Program influence on the residential market
- › Recommendations for improvements

1.3 PROCESS EVALUATION

1.3.1 Program Participation

The HEC program has had a large uptake. From January through June 2016, a total of 2,372 projects were completed, all with their E Audit completed during this period, regardless of when the D Audit or the retrofit work was conducted.

Figure 2 shows a breakdown of completed projects by the number of the upgrades installed in each individual project. More than four out of five (83%) participants installed the minimal number of upgrades required by the program. On average, 2.2 upgrades were installed in each project.

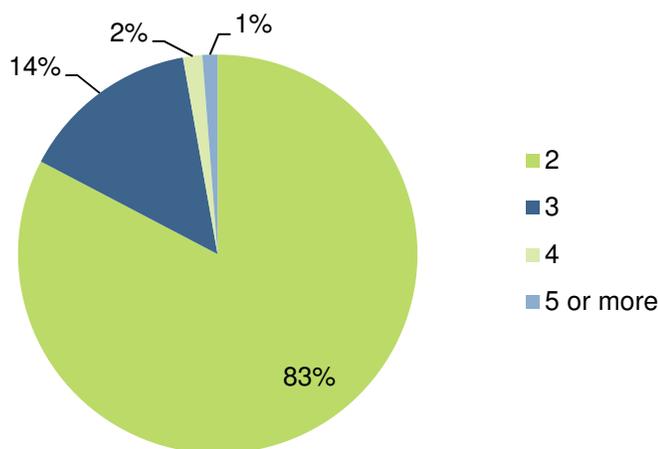


Figure 2: Breakdown of HEC Projects by Number of Upgrades in Each Project

Figure 3 shows a breakdown of participant proportions by the type of two-measure-pairing implemented by participants in fulfillment of the program requirement. Overall, the vast majority of energy-efficiency projects included a furnace upgrade (99%). The typical projects implemented consisted of a furnace upgrade along with air sealing improvement (83%).

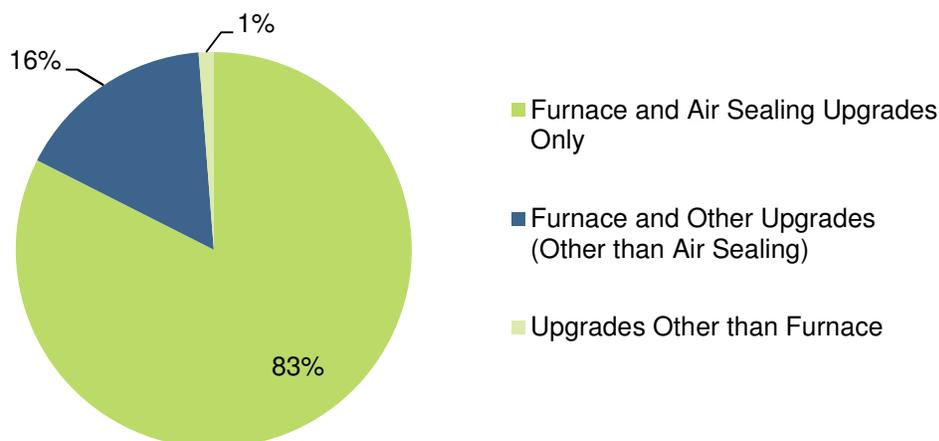


Figure 3: Breakdown of Participant Proportions by Type of Two-measure-pairing across the HEC Projects Implemented

The majority of participating houses (52%) were built between 1976 and 2000. The overall average natural gas savings achieved in a house was 1,316 m³ (an average of 30% energy savings compared to the original energy consumption). The energy savings ranged from 235 m³ to 6,277 m³.

The average time taken to complete the program process was 39 days. The shortest period occurred when the two audits were conducted in the same day or in two days in a row (2%), whereas the longest period spanned two years. Customers who did not complete an E Audit after their D Audit represent a small proportion of the program participants (5%)³, indicating a very low drop-out rate.

In the previous years, a key focus of the program was put on extending the offerings across the Enbridge franchise area and making the program available to a broader customer base. As indicated by the Evaluator's analysis of the program database, the program succeeded in extending its offerings among the wider customer base located beyond the York region, the first area targeted when the program was launched in 2012. The statistics compiled by the Evaluator based on the program's database show the following breakdown by region of the households that completed an Audit D during the January-June 2016 period:

- › 42% in the metropolitan Toronto area, including the Greater Toronto Area (GTA)
- › 27% in York region
- › 21% in Peel region
- › 8% in Durham region
- › 3% in the Niagara and Ottawa areas

³ This proportion was calculated by dividing the number of participants (563) who completed only an Audit D in 2014 or 2015 by the total number of participants who completed an Audit E during the same period (5,213 in 2014 and 5,646 in 2015).



1.3.2 Program Database and Document Review

Program Database

Good-quality data-tracking and reporting is crucial for not only effective program management but also program evaluation purposes. The Evaluator reviewed the contents of the HEC program database provided by EGD and found them overall well organized and effective. Except for certain acronyms, the program database was clear and easy to understand from a third-party perspective.

The HEC program database is an Excel spreadsheet containing data about residential customers involved at different stages of the program. The HEC program database serves as the centralized repository of the participants' information gathered from the four main Service Organizations (SOs). The Evaluator did not review the SOs' tracking reports; however, ideally, SOs should use the same template to facilitate EGD's work in consolidating the information and avoiding data-handling errors.

The program database contained five tabs, including the "Master Audit E Files" tab for customers who completed their E Audit. This tab included the participants' contact information, E Audit file number, EGD account number, house details (year built and surface area), along with the type and number of energy-efficiency upgrades implemented (air sealing, window upgrade, etc.), the SO that completed the D and E Audit, the dates the D and E Audits were conducted, and the pre and post annual gas consumption and gas savings values.

The program database also contained columns for internal validation purposes. For example, the participant's contact information is cross-referenced with EGD's SRM system (Supplier Relationship Management) before the rebate is paid. There is also a column for validating the savings results entry. Overall, the data compilation seems accurate since this validation column identified only six participants with inconsistent savings results, who represented less than 0.5 percent of all the participants in the program database.

The Evaluator noted that the status of each participant was up-to-date. The Evaluator also observed that the overall level of consistency among the various data-entry fields of the database was good. The database contained almost no irregularities, except for the energy audit dates. For example, audit date entries such as "2022" and "1901" were found and several dozens of Audits E were tracked as if they had happened before Audit D. Moreover, the dates were entered in numerous formats, using dashes or slashes, or using various orders for the day, the month and the year. The Evaluator suggests standardizing the data entry format in the SOs' template for better consistency by using, for example, an input mask. This method would make it easier to conduct analyses, such as sorting out the data, calculating the number of days separating the two dates, etc.

The gross gas savings are calculated in the database by deducting the natural gas consumption values calculated by Certified Energy Auditors using HOT2000 simulations (NRCan's accredited modelling software), before and after the energy-efficient upgrades were installed. EGD reports the gas savings results in both percentages and cubic meters. A summary tab also provides an overview



of the gas savings achieved in total for each month and by each SO. The cumulative cubic meters (CCM) of lifetime natural gas savings are also calculated along with the savings specifically associated with the furnace upgrades.

Although the main participants' information needed for monitoring purposes and conducting evaluation activities are documented in the HEC database, the Evaluator's previous experience suggests that adding the following kinds of relevant information could help improve data consolidation and management or further facilitate follow-up and evaluations:

- › The D Audit file number: The HEC energy audits are based on the EnerGuide protocol and HOT2000 software offered by NRCAN. An EnerGuide file number is usually assigned to each participant for the D and E Audits, thereby allowing NRCAN to track those simulation files. The Evaluator noticed that only the E Audit file number was included in the "Master E Audit Files" and suggests adding the NRCAN D Audit file number as well.
- › The participant's email address: Provided along with other contact information, email addresses are useful contact information which facilitates reaching participants to book visits for quality assurance or conduct other evaluation activities.
- › Incentive amount: Incentive amounts can be helpful to evaluators in selecting samples or conducting surveys. Providing respondents details about the incentive they have received following their participation in a program provides context and a prompt, especially if the participation was completed some time ago.
- › Recommended measures and savings potential: The measures installed by participants are reported in the database. Documenting the measures recommended in the audit report along with those installed can provide useful insight on program results analysis and the design of follow-up and marketing strategies. The savings potential indicated in the D Audit report could also be tracked to provide similar insights on how to better analyze and interpret program results.

Overall, the Evaluator thinks that the HEC program database works well, is consistent and contains the information needed for the evaluation and monitoring. If EGD implements the suggested improvements, the database will become even more informative and useful for enabling more effective and extensive program evaluation and monitoring in the years to come.

Program Plan

The HEC program has a plan which describes key program elements such as the rationale, objectives, implementation and marketing strategies, participation process map, and financial analysis. The program plan is well structured and contains relevant information useful for both the program staff and the Evaluator. One good element observed was the revision date on the front page, which makes it easier to track program updates.



The program plan also features an evaluation plan section. When this evaluation was being carried out, this section was left blank. The Evaluator suggests filling in the evaluation plan section with at least the following information:

- › Past evaluations: date, type of evaluation (process, market, impact or other types), internal or external evaluation.
- › Future evaluations: expected date and scope.

A logic model of the program can also be found in the appendix of the program plan. A logic model is a diagram representation of the program theory which describes how the program is expected to work and how it contributes to the intended or observed outcomes. A logic model should reflect the current program strategy and is therefore expected to evolve in order to reflect program changes and adapt to the ever-changing policy environment. Illustrating the program logic can reveal deficiencies in program focus or effort and helps ensure that all those involved know what the program seeks to accomplish. In addition, a logic model for which performance indicators have been established becomes a relevant management tool for monitoring the intended outcomes.

The HEC logic model shows the causal links between program activities and the likely outputs and outcomes in the market. Developed in 2016, it illustrates the current program strategy. As a way to improve program management, the Evaluator recommends defining and monitoring performance indicators such as the numbers of customer contacts, audits completed, awareness level, and measures installed. Since the HEC program relies heavily on the work of CEAs and contractors, it would be interesting to monitor the participants' satisfaction over time and analyze the satisfaction ratings for each of the CEAs and contractors in order to detect potential problems in service delivery and ensure a good customer experience. The performance indicators selected should be included in the program plan.

Program Marketing and Outreach

Activities undertaken by EGD, service organizations and contractors play a central role in raising customers' awareness of the HEC program and recruiting participants. The marketing and outreach activities conducted by EGD during the evaluation period included magazine advertisements, online banner advertisements, social media, bill inserts, trade shows, etc. Most of EGD's activities are directed toward customers, but some activities such as email blasts are aimed at contractors.

Generally speaking, the key messages conveyed in EGD's marketing communication included: improvements to residential customers' gas consumption resulting in the increased energy efficiency of the home, lower their energy bills, increase comfort at home, and educate the customer on the benefits of home energy conservation. One of the strengths of the marketing strategy is that it promotes not only energy benefits but also non-energy benefits.

To inform customers about the HEC program, EGD uses not only its corporate website (enbridgegas.com), but also the program's micro-site "knowyourenergyscore.ca". EGD provided



snapshots of the previous HEC micro-site associated with the evaluation period (January through June 2016), since the webpage has been modified since. The previous HEC webpage was succinct, giving an informative description of the participation process and the incentives available. However, the webpage was densely filled with texts without enough visual elements to accompany them, and the font used was quite small.

1.3.3 Benchmarking against Similar Programs

As part of this evaluation, the Evaluator conducted a benchmarking study of four Canadian and three American utilities. The Evaluator investigated the eligibility criteria, eligible upgrades, and incentive structure of residential audit programs offered in these jurisdictions. They were compared to the HEC program offered between January and June 2016. The benchmarking study was conducted to provide general insight on how other similar programs are being delivered elsewhere.

When similar programs were selected, priority was given to those targeting natural gas customers and those targeting both natural gas and electricity customers. Certain programs intended for electricity customers were also considered because these programs presented similarities with the HEC program. The Union Gas residential audit program was included to provide an overview of another natural gas energy-efficiency program offered in the province.

The following programs were covered by the benchmarking study:

- › Union Gas – Home Reno Rebate
- › Manitoba Hydro – Energy Evaluations
- › *Énergie et ressources naturelles Québec* – Rénoclimat
- › Efficiency Nova Scotia – Home Energy Assessment
- › Efficiency Maine – Home Energy Savings
- › Mass Save – Home Energy Assessment
- › Pacific Gas & Electricity Company (PG&E) – Home Upgrade, Multifamily Rebates

APPENDIX I shows a table with details about these selected programs and their main characteristics. As shown in that table, some jurisdictions offer more than one program path depending on the customer's house (single-household or multi-family units) or ownership (homeowners, landlords, or renters). This is the case with Massachusetts (Mass Save) and California (PG&E). The eligibility criteria, upgrades, and incentives then vary with the specific program path chosen and followed.

The programs feature either a performance-based design where the incentive is based on the energy savings calculated or a prescriptive design where the rebates are associated with specific energy-efficiency measures up to a maximum incentive amount. Two exceptions have been found; the Mass Save's multi-family units program path provides incentive that covers a certain percentage of the overall cost of custom projects; the Rénoclimat program in Quebec combines both designs (a house's EnerGuide score must be increased by at least one point to be eligible for prescriptive rebates). PG&E



in California offers two paths under its Home Upgrade program, with smaller projects following a prescriptive path and homeowners aiming for more than 45% energy savings following the performance-based Advanced Home Upgrade path. Since October 2015, Efficiency Nova Scotia has been offering a new incentive structure for its Home Energy Assessment program, which is meant to encourage homeowners to perform as many upgrades as possible. Under this new incentive structure, the incentive amount allowed for a specific upgrade varies depending on the total number of upgrades implemented. As the total number of upgrades implemented increases, so does the prescriptive rebate amount.

As for energy audits, performance-based programs like the HEC, Quebec's Rénoclimat, and PG&E's Advance Home Upgrade path, involve conducting both a pre-retrofit and a post-retrofit audit (D and E respectively). Other programs providing prescriptive rebates only require conducting an Audit D. This is the case for house upgrade programs in Maine (Efficiency Maine), Massachusetts (Mass Save) and California (PG&E's Home Upgrade path). On the other hand, Efficiency Nova Scotia and Union Gas offer prescriptive rebates, but still require conducting two energy audits. In Manitoba, an online energy audit provides customers with recommendations on applicable upgrades for their homes, but rebates are available through other Manitoba Hydro programs.

Each approach has its advantages and disadvantages. While a performance-based program requiring conducting two energy audits employs a more holistic approach aiming to achieve global energy savings objectives for a house, it usually leads to greater confusion among customers concerning the final incentive amount they qualify for, compared to programs offering prescriptive rebates for specific measures.

It has been found that programs targeting both energy sources (natural gas and electricity) tend to offer a variety of upgrades other than building envelope and heating measures, including one program offering free-of-charge installation of electrical upgrades, such as efficient light bulbs, water-saving devices (faucet aerators and low-flow showerheads) and advanced power strips during Audit D. Some jurisdictions provide a free-of-charge pre-renovation audit (Quebec and Massachusetts). Most jurisdictions offer a rebate, but some do not (California) and the full cost is then covered by the participants. Some jurisdictions also offer a free online energy audit to be conducted at home by consumers themselves to identify potential energy-saving opportunities for their homes.

Finally, the Evaluator has noticed that some utilities (Efficiency Maine, PG&E, and Efficiency Nova Scotia) offer additional financial support through low interest financing. A loan is granted to participants who apply for such support to enable them to conduct upgrades. Usually, the customer must meet a set of requirements to be eligible for a loan. The maximum amount varies between \$25,000 and \$30,000 and has to be reimbursed over a period varying between five and fifteen years. In Quebec, participants can be eligible for an income tax credit for their retrofit work.

1.3.4 Participant Survey

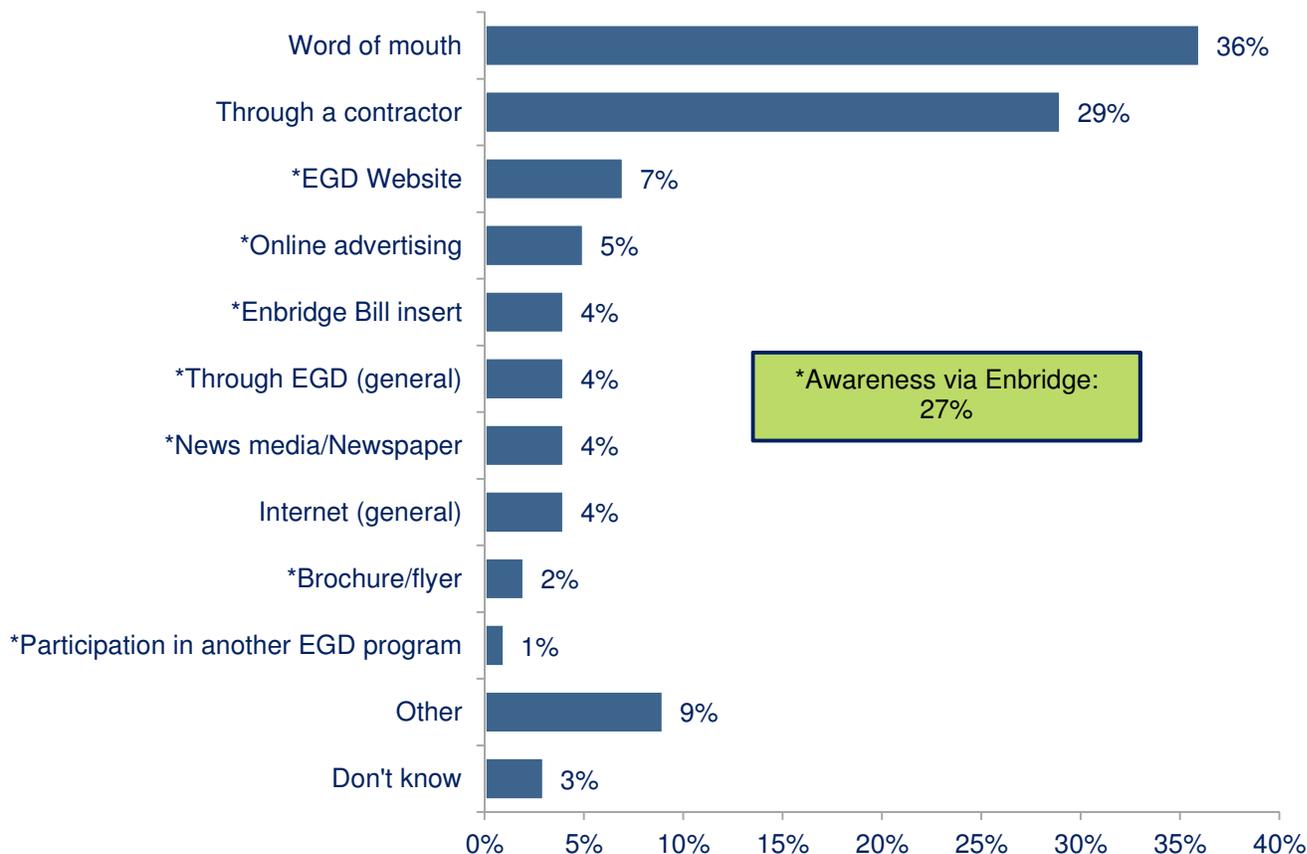


As part of the HEC evaluation, a survey was conducted with 200 participants. The following subsections present the main findings of this survey.

The single-detached house (72%) was the primary type of residence where energy upgrades were undertaken and nearly all the participants lived in their own homes (94%).

Sources of Awareness and Reasons for Participation

HEC’s participants found out about the program mainly through word of mouth (36%) and contractors (29%), which is consequent with program delivery strategy. As shown in Figure 4 below, EGD also contributed to program awareness through its website, advertising, bill inserts, or other EGD programs.



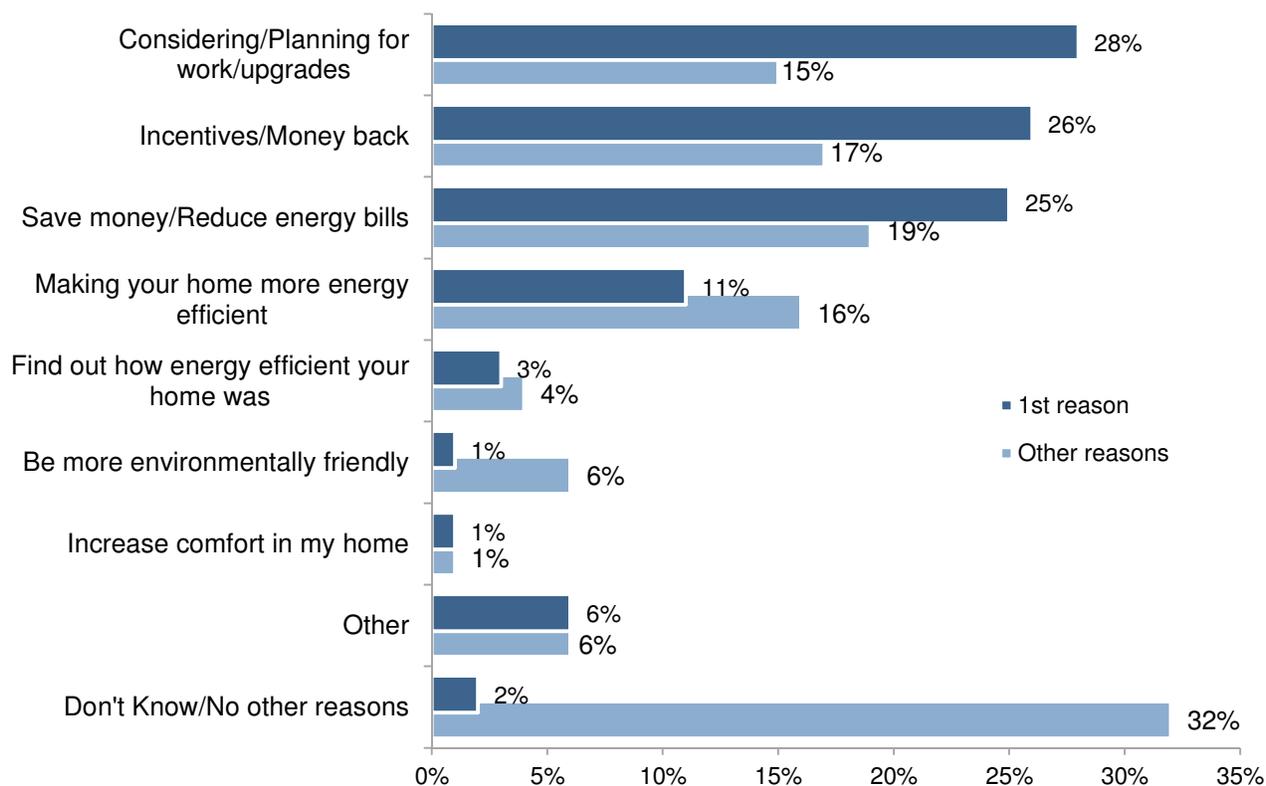
Source P1: How did you first learn about the Enbridge Home Energy Conservation Program? (n=200)
Total exceed 100% due to multiple responses

Figure 4: Awareness of the HEC Program

The three main reasons for participating in the HEC program were because customers were already considering upgrades for their homes (28%), to receive a financial incentive (26%) and to reduce their



energy bills (25%). A performance-based audit program allows engaging households who have already identified retrofit works to be done in their homes to go through a holistic approach to identifying all the energy-efficiency improvement opportunities in their homes.



Source P2: Now I'm going to ask you to think back to when you decided to participate in the program. What was the SINGLE most important reason you were interested to do so? (n=200)
 Source P3: Were there any other reasons? (n=200)
 Total exceed 100% due to multiple responses

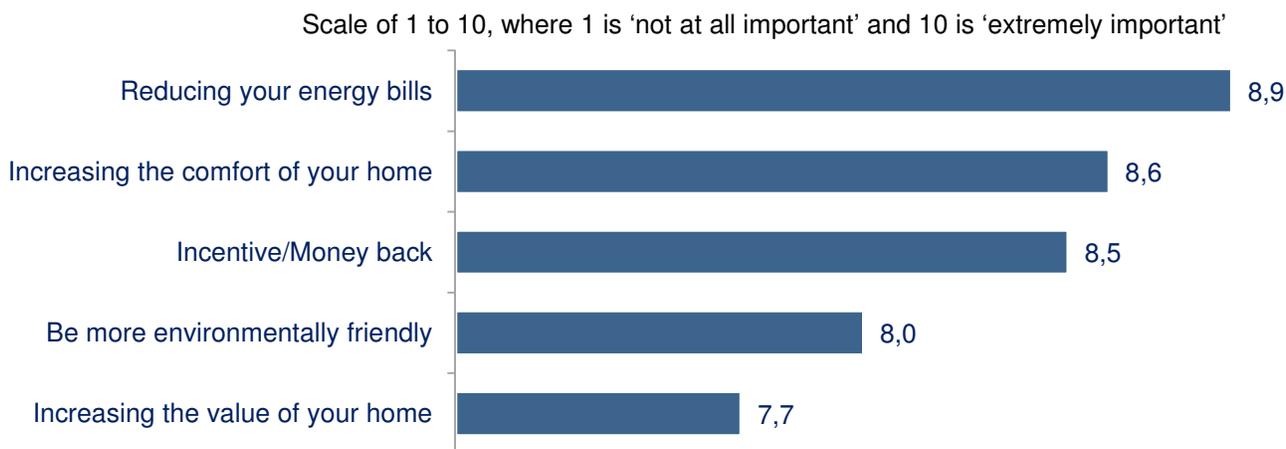
Figure 5: Reasons for Participating in the Program

Participants were asked to rate the importance of the reasons in influencing their decision to participate in the program. As shown in Figure 6, the participants provided a high average rating for three of the five reasons assessed, namely reducing their energy bills (8.9/10), increasing the comfort of their home (8.6/10) and getting an incentive or money back (8.5/10). Being environmentally friendly and increasing the value of their home received a somewhat lower average rating (8.0/10 and 7.7/10 respectively), but were nonetheless considered as having a big influence on their decision by a significant proportion of the participants surveyed.

These survey results indicate the appropriateness of the messages conveyed by EGD's when promoting the HEC program. Indeed, the marketing messages about such themes as the reduction of energy bills, the possibility of earning incentives, the reduction of the home's impact on the



environment and increasing home comfort are all popular and persuasive arguments among the participants interviewed. In program communication, a bigger emphasis could be put on the theme of greater comfort at home due to its great importance for participants, as shown in this survey’s findings.



Source P9a-e: On a scale of 1 to 10, where 1 is 'not at all important' and 10 is 'extremely important', how important, if at all, were the following when deciding what upgrade(s) to make to your household? (n=200)
Don't know removed from calculation

Figure 6: Reasons Influencing Decision-making on Home Upgrades

Information Received through the Program

Among the participants, 90 percent recalled having received information about their homes’ energy consumption and recommendations on energy-efficiency upgrades they could install. As for the energy audit report, 72 percent recalled having received an audit report from the CEA, while 28 percent did not recall or reported having received none. Among those who reported receiving the energy audit report, 83 percent read it.

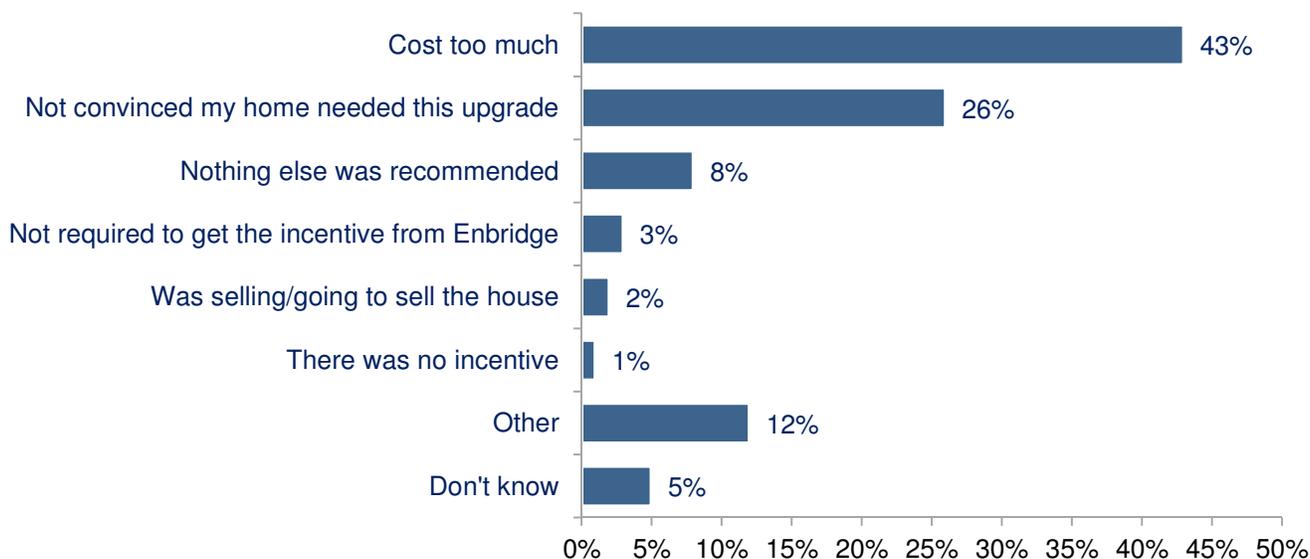
The survey results suggest that improvements could be made to inform program participants about their homes’ new energy performance after the upgrades are implemented in their homes. In fact, only 37 percent of the participants said they had received a new energy-efficiency rating for their home, while 31 percent said they had not received it and 33 percent did not remember receiving any information about their new energy-efficiency rating.

Upgrades Recommended and Barriers to Participation

As mentioned in Section 1.3.1, the majority of participants implemented only two upgrades in their home as part of the HEC program. Among these participants, 44 percent had considered implementing more than two upgrades at a certain point in their participation process, while 46 percent had not considered this option. The respondents explained that they had not implemented more upgrades mainly because of the high cost of the upgrades and their belief that their home did not need



these upgrades (see Figure 7).



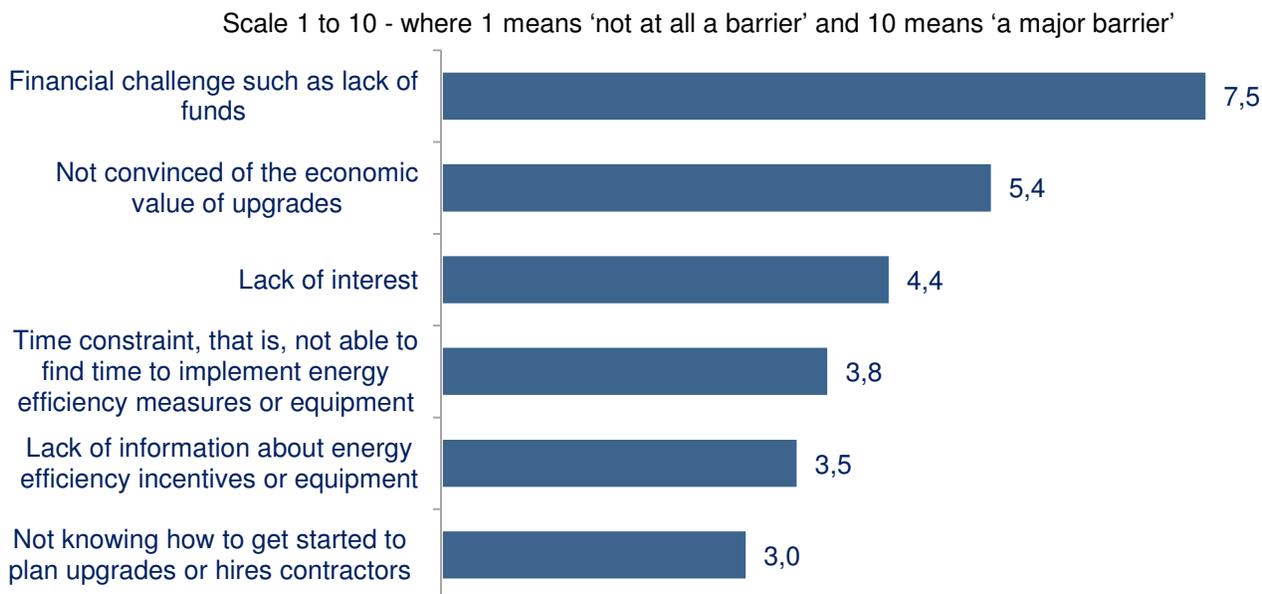
Source U5b: What was the main reason you decided not to implement more than two upgrades through the program? (n=145)

Base: Participants who implement only two upgrades

Figure 7: Barriers to Participation

Respondents were asked to rate six barriers so that the Evaluator could gain a better understanding about what had prevented the participants from implementing some of the recommended upgrades for their home. As shown below, financial challenges such as a lack of funds were seen as the biggest barrier by participants, followed by the scepticism about the economic value of the upgrades.

The survey responses about these barriers highlighted the valuable role that a program such as HEC can play in providing participants with financial incentives and the energy audit report illustrating the potential cost-effectiveness of the recommended upgrades.



Source U3a-f: Now, I would like to ask you about the reasons why you chose not to implement those upgrades. I will read you a list of barriers and for each one, please answer on a scale of 1 to 10, where 1 means 'not at all a barrier' and 10 means 'a major barrier'. (n=61)

Don't know removed from calculation

Base: Participants who chose to not implement some of the upgrades recommended

Figure 8: Reasons for Choosing Not to Implement the Upgrades Recommended

Impact of the Program

The program had a big impact in terms of educating customers about energy efficiency. More than four out of five participants (87%) felt they knew more about their home's energy efficiency after participating in the program (with 61% reporting "very much more" and 26% reporting "a little more").

Thanks to the information received through the program, the participants reported that they were now more aware of power usage. Indeed, 75 percent of participants surveyed reported that the program changed their perspective on how to use energy at home, by a little bit (with 39% reporting) or a lot (with 36% reporting).

Three quarters of the participants (77%) also noticed an improvement in the comfort level at their home, which is a high proportion considering most of them implemented the upgrades less than one year ago. The following improvements were mentioned:

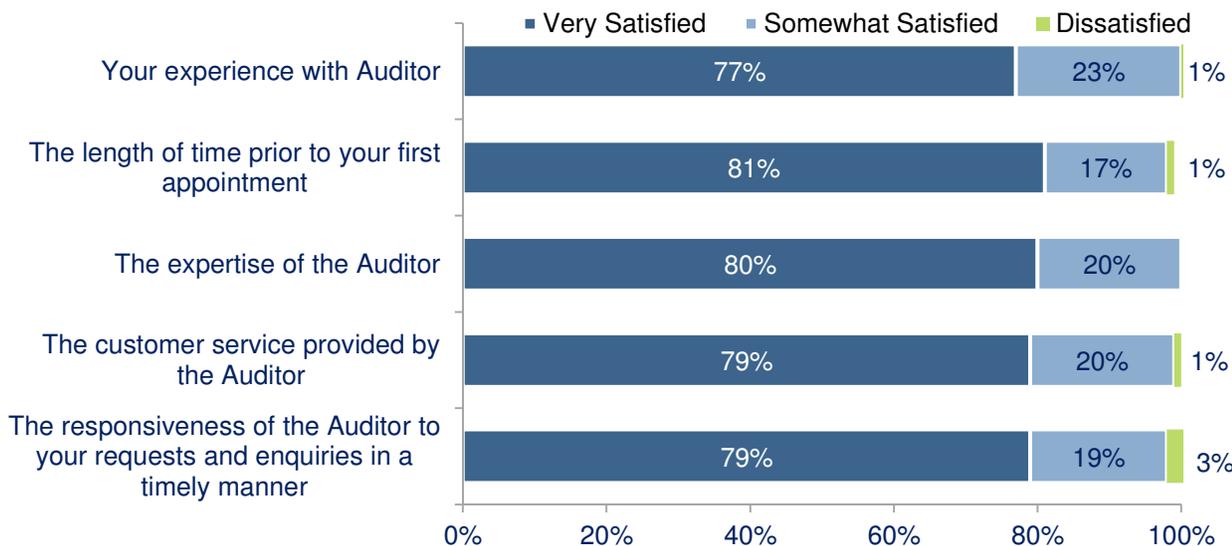
- › Even temperatures throughout the home (33%)
- › Warmer house (33%)
- › More comfortable temperature throughout the home (14%)
- › Noise reduction (14%)



Experience with the Certified Energy Auditor

All the participants were satisfied about their overall experience with the CEA, with the majority (77%) reporting being very satisfied.

Respondents were asked about their satisfaction with specific aspects of their contact with the CEA. As displayed in the chart below, nearly all the participants were satisfied with the length of time allowed to complete the upgrades, the expertise of the CEA, the customer service provided by the CEA and the CEA’s responsiveness to their requests and enquiries.



Source S5f -S6a-d: Now talking about your experience with the Certified Energy Auditor – How satisfied would you say that you are with...(n=200)
Don't know and not applicable removed from calculation
The total may exceed 100% due to rounding.

Figure 9: Satisfaction with the Certified Energy Auditor

Satisfaction with the Program and its Aspects

HEC achieved a very high level of satisfaction. Indeed, nearly all the participants were very satisfied (71%) or somewhat satisfied (25%) with HEC overall. The two primary reasons cited by the participants for their satisfaction were because they reduced energy bills (28%) and they received an incentive (28%) for implementing energy upgrades. Others noticed an improvement in comfort at home (14%); they found that the HEC was a great program and offered great upgrades (13%); and they found their home more energy-efficient (12%).

“I saved money on the monthly bill and the house is warmer”.

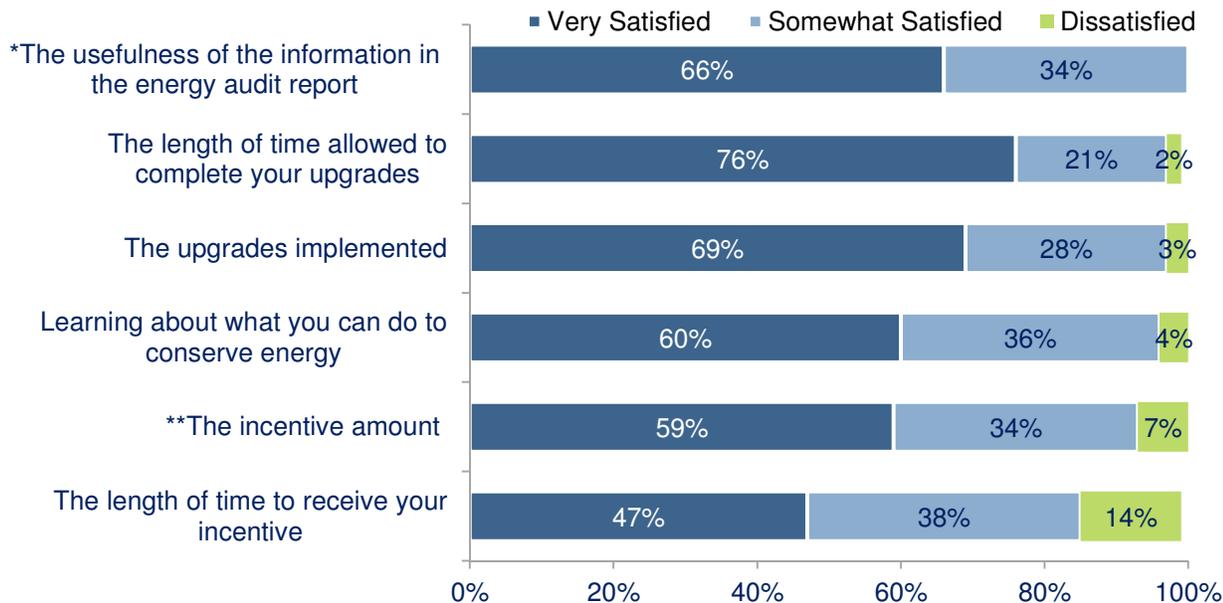
“I saved a lot of money on the work done. I would not have done it if it weren't for the program”.

“I think the program helped me a lot. The auditor gave me useful information for my home”.



Among the few participants reporting being less satisfied, some had not noticed any savings or reduction of their energy bill (5%); others could not afford to implement all the upgrades (5%); and the incentive was deemed too small (5%).

Respondents were asked about their satisfaction with specific aspects of HEC. As shown in the chart below, the participants were mostly very or somewhat satisfied. All the participants who read their energy audit report were satisfied with the usefulness of the information in the report. The survey results also showed a high level of satisfaction with the length of time allowed to complete the upgrades, the upgrades implemented and the information about how to conserve energy. The incentive amount and length of time to receive it generally received positive ratings, although somewhat less positive than those received by other program aspects. Some dissatisfaction toward incentive amounts and their processing time are common in all program evaluations.



Source S5a-e: How satisfied would you say that you are with the following aspects of your participation in the program? How about... (n=200)

Don't know and not applicable removed from calculation

* Base: Participants who read the energy audit report

** Base: Participants who had received their incentive from EGD at the time of conducting the survey

Figure 10: Satisfaction with Aspects of Program Participation

The participation process seemed easy for the majority of participants, with 69 percent considering the process as “very easy” and 21 percent as “somewhat easy”. The small number of participants who reported having difficulties in taking part in the program mentioned that there was a lack of information (3 respondents), the participation process took too long (2 respondents) and there were too many steps or people involved (2 respondents).



Based on their personal experience with the program, nearly all the participants (97%) said that they would recommend the program offered by EGD to others. This result is consistent with the high satisfaction level described previously.

Recommendations for Improvement

Over a half of the participants had no recommendations on how to improve the program (56%). The participants who did make suggestions recommended advertising the program more or in a better way (9%), offering higher incentives (9%), offering more information on the products or upgrades recommended (6%) and improving communication such as better follow-up (6%).

1.3.5 Interview with Partial Participants

This section discusses the results from six in-depth telephone interviews conducted with homeowners who had initiated participation in the HEC program, but then did not complete the final audit. Four of the respondents lived in single-detached homes and two in semi-detached. Except for one respondent, the participating homes were where the respondents lived themselves.

Sources of Awareness

One of the first interview questions asked about how the respondent had first learned about the HEC program. The sources of awareness are similar to those found in the participant survey (section 1.3.4). Three of the six partial participants reported hearing of the program through a contractor as they were planning to have some work done. One respondent mentioned hearing about the program from a friend and another learned about it from an EGD bill insert. Other sources each mentioned by one respondent were a newspaper advertisement, a Google search for rebates and a Toronto municipal website.

The contractor was also mentioned as a source of influence on the decision to have an energy audit conducted through the HEC program. Three respondents said that the decision was made following a discussion with their respective contractors. One said it was suggested by the insurance company so that this company could assess the home's value using some of the audit findings such as how well it was insulated.

Information Received through the Program

All the respondents said a CEA informed them about their home's energy consumption and provided recommendations on energy-efficiency upgrades. According to respondents, the CEA usually pointed out issues observed during the audit in the homeowner's presence. Then, the CEA sent a written report covering these same issues. Of the six respondents, four reported receiving an energy audit report; one reported receiving a verbal summary; one could not remember. When asked if they read the energy audit report, three said they had. However, it seemed that these reports contained information similar to what the CEA had shared with the homeowner during the audit; so, the report was really quickly browsed.



Only one of the respondents mentioned having questions that the CEA or EGD could not answer. This homeowner wanted some assurance that he would definitely receive the rebate after completing the upgrades; neither the CEA nor EGD offer that guarantee.

Upgrades Implemented and Barriers to Participation

Of the six respondents, five said that they had implemented or were implementing some of the recommended energy-efficiency upgrades. One respondent who was skeptical about the validity of the recommended upgrades decided not to install any of them, thinking that some retrofits had recently been done (insulation) and there was no need to repeat them. In addition, he was not sure that he would receive any rebate even if he completed the recommended upgrades.

The following table lists the upgrades completed by all the respondents except one. This list also includes the upgrades that one respondent was still working on at the time of the phone interviews.

Table 1: Upgrades Implemented

Upgrade	# Who Have Implemented
Wall Insulation	2
Attic Insulation	3
Exposed Floor Insulation	1
Basement Insulation	2
Drain Water Heat Recovery System	0
Water Heater Tank	2
Windows	2
Air Sealing	4
High-efficiency Furnace	4

As previously noted in this report, contractors had a strong influence. This influence can be seen in the number of high-efficiency furnaces installed; four of the six respondents each had a high-efficiency furnace installed. Air sealing was also mentioned by four of the six respondents.

The participants who completed (or were completing) upgrades were asked to rate the level of influence that the audit and the report had on their decision on a scale from 0 to 10 (with 0 indicating “no influence” and 10 “a great deal of influence”). One respondent indicated that there was no influence (with a rating of 0), since he was already considering doing the exact same ones. Two indicated that there was some influence (with both giving a 5) and particularly some influence on the smaller upgrades such as air sealing. One indicated that the audit and the report were highly influential (with a rating of 8).

Among the various reasons cited for not completing the second audit varied; two consistent themes were identified. Two of the respondents had not completed all the recommended upgrades and as a result, they did not think it was worthwhile to complete the second audit. Two respondents mentioned



difficulties with scheduling. One of these two said that the second audit was booked, but the CEA never showed up; the other said it was difficult to schedule the second audit. The remaining two respondents had not yet tried to complete the second audit; one was in the process of completing most of the upgrades and the other decided not to install any upgrades.

Experience with the Certified Energy Auditors

The respondents were asked to evaluate their satisfaction with their CEAs on the attributes shown in the Table 2 below. There was mixed reaction to the question of the CEA’s responsiveness. Three of the respondents said they were very satisfied with the responsiveness and the other three were somewhat dissatisfied (two) or very dissatisfied (one). One of the respondents giving a lower rating had a delay on the project and tried to reach the CEA to see if it would be possible to have an extension. Another said the CEA did not come at the scheduled time and was then difficult to reach. The issues with responsiveness occurred toward the end of the participation process rather than at the beginning. This issue was not mentioned in the participant survey results, which showed quite a high level of satisfaction with the CEA’s responsiveness to the participants’ requests and enquiries.

The wait time between the first contact and the visit received good ratings, with most respondents reporting “very satisfied” and one reporting “somewhat satisfied”. Most reported that the CEA’s visit happened within a week following the contact.

Table 2: Satisfaction with Certified Energy Auditors

Title	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	Not Applicable / Do not Know
The responsiveness of the CEA to your requests	3	0	0	2	1	0
Length of time prior to first appointment	4	1	0	0	0	1
Expertise of the CEA	3	0	0	1	1	1
Customer service provided by CEA	4	0	0	1	1	0
Experience with CEA	4	0	0	0	2	0

The CEA’s expertise was given a “very satisfied” rating by three of the respondents. Two reported being dissatisfied (one “somewhat dissatisfied” and one “very dissatisfied”) because one CEA never showed up at the scheduled time, and the other was skeptical about the recommendations made by the CEA from the very beginning.

The same two respondents who expressed dissatisfaction with the CEA’s expertise were dissatisfied with the customer service and their overall experience with the CEA. All the other four respondents



were very satisfied. At least two respondents noted that there was a follow-up/reminder from their CEA as they approached the deadline to complete the final audit, which they appreciated.

Satisfaction with the Program and its Aspects

The respondents were also asked to rate their level of satisfaction with three aspects of the program. Learning how to conserve energy was the highest rated element of the program. Three said they were very satisfied and two said they were somewhat satisfied.

The time allowed to complete the upgrades was an issue for three of the respondents, who had not completed their upgrades in the time allowed. They were somewhat dissatisfied (two) or very dissatisfied (one). The other two respondents said they were very satisfied with the time allowed.

As mentioned previously, the energy audit report often only received a cursory review from the respondents. Not surprisingly, the satisfaction ratings were then not that strong: three respondents said they were somewhat satisfied with the audit report; one was very satisfied; and one was very dissatisfied.

Table 3: Satisfaction with HEC

Aspect Rated	Very Satisfied	Somewhat Satisfied	Neither	Somewhat Dissatisfied	Very Dissatisfied	Not Applicable
Learning how to conserve energy	3	2	0	0	1	0
Time allowed to complete upgrades	2	0	0	2	1	1
Usefulness of energy audit report	1	3	0	0	1	1

Of all the six respondents, four said it was very easy to take part in the HEC program; one said it was somewhat easy, and one said it was very difficult because he had not yet completed the program participation steps due to the difficulty in reaching the CEA to complete the final audit. The CEAs interviewed did mention how particularly busy they were over certain periods of the year, especially in the fall when many participants try to complete their audit E before the end of the year.

Recommendations for Improvement

Toward the end of the interview, respondents were asked to make recommendations on how to improve the HEC program. Two questioned the program deadline for completing the projects and thought it should be extended. In fact, they wondered if it was still possible for them to complete the program following the retrofit work they had done. One respondent did not make any recommendations. Other recommendations from the participants’ perspectives are listed below:

- › The program should allow smaller projects, like air sealing, to be completed by the homeowner as long as the final inspection confirms that the work has been done.
- › Thermal spectrographic imagery should be included.



- › More follow-up should be performed by EGD to ensure that final audits are completed.
- › EGD should guarantee that if the work is done, then homeowners will definitely receive a rebate.

None of the respondents said that they were so discouraged by their experience that they would avoid participating in future EGD programs, although several said that they would be more cautious in their future participation. Two said they were very likely to participate in a future program, three said they were somewhat likely and one said “neutral”. All the respondents said their future participation would depend on the specifics of the program and how it applies to them. The two respondents who gave the most negative evaluation of the program and the CEA said that they would want a guarantee from EGD that if they install upgrades, then they will be granted the rebate.

1.3.6 Interviews with Contractors

This section presents the findings from six in-depth interviews with contracting companies that implemented HEC projects between January and June 2016. The interviews were conducted with sales, marketing and installation managers in these companies (hereafter referred to as contractors). All the contractors interviewed mainly implemented HVAC measures.

It is worth noting that the findings discussed in this section have been made based on the interviews with those contractors who accepted to answer the Evaluator’s questions and they may not represent the points of view of all the other contractors. During the process of booking the interviews, some contractors refused to be interviewed and expressed deception or animosity toward the program. A contractor said they did not want to have anything to do with the HEC program. Another said there was not much to say because the only thing they had done was to provide a CEA with the contact information of those customers interested in receiving a rebate for a furnace. One contractor said they had not succeeded in recruiting any customer for the program, mostly because of the program’s demanding requirements; however, it seems that this contractor did not have a good understanding of the program’s requirements.

Program Awareness and Satisfaction

The interviewees were involved in the program for various periods of time, starting from the beginning of 2012 up to the spring 2016. They first learned about the HEC program from EGD, a CEA, or by word of mouth from other contractors. One contractor reported taking the initiative to visit EGD’s website and contact a CEA to start getting involved in the program. Two contractors reported being very familiar with the HEC: one has been involved since the program was launched; and the other has had direct contact with EGD. The four other contractors said they were somewhat familiar with the program.

Overall, all the contractors reported being either very satisfied or somewhat satisfied with the program and its different aspects. Half of the contractors were very satisfied with the eligibility requirements, while the other half were somewhat satisfied. Four contractors were somewhat satisfied with the HEC incentive structure, while the two others did not express any concern on this topic. Costs alleviation,



energy savings, efficient management, and the whole-house energy efficiency approach (domestic hot water, heating, and insulation) were cited as the HEC program's strengths.

Communication with Certified Energy Auditors

All the contractors received information from CEAs about the HEC program, mostly regarding eligibility requirements or changes to the program. One contractor reported having received training. The contractors received promotional materials from CEAs, but these materials were mostly for internal use and were not distributed to customers. Three contractors said they would like to receive additional information, such as technical information about audits or details about the upcoming changes to the program. Brochures were mentioned as something that would be useful for distributing and better informing customers, instead of only relying on face-to-face talking with customers.

The contractors indicated that they were very satisfied with their relationship with CEAs. Most of them established a good working relationship with CEAs over time. The CEAs were described as available, professional, knowledgeable, and able to complete their work on time. The few limited concerns cited were related to delays in file processing, which was also considered as beyond the CEAs' control.

Customer Interaction and Program Outreach

According to the contractors interviewed, generally customers did not know about the HEC program before meeting with them. Homeowners who were already aware of the HEC program had received EGD's promotional materials or had been informed by other contractors when gathering quotes from multiple contractors. Indeed, as indicated by the participant survey findings, one third of the participants first heard about the program through a contractor. All the six contractors promoted the HEC on their organizations' websites without using any other promotional materials. They generally referred customers to EGD's website or relied on the CEAs to provide more information downstream.

Half of the contractors reported promoting the HEC program among all their customers. The other half reported promoting the program only among those customers who were potentially eligible, for example those homeowners with no high-efficiency furnace. One contractor recommended different types of equipment depending on whether the customer was an HEC participant or not, namely by recommending higher-efficiency yet less affordable furnaces to participants. The other five contractors mentioned they recommended the same equipment to all the customers, because most furnaces in the market are now high-efficiency or because the contractor believed in introducing customers to the best technology option regardless of their participation in a program.

Generally, the contractors did not think that it was their role to help customers decide on the kinds of upgrades to implement. It is well understood that it is the CEA's responsibility to recommend energy-efficiency upgrades. One of the contractors said it was possible providing customers with explanations about a second or a third potential measure, but no recommendations. However, the contractors did report assisting customers in selecting higher-efficiency furnaces among their products. Other roles



mentioned included facilitating communication between customers and CEAs, and providing information on incentives available and energy savings.

Overall, once a customer learned about the existence of the program, contractors relied on CEAs to provide detailed information about the HEC program and other upgrades than a furnace. The contractors provided customers with a CEA's contact information, or provided a CEA with customers' contact information.

Barriers and Difficulties Related to Program Delivery

According to the contractors interviewed, there were overall few complaints from the participants. The few complaints received concerned the visual aspect of an upgrade which did not meet the customer's expectation, installers leaving debris behind, costs of upgrades, or delays in receiving the incentive.

Three contractors mentioned that some customers were concerned about the possibility of their energy savings failing to meet program requirements. According to these three contractors, customers are: (1) often reluctant to spend money without being given a guarantee that they qualify for an incentive and (2) confused about the amount of incentive available, since it is based on the increase in energy efficiency (performance-based) instead of the upgrades installed (prescriptive based). This worry was also echoed in the CEAs' comment that performance-based programs are usually less instinctive since energy efficiency is not well understood by the general public. Even after having been involved in the HEC program for a number of years, one of the contractors indicated that the eligibility requirements were vague and that it was difficult to explain to potential participants why it was necessary to implement a second upgrade, along with the furnace upgrade, to be eligible for the HEC.

Program Influence

Five contractors described EGD's implementation of efficient furnaces as highly influential (but could not comment on other upgrades as they were HVAC contractors). They considered the program helpful in (1) increasing the number of high-efficiency units sold in the market; (2) encouraging customers sitting on the fence to install a furnace upgrade, and (3) educating customers about energy efficiency's benefits. One contractor specified that since EGD is a "big name", the company's energy-efficiency efforts encourage the market to adopt more efficient technologies or measures.

Most contractors also made positive comments on the program's impacts on their respective organizations, saying that the HEC program served as an additional marketing tool, provided them with a competitive advantage in the market, and helped generate a higher volume of sales. However, one contractor said that they did not see any impact on the market from the HEC program since the company decided to target those market segments covered by other energy-efficiency programs which generate more business and more interest among homeowners according to this contractor.



Contractors' Recommendations for Improvements

In addition to the recommendations on increasing the incentive available and reducing the time needed to process participants' files, contractors made other suggestions for improving the HEC program regarding marketing and program delivery.

The contractors expressed some concerns about the fact that contractors are practically the main program driver. Of the contractors interviewed, three voiced the opinion that increasing program awareness among EGD customers before they meet with a contractor would help improve their understanding of the HEC's whole-house approach. Contractors are excellent sales people, but since they promote a specific type of measure, this can easily lead to the impression that HEC is more of a prescriptive program featuring the installation of high-efficiency furnaces. This view was also shared by CEAs, whose points of view are further detailed in the next section.

In addition, these three contractors noticed that some customers were confused about the program. According to these contractors, customers can easily understand the program's process and requirements when these are properly explained to them; but they can get confused when they receive wrong information from other contractors. Such contractors might have tried to take advantage of the program to complete more sales or might not have been familiar with the program's requirements. The three contractors recommended that simple promotional materials be developed and provided to contractors to be handed out among customers instead of relying on verbally provided information only.

1.3.7 Interviews with Certified Energy Auditors

This section discusses the findings from three in-depth interviews with program partners. The interviews were conducted with representatives of CEA organizations.

Involvement in the Program and Satisfaction with It

All the respondents were involved in the program for at least three years and indicated high overall satisfaction with HEC, especially with its current format. CEAs were aware of EGD's recent efforts to secure program funding for the coming years and improve communication and program management. However, two CEAs still considered their own involvement in the program as complicated. The reasons for this include the program's many facets and various people involved as well as a feeling that EGD does not really use the CEAs' full capacities. One respondent added that the CEAs know their job, but think that EGD does not really understand how to make the best use of the services offered by CEAs.

All the CEAs were either very or somewhat satisfied with the HEC's eligibility requirements and incentive structure. Concerning eligibility, similar to a contractor, a CEA expressed discontent that the age of the furnace was not taken into consideration along with the efficiency level. As for the incentive



structure, one respondent mentioned that the incentives were low compared to those offered by similar programs.

One CEA was very satisfied with the marketing and outreach activities initiated by EGD, while two CEAs were somewhat dissatisfied. One CEA was concerned about the fact that traditional marketing channels are highly saturated and may not be the best way to promote the program. Therefore, it was mentioned that the marketing needs to be more streamlined and focus on channels where it is possible to create the greatest impact with a limited amount of funding. One CEA expressed some dissatisfaction with the fact that EGD targets HVAC contractors to drive the program instead of targeting directly customers. This CEA agreed that contractors are a sort of “low-hanging fruit” to help promoting the program, but mentioned that EGD should direct more marketing efforts toward homeowners. According to this CEA, the HEC program would be more what is it meant to be, i.e. a whole home approach, if the process was initiated more by homeowners and CEAs, instead of by HVAC contractors who promote their products (furnaces). A similar opinion was also expressed by some contractors. This CEA mentioned that furnace upgrade is a good way to generate energy savings, but it does not represent a whole-home approach; in this way, it is harder for CEAs to suggest additional upgrades after contractors promote high-efficiency furnaces and clients mainly consider this upgrade.

Overall, CEAs mentioned that the HEC’s strengths include resource allocation, communication with program partners and streamlined administration. CEAs also appreciated the fact that, as a performance-based program, the HEC revolves around increasing energy-efficiency knowledge among customers.

Relationship with Enbridge Gas Distribution

All the CEAs were very satisfied with their communication and relationship with EGD. The CEAs mentioned that they were in regular contact with the HEC team, which offered plenty of opportunities to provide input. CEAs felt they were listened to by EGD and appreciate EGD’s good understanding of the business challenges and long-term vision, which was not observed as much when the initiative was led by NRCan. One CEA doubted, however, how the feedback provided was really considered and implemented by EGD.

All the CEAs were very or somewhat satisfied with the information or training received from EGD on all the aspects of the program. Two of the CEAs actually mentioned they provided more training to EGD than they received from it. One CEA suggested setting up a score card covering target metrics to be reviewed at a monthly meeting as a way to create more accountability without changing targets too often. Another CEA mentioned he would like to bring the HEC team to witness an energy audit and better understand a CEA’s daily work and services to together brainstorm solutions to improve the program.



Communication with Contractors

Each CEA worked with a big number of contractors (a few hundred altogether). Overall, CEAs were satisfied with their relationship with most contractors, especially those that were well trained and understood the program and its benefits. The relationship was described as symbiotic as CEAs and contractors both benefit from each other's work. The CEAs mentioned, however, the issue that some contractors (about 10%), mainly HVAC contractors, impart the wrong expectations among homeowners and describe the incentive as automatically available, which creates disappointment and confusion among potential participants. The majority of the audits are set up with the help of contractors and CEAs were somehow concerned whether this constitute a challenge to fully delivering the program by following its whole-home approach.

Interaction with Customers and Program Outreach

The CEAs interact with customers mostly following a first contact between customers and contractors. The other customers' interactions are a result of word-of-mouth and EGD's mass-marketing activities where homeowners contact CEAs directly. As for program outreach, CEAs mostly target contractors using brochures and one-page flyers, which are provided by EGD or produced by the CEAs and approved by EGD. CEAs do not really take part in program outreach activities involving homeowners. One CEA mentioned that EGD's promotional materials had not been produced on time, which was the reason why this CEA's organization produced its own marketing materials.

The CEAs view their role as critical for providing homeowners with recommendations on how to make their homes more energy-efficient, help them qualify for the program and obtain the maximum incentive. It was mentioned how CEAs do not necessarily help select the upgrades, since there is a fine line between encouraging upgrades and being a salesperson. The homeowners' decision on which upgrades to select among the ones recommended in the energy audit report depends on budget availability and the information first received from contractors. All the CEAs mentioned that they discuss energy efficiency with homeowners. According to the CEAs, those participants that contact a CEA after hearing about the program from EGD's marketing activities (instead of from HVAC contractors) are generally more receptive to recommendations about additional upgrades beyond what was initially considered as retrofits.

The main follow-up with participants conducted by CEAs after the first energy audit is the energy audit report. CEAs do not conduct further follow-up, though they answer questions when homeowners inquire about their energy audit report and recommended upgrades.

Barriers and Difficulties Related to Program Delivery

The CEAs pre-screen homeowners to determine their eligibility. According to the CEAs, the proportion of homeowners that do not qualify after the pre-screening process is usually small. About 5% to 10% of customers who are first in contact with a contractor, which is often the case, do not qualify. The contractors were said to be helpful in the pre-screening process. The proportion of homeowners who



contact a CEA first (before getting in touch with contractors), but do not qualify for the HEC, was higher (as much as 50-60% of customers calling to investigate about the program according to CEAs). The reasons for customers failing to qualify include already having a high-efficiency furnace and living in a relatively new house (therefore without the potential for achieving the minimum savings). Also, not all the customers who qualify after the pre-screening participate in the program because of budget availability, postponed participation to a time when it would be more convenient to undertake renovations, or a lack of interest for implementing another upgrade along with the furnace upgrade.

According to the CEAs, few customers (less than 5%) do not achieve the necessary savings and therefore do not qualify for an incentive after completing Audit E. If this is the case, it is usually due to a change in circumstances since Audit D had been conducted. In general, the CEAs found that those customers who had completed an Audit D to be receptive to recommendations for additional upgrades, though in reality many do not implement more than two upgrades because of the costs.

The CEAs' experience suggests that the least popular upgrades include (in no particular order):

- › Main floor wall insulation, basement insulation and windows, since they are more expensive and require more commitment from the homeowner to undertake such upgrades
- › Heat recovery ventilation and water heaters, since they are more expensive measures and the existing systems usually work well.
- › Drain water heat recovery as it is easier to install in a new home than as part of a retrofit,
- › Exposed floor, since it does not generate many savings by itself unless it is part of a much larger renovation project.

According to the CEAs, some elements of the HEC program are not well understood by participants. All the CEAs mentioned that participants are usually confused about energy savings and energy efficiency in general. For example, some homeowners wonder how a CEA could provide recommendations on how to improve their house's efficiency without looking at energy bills. It is usually easier to understand prescriptive programs, and especially the level of incentive to be received. As for the complaints about the HEC program, the CEAs received few of them. However, some participants inquired if their file had been processed or asked when they would receive their incentive. It was mentioned by one CEA that, though it is not easy to deliver performance-based programs and there is still room to improve the HEC's program delivery, such a program is very helpful and highly valuable.

Program Influence

The CEAs presented various perspectives on the program's influence on the residential market. According to one CEA, the HEC program has a very positive impact on the market as performance-based programs can provide participants with a better understanding about energy efficiency and savings, and such a better understanding would not be achieved through prescriptive programs.



However, according to another CEA, considering the size of the program and the size of the residential market, the HEC program has a very limited influence on the overall market.

As for insulation, one CEA considered the program have much influence on the popularity of this measure as the program can easily persuade customers to install insulation in their homes, while another one mentioned it is somewhat influential since this measure is not visible and not that easy to understand. They commented that people know there is already insulation in their walls and would question why there is a need for adding more.

As for air sealing, two CEAs thought the program have a big influence on the implementation of air sealing in homes as this measure is easy to understand and implement even by participants themselves. Although air sealing received large uptake among program participants, one CEA mentioned that the measure's energy savings impact might be reduced when implemented by the participants themselves because this measure is actually more difficult to effectively implement than it seems.

As for furnaces, all the CEAs agreed that the program is extremely influential in the adoption of this measure in the residential market, since HVAC contractors are described as effective marketers and this measure has a direct impact on fuel usage and generated high savings (thus making it easy for homeowners to meet the HEC requirement). Also, there is a direct link between fuel consumption and the energy bill, and homeowners understand this very well.

Finally, all the CEAs highlighted how the HEC program is a great success for their organizations and led to more employment and business opportunities.

Recommendations for Improvements

Some specific suggestions to improve the HEC were made by respondents during the interviews. To increase measure uptake, one CEA mentioned that participants should be allowed to re-enter the program more than once, which means they could first upgrade their furnace and reduce air draft, and still be eligible for improving insulation as part of a subsequent round of participation. He also suggested providing additional bonus if participants have implemented a third and a fourth measure as part of their retrofit. Another CEA recommended there should be more incentive for windows and wall insulation.

In terms of data-tracking, CEAs consider the process mechanical, a bit rudimentary, and time-consuming, but suggested it could be a bit more automated, with more macros created to reduce the volume of manual inputting.

The CEAs also shared their perspectives on the administrative side of things. Although they consider the program to be overall well managed, some recommendations were made. One CEA has been in contact with two different teams at EGD for the HEC program and suggested having only one team in order to avoid and reduce miscommunication and facilitate effective administrative work. Another CEA



mentioned it would be a great improvement if the similar residential upgrade programs offered in Ontario were merged to offer centralized energy-efficiency services.

1.4 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions and recommendations concerning the key research areas covered by the HEC program process evaluation.

Program Design and Management

The HEC program was designed to make a big impact on the residential market by following a whole-house approach to achieving energy savings. The incentives structure, based on the percentage of savings achieved, helps ensuring energy savings target by household are met. Moreover, the HEC program has a logic model which enables the program administrator to think through likely program outcomes and ensure the strategic and tactical approaches will lead to the desired results.

The interviews with the CEAs showed that EGD followed a collaborative and coordinated approach to HEC's program management. The CEAs said they have plenty of opportunities to provide input on the program and are in regular contact with the HEC program team. An excellent communication channel has been established between EGD and the CEAs over time.

Recommendation No. 1: Define and monitor the program performance indicators

To improve program management, the Evaluator recommends defining and monitoring additional performance indicators (in addition to the current CCM of natural gas saved and the numbers of projects completed) based on the outcomes outlined in the logic model. The target metrics are expected to not only help quantify program objectives and outcomes, but also facilitate regular follow-up and monitoring. Such indicators could include the numbers of customers contacted, the customers' levels awareness and satisfaction related to the program, and the number of energy-efficiency measures installed and audits completed. It would be interesting to monitor the participants' satisfaction over time and analyze the satisfaction ratings for each of the CEAs and contractors in order to detect potential service-delivery problems and ensure a good customer experience. Monitoring participants' awareness and satisfaction metrics can provide support and help for developing streamlined marketing activities.

To maintain a collaborative approach, the CEAs should be involved in the process of defining program metrics. This also helps to align the program delivery more easily with the performance indicators, especially if these indicators evolve and change over time. However, a multi-year planning approach should be favoured wherever possible. All the performance indicators and monitoring approaches should be included in the program plan.



Program Database and Documentation

It was found that the HEC program database contains the main information required for program management and process evaluation purposes. Overall, it is clear and well structured. EGD uses an electronic management system to facilitate data-tracking and validation, and using such a system is considered as a best practice for operating a residential energy assessment program. The program plan was also found to be relevant and a valuable tool for both the program staff and the Evaluator.

Recommendation No. 2: Further improve the program database by introducing better uniformity and some additional participant information

The Evaluator recommends standardizing the date-entry format in the database in a more consistent manner, thereby facilitating analysis of the results. To further improve the database's content, additional participant information could be included, such as the participants' email address, the incentive amount, the D Audit file number, and savings potential. The Evaluator's previous experience suggests that adding participant could help improve data consolidation and management and facilitate follow-up and evaluations.

Recommendation No. 3: Complete the evaluation plan section of the program plan

To ensure continuity between evaluations and facilitate evaluation-planning, the Evaluator suggests completing the evaluation plan section in the program plan by providing at least the following information: (1) previous process, market, impact or other types of evaluations undertaken, their dates, and whether they were completed by in-house staff members or external third parties; and (2) plans for future evaluations, including expected dates and scopes.

Program Delivery and Participation Process

Customer education is an important aspect of programs featuring whole-house approaches. In this respect, it was found that the HEC program has yielded excellent results in increasing energy-efficiency knowledge among participants. After taking part in the program, the majority of participating customers reported knowing more about energy efficiency and changed their perspectives about energy usage at home. The program has provided a simple and easy participation process, as demonstrated by the participants' high satisfaction level. The contractors were also found to be a strong force in driving a high level of participation among customers. The HEC program provides contractors with intrinsic motivations to participate in program delivery.

Recommendation No. 4: Perform follow-up with participants as part of HEC's program delivery as the deadline approaches for completing the final energy audit

Although the HEC participation experience received good ratings from participants, the Evaluator suggests that each of the CEAs perform follow-up with participants or give them a reminder about E



Audits deadline to further improve the participation process. Performing regular follow-up is also a best practice in energy audit program delivery to encourage customers to follow through on their projects.

By contrast, according to the CEAs interviewed, they rarely conduct follow-up with participants unless a customer calls them to enquire about the recommended upgrades in the energy audit report. The interview conducted with partial participants indicated that of the six respondents, three mentioned they had not completed their upgrades before the deadline set, and were dissatisfied with the time allowed to complete the upgrades. Such follow-up could help respond to the participants' questions about the project deadline or reduce dissatisfaction with the time allowed to complete the upgrades. Performing follow-up could also help schedule Audits E more evenly throughout the year to avoid the CEAs' end-of-year rush when they have to complete a big number of final audits within a short period of time.

Recommendation No. 5: Improve homes' energy performance information delivery to HEC participants

Although a high number of participants reported that they knew more about their homes' energy efficiency after participating in the HEC program, 28 percent did not recall having received any audit report and 64 percent did not recall having received a new energy-efficiency rating for their home after having implemented the upgrades. These survey results suggest that improvements could be made to better inform participants about their homes' old and new energy efficiency levels. Providing customers with such information is a crucial component in a home energy efficiency improvement program featuring the use of pre-retrofit and post-retrofit audits. Such information, if properly presented and delivered in a timely manner, could help persuade participating customers to implement the upgrades recommended and help them understand the upgrades' impact on making the savings. The Evaluator recommends working with CEAs to identify ways to improve communication of the energy-efficiency results to participating homeowners.

Recommendation No. 6: Provide an additional incentive to encourage participants to implement more than two energy-efficiency upgrades.

The HEC program offers fixed incentives based on the range of energy savings achieved (25%-49%, or 50% or more energy savings). Despite this incentive structure, most of the HEC program participants have implemented only two recommended upgrades as part of their retrofit work. The Evaluator therefore recommends considering adding an incentive aimed at increasing the number of measures included in each project. This additional incentive would help overcome the cost barriers linked to the implementation of more upgrades. The incentive could be a small bonus awarded for implementing a third and a fourth measure. The additional incentive could be applied without modifying the current incentive structure so that the main incentive amount can continue to be granted based on the level of energy savings achieved.



Program Marketing and Outreach

Participants mostly found out about the program through word of mouth. This is a good indicator of the high satisfaction level among participants which was confirmed with the survey results. The Evaluator also noticed that the main reasons cited for participating in the HEC program were the same benefits advocated by EGD's key marketing messages (increase the energy efficiency at home, lower the energy bills, increase comfort at home, and educate the customer on home energy conservation). This shows that EGD's marketing materials convey the proper key messages, which highlighted both energy-savings benefits and non-energy-savings benefits. Among EGD's marketing tools, the HEC micro-website was the most cited by respondents as a source of program awareness. The website was also found to be very useful to CEAs and contractors. EGD's various marketing tools were found to have contributed to raising awareness about the program among HEC participants.

Recommendation No. 7: Provide a brief program description leaflet for contractors to hand out to potential participants

The Evaluator recommends providing the contractors with a simple program leaflet summarizing the participation process, eligibility criteria, eligible upgrades and incentives. Doing so would ensure that accurate and up-to-date information is delivered to customers, thereby reducing the possibility of creating false expectations among potential participants. Such a leaflet would allow contractors and potential participants to consult tangible documentation instead of only relying on verbal information only. Such a leaflet would also help increase the contractors' knowledge about the program.

Recommendation No. 8: Further increase the program micro-website's contents⁴ and keep the CEAs' websites up-to-date

To further improve the program's online marketing, the Evaluator recommends the following small changes to the "knowyourenergyscore.com" micro-website:

- › Add an explanatory video to the program's micro-website, walking the customer through the program process or presenting typical upgrades.
- › Clarify the information concerning the HEC program's incentive structure as the current description was found to be confusing.
- › Make it clear to customers that they must be a homeowner to be eligible to participate in the HEC program.
- › Turn the names of the approved CEAs listed into hotlinks leading to their respective websites.

Finally, EGD should work with the CEAs to make sure their respective websites present the most up-to-date information about the HEC program.

⁴ knowyourenergyscore.com



General Observation and Recommendation

Overall, it was found that the HEC program was satisfying for all the parties involved (participants, contractors, and CEAs), and that it generated strong interest and high participation in the residential market.

Recommendation No. 9: Consider relying on channels or networks other than contractors to recruit participants

In its current format, the HEC program relies heavily on contractors to promote and drive the program. However, since most audits are scheduled through contractors and contractors mostly promote a specific type of measure, the CEAs generally face the challenge to effectively delivering the program by following its whole-house approach. If EGD intends to bring the HEC program a step further in terms of the energy savings achieved, the number of upgrades installed per home, and energy-efficiency knowledge among participants, the Evaluator suggests relying less on the contractors to recruit participants. This potential objective could be done if more participants contact a CEA to initiate their participation process after hearing about the program through EGD's marketing activities and materials. Currently, relying on HVAC contractors to recruit participants is not necessarily favourable to the uptake of a wide range of energy-efficiency measures, apart from energy-efficient furnaces. The HEC program outreach strategies and delivery process could be improved to better identify those potential participants who have not yet planned undertaking energy retrofit in their homes. As for participants who have already planned such work, the HEC program design, however, is currently very helpful in recommending additional upgrades and expanding the retrofits' scope through the energy performance audits.



2 HOME WINTERPROOFING PROGRAM

2.1 PROGRAM OVERVIEW

In 2007, EGD launched the Home Winterproofing (HWP) program (previously known as the Low Income Weatherization program) which aims at improving the natural gas energy efficiency of low-income residences in Ontario. Specifically, the HWP program provides low-income customers with a free home energy audit and building envelope upgrades (insulation and air sealing measures).

EGD's main approach to delivering the program is to work with three primary delivery agents (DAs) who perform the energy audits and install measures. These DAs are well-established in their communities and have strong links to social service providers.

The HWP program is available for:

- › Occupants of single detached and low-rise multifamily households (3 stories or less) OBC Part 9.
- › Private homeowners and residential tenants within the EGD franchise who pay their own gas bills and whose income is at or below 135% of Statistics Canada's Low Income Cut-Off (LICO).
- › Tenants residing in social and assisted housing, regardless of gas bill payment responsibility.
- › Recipients of social assistance benefits.

Once all the eligibility requirements have been validated and the potential participant has filled out the application form, a pre-retrofit energy audit (A Audit is conducted by the DA's certified energy auditors (CEAs). During A Audit the CEAs determine which building envelope upgrades are most appropriate for each home. Also at the time of assessment, the home prequalifies for water conservation measures (e.g. showerheads and aerators), CO detectors, heat reflectors and a programmable thermostat. CEAs also calculates potential gas savings through the use of HOT2000 (NRCan's accredited modelling software) from new insulation (attic, wall and basement) and air sealing upgrades, while evaluating potential health and safety issues that could prevent the installation of these upgrades, such as high moisture, poor insulation or old wiring. Once the upgrades are installed, a post-retrofit energy audit (B Audit is conducted to verify the modelled gas savings calculated through the use of HOT2000.

In 2012, the program was modified to include additional measures, such as providing CO detectors to participants. In 2014, the marketing and outreach strategy was modified and the program was renamed Home Winterproofing. In 2015, heat reflector panels were added to the program. Otherwise, the program has not undergone any major changes.

2.2 EVALUATION METHODOLOGY

2.2.1 Methodological Model

Figure 11 illustrates the research strategy used to conduct the HWP program process evaluation. The data-collection activities carried out in the evaluation are then further described in detail.

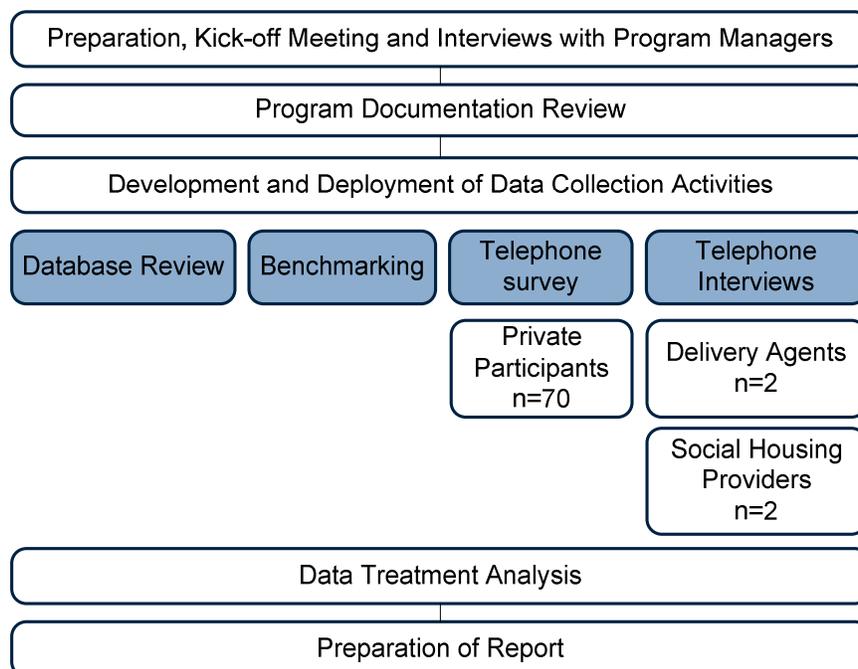


Figure 11: HWP Program Methodological Model

2.2.2 Program Database and Documentation Review

As part of the process evaluation, the Evaluator reviewed the HWP program database to assess its components and mechanisms. More specifically, the review was done to achieve the following objectives: (1) to verify whether it provides the complete information needed for program monitoring and evaluation by following the industry’s best practices; and (2) to assess the level of consistency among the various data-entry fields and detect abnormalities that need to be addressed.

The Evaluator also reviewed the program documentation such as the marketing brochure, the program website, logic model, and process map. The Evaluator also reviewed the report summarizing the participant focus groups held by EGD.

2.2.3 Benchmarking against Similar Programs

The Evaluator conducted a benchmarking study to compare the HWP program with other similar North American residential audit programs by focusing on key design elements, such as the eligibility criteria



and energy-efficiency measures offered. For comparison purposes, the Evaluator identified eight low-income programs offered by Canadian and American jurisdictions.

2.2.4 Participant Survey

In December 2016, CRA conducted a telephone survey with a total of 70 HWP private household participants. The average length of the survey was 13 minutes.

The participant survey was meant to collect feedback on the following aspects:

- › Sources of program awareness
- › Reasons for participation
- › Information received
- › Barriers to participation
- › Impact of the program
- › Satisfaction with the program
- › Recommendations for improvements

With 70 respondents, the corresponding margin of error at a 90 percent confidence level is ± 8.1 percent.⁵

2.2.5 Interviews with Delivery Agents and Social Housing Providers

In December 2016, Econoler conducted interviews with program partners, including two DA representatives and two SHP managers, to collect feedback regarding the following aspects of the HWP program:

- › Program satisfaction
- › Relationships among the DAs, SHPs and EGD
- › Interactions with customers and program outreach
- › Barriers and difficulties regarding program delivery
- › Program impact
- › Recommendations for improvements

Only two of the three program DAs were interviewed, because the third was not available to answer the questionnaire at the time of program evaluation.

⁵ The margin of error was calculated on a finite population of 220, which is the total number of participating customers provided by EGD for the period evaluated.

2.3 PROCESS EVALUATION

2.3.1 Program Participation

From January through June 2016, a total of 334 projects were completed. Figure 12 shows a breakdown of the proportions of projects implemented by the type of participant, highlighting that most participating households were private homes.

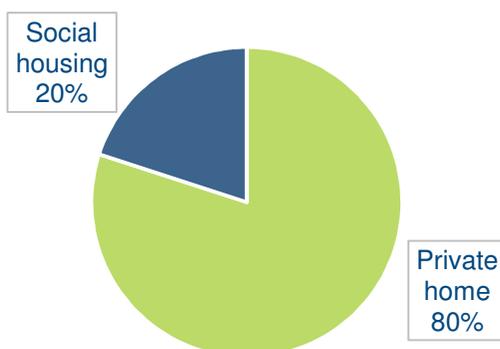


Figure 12: Projects by Type of Participant

As shown in Figure 13, air sealing and attic insulation were the most common building envelope upgrades installed at the participating households for the evaluated period. Moreover, nearly all the participants (96%) received a CO detector, which was given to the participants at the time of the B audit visit if they had not yet had one. Over half of the participants (53%) also received some products offered by EGD, such as thermostats, aerators and showerheads. The average natural gas savings achieved was 868 m³ in a private home and 688 m³ in a social housing unit.

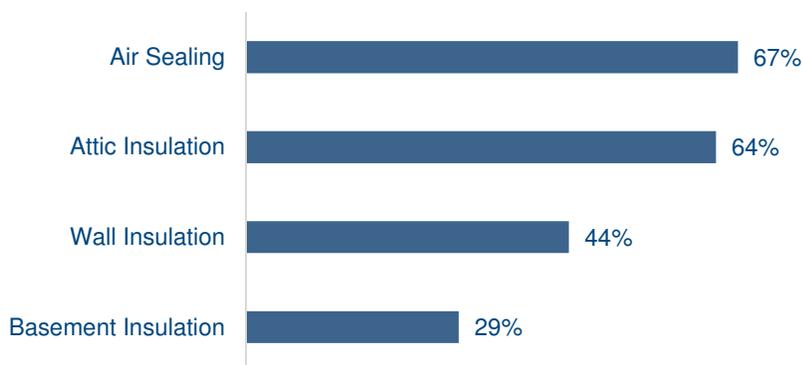


Figure 13: Types of Building Envelope Upgrades Installed

2.3.2 Program Database and Document Review



Program Database

The Evaluator reviewed the contents of the HWP program database provided by EGD and found them to be clear and effective. The program database is an Excel spreadsheet containing data about the customers that participated in the program. The program database contained five tabs, including one tab for each of the three DAs, a “MASTER” tab that consolidates the information from each DA, and a summary tab that provides an overview of the total savings achieved in each month and by each DA.

The information useful for evaluation was contained in the “MASTER” tab. This tab included the participants’ complete contact information and status, DA file and EGD account number, DA, language, housing type (private or social housing) and tenure (tenant or owner), the landlord’s or social housing provider’s contact information, house details (age, surface area and building type), as well as the audits’ and retrofits’ dates, main heating system, upgrades installed (costs and savings associated), total savings and TRC value for each project. EGD reports the total savings results in both CCM and cubic meters.

The program database also contained details concerning health and safety issues, namely columns with the health and safety work description, cost, and if any, reason for project rejection. However, this column was empty. The program database also indicated if participants received a CO detector and qualified for the TAPs program (Thermostats, Aerators and Showerheads). Finally, there are columns to present how participants heard about the program and if they were referred by their local distribution company (LDC).

The Evaluator found the status of each participant was up-to-date and observed that the overall level of consistency among the various data-entry fields of the database was good. The program database contained no irregularities. However, the Evaluator noted some differences between the different DAs’ tabs, which might have been due to different reporting templates. These differences can potentially lead to mistakes in compiling data and EGD is currently addressing the matter.

Although most participant information needed for conducting surveys and interviews, such as names and phone numbers, was already documented in the database, the Evaluator’s previous experience suggests that the following information should also be documented:

- › The house’s pre- and post-retrofit energy consumption values: The Evaluator suggests adding each project’s pre- and post-retrofit energy consumption values to the program database. Such data would help validate the energy savings achieved and support a more complete program results’ analysis.
- › The participant’s email address: Provided along with other contact information, email addresses are useful contact information which facilitates reaching participants to book visits for quality assurance or conduct other evaluation activities.

Overall, the Evaluator thinks that the HWP program database works well and is consistent while containing the information required for monitoring and evaluation.



Program Documentation

The HWP program has a plan which describes key program elements such as the rationale, objectives, implementation and marketing strategies, participation process map, and financial analysis. The program plan is well structured and contains relevant information useful for both the program staff and the Evaluator. One good element observed was the revision date on the front page, which makes it easier to track program updates.

The program plan also features an evaluation plan section. When this evaluation was being carried out, this section was left blank. The Evaluator suggests filling in the evaluation plan section with at least the following information:

- › Past evaluations: date, type of evaluation (process, market, impact or other types), internal or external evaluation.
- › Future evaluations: expected date and scope.

In 2016, the HWP program managers developed a logic model which illustrates the causal links between program activities and the likely outputs and outcomes in the market. This is a good initiative since illustrating the program logic can reveal gaps in program focus or effort and helps ensure that all those involved know what the program seeks to accomplish. The program documentation also features a participation process map, which illustrates the participation steps for the customers, DAs and EGD.

As a way to improve program management, the Evaluator recommends defining and monitoring performance indicators linked to the program activities and desired outcomes outlined in the logic model, such as the number of SHPs contacted, the numbers of applicants, the numbers of audits completed and the program awareness level.

Program Marketing and Outreach

Both EGD and DAs are involved in the program marketing and outreach. In an effort to reach as many customers as possible, EGD encourages DAs to explore a variety of promotional tactics. The DAs explained that the current program promotional approaches include brochures left behind in houses during the pre-retrofit audit, referral cards for participants to give to family or friends, posters in social housing buildings, postal drops in low-income neighbourhoods, earned media, targeting mail, booths at specific events, and relationships to get referrals from other SHP working also with low-income constituencies.

The DAs' marketing materials must follow EGD guidelines and go through EGD for approval. Marketing tactics along with their timelines are documented in the program marketing plan. The Evaluator saw no mention about the two different types of customers (private and social housing) in the marketing plan or participation process. If different marketing and delivery strategies are used, they should be documented.

To inform customers about the HWP program, EGD also used its corporate website



(enbridgegas.com). The program website pages were found to be simple and effective in providing a first good impression overall. They were mentioned as a useful marketing tool during interviews with DAs. In terms of contents, the Evaluator found the information clear and concise, which is particularly important considering the customers targeted by the program. The main navigation tabs (overview, eligibility, apply, and social housing providers) could be formatted in a slightly larger font to be more easily located and facilitate navigation throughout the website. Also, the website could be more precise about the fact that both tenants and homeowners can participate in the HWP program as long as they pay their own energy bills. The website presented dynamic content using a video of previous homeowners' testimonials.

2.3.3 Benchmarking against Similar Programs

The Evaluator conducted a benchmarking study and compared the HWP program with other residential energy audit programs targeting low-income households. The eligibility criteria and program offerings were investigated. The benchmarking study was conducted to provide general insight on how other similar programs are being delivered elsewhere.

The Evaluator selected the same jurisdictions as those in the HEC study as they were also considered relevant for a comparison with the HWP program. The only additional utility studied in the HWP benchmarking study was the Independent Electricity System Operator (IESO) to provide a complete overview of the low-income residential audit programs offered in the province.⁶ Priority was given to those programs targeting natural gas customers or a combination of natural gas and electricity customers. Certain programs intended for electricity customers were also considered because the nature of these programs was relevant for comparison purposes.

The following programs were covered by the benchmarking study:

- › Union Gas – Home Weatherization Program
- › Independent Electricity System Operator – Home Assistance Program
- › Manitoba Hydro – Power Smart Affordable Energy Program
- › *Énergie et ressources naturelles Québec* – Éconologis
- › Efficiency Nova Scotia – Home Warming
- › Efficiency Maine – Low Income Weatherization
- › Mass Save – Energy Efficiency and Weatherization Assistance Programs
- › Pacific Gas & Electricity Company (PG&E) – Energy Savings Assistance Program

APPENDIX II shows a table with details about these selected programs and their main characteristics. As shown in that table, all the utilities have their respective income grids with different levels indicating the eligible maximum household income eligible per number of household members. The amounts

⁶ The IESO offers a low-income energy assessment program similar to the HWP program, but does not offer one similar to the HEC program.



were not compared in the benchmarked study as they depend highly on the specific socio-economic context of each utility. In Ontario, the two natural gas utilities require participating houses to be built prior to a certain year. This is also the case in California (PG&E), where houses must be more than five years old. Some jurisdictions, such as Quebec and Maine, clearly specify that participants cannot have taken part in the program previously. Most programs target homeowners, tenants (with agreement of the landlord) and landlords, while others include apartment building owners (Mass Save and Manitoba Hydro) or social housing providers (EGD and IESO). Nova Scotia only allows participation by houses (no apartments). In general, the eligibility requirements include at least the criteria on the household income level (income or assistance program participation) and pertain to one or more of the following elements: the house (type, age, size, value, and/or year-round occupation), the applicant (bill payer, tenant, active account with the utility, and previous participation), and the energy source.

In terms of the upgrades available, most jurisdictions offer free upgrades following an energy audit, except for Efficiency Maine, which instead offers more prominent rebates to facilitate upgrade implementation in low-income homes. In addition to the free upgrades available under its program, Manitoba Hydro offers additional rebates to replace standard boilers or furnaces (with monthly payments over five years). In some jurisdictions, especially those which offer combined programs for natural gas and electricity, the upgrades which do not require renovation work are provided or installed during the audit (efficient lighting, appliance replacement, water-saving devices, smart power bars, and CO detectors). The range of upgrades offered varies from one program to another, but overall, most utilities offer at least insulation and air sealing.

In terms of program design, the Evaluator noticed the design of *Econologis* is distinctively different as it does not include any house energy audit; but it includes a visit by an energy advisor to discuss energy efficiency and provide practical advice on how to save energy. Air sealing measures and water-saving devices are also implemented during this first visit. A second visit involves installing programmable thermostats. Additionally, the *Econologis* website provides a link to a document which is updated regularly for participants to track their file status.

The benchmarking study shows that although the upgrades offered and the eligibility criteria vary among similar programs, the underlying considerations and principles reflected by the HWP program's design and delivery are largely consistent with those reflected by similar programs that other jurisdictions administer.

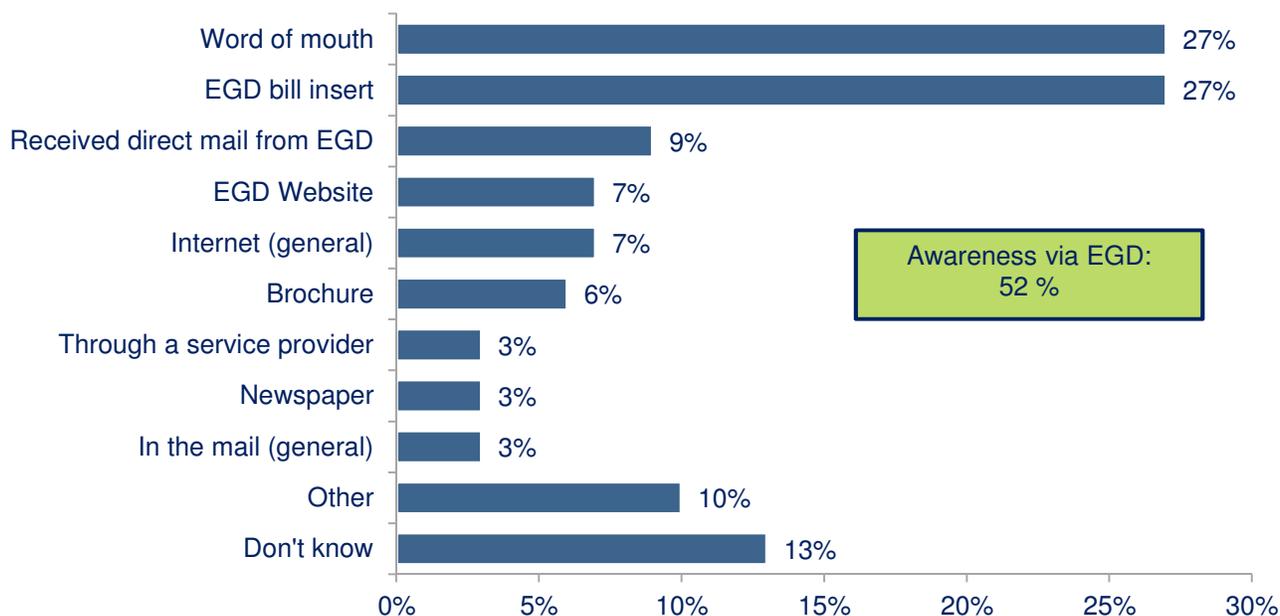
2.3.4 Participant Survey

As part of the Home Winterproofing evaluation, a survey was conducted with 70 participants. The following subsections present the main findings of this survey.



Sources of Awareness and Reasons for Participation

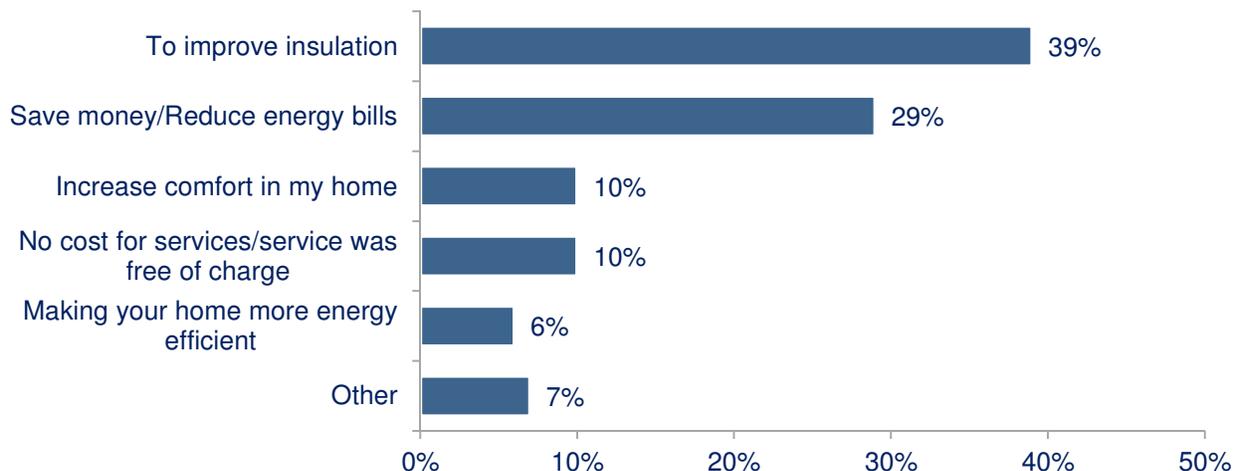
Word-of-mouth and EGD bill inserts were the most common source of the awareness (27%). In addition to the bill inserts, some participants learned about the program through other forms of EGD communication (direct mail 9%; website 7%; brochure 6%; newspaper 3%).



Source P1: How did you first learn about the Home Winterproofing program? (n=70)
Total exceed 100% due to multiple responses

Figure 14: Awareness of the Home Winterproofing Program

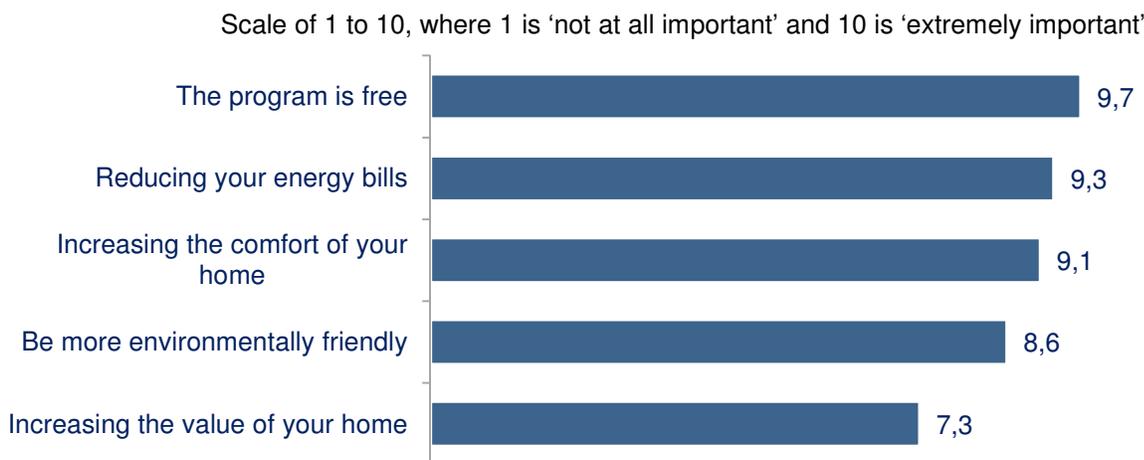
Improving insulation (39%) is the main reason cited for participating in the program. Participants were also motivated by the need to reduce their energy bills and save money (29%). Other motives or reasons cited by a smaller proportion of participants included increasing comfort at home (10%), free service (10%) and making the home more energy-efficient (6%).



Source P2: What was the SINGLE most important reason you chose to participate in the program? (n=70)

Figure 15: Reasons for Participating in the Program

Participants were asked to rate the level of influence that certain factors had on their decision to participate in the program. The participants provided a very high average rating for three of the five factors assessed, namely the program was free (9.7/10), reducing their energy bills (9.3/10) and increasing the comfort of their home (9.1/10). Being environmentally friendly also received a high average rating (8.6/10), demonstrating participants’ concerns for the environment.



Source P4a-e: On a scale of 1 to 10, where 1 is ‘not at all important’ and 10 is ‘extremely important’, how important, if at all, were the following when deciding to participate in the Home Winterproofing program? (n=70)

Figure 16: Reasons Influencing Decision-making on Program Participation



Information Received through the Program

Most of the participants (80%) received information from the DA about the upgrades implemented in their homes and about the impact it could have on their energy bills. Among these participants, 80 percent found the information very useful and 16 percent somewhat useful. All the participants found the information provided by the DA easy to understand (Actually, 84% said it was very easy to understand and 16% somewhat easy).

Barriers to Energy-efficiency Upgrades

When the time came to implement energy-efficiency upgrades in their home, 54 percent of the participants identified the financial constraint as the major barrier. A lack of information about energy efficiency products was also a barrier cited by ten percent of the participants. These barriers, which pertained to energy-efficiency upgrades in general, prove the importance of a program such as the HWP to offer free upgrades and information about energy efficiency to participants.

As part of the program, some of the participants interviewed chose not to add insulation to their home. These participants found that adding insulation would involve too much drilling and repair work.

Impact of the Program

The program had a big impact on educating the participants about energy efficiency. Around one half (53%) of the participants reported knowing much more about their homes' energy efficiency after participating in the program and a fifth (21%) reported knowing a little more. Moreover, for 56 percent of the participants surveyed, the information received through the program changed in some way their perspective on how to use energy at home.

Seven in ten (71%) participants noticed an improvement in the comfort level at home as a result of the upgrades installed. The main changes observed included a warmer or more comfortable home (50%), fewer drafts throughout the home (28%), the home being easier to heat (20%) and more even temperatures throughout the home (14%).

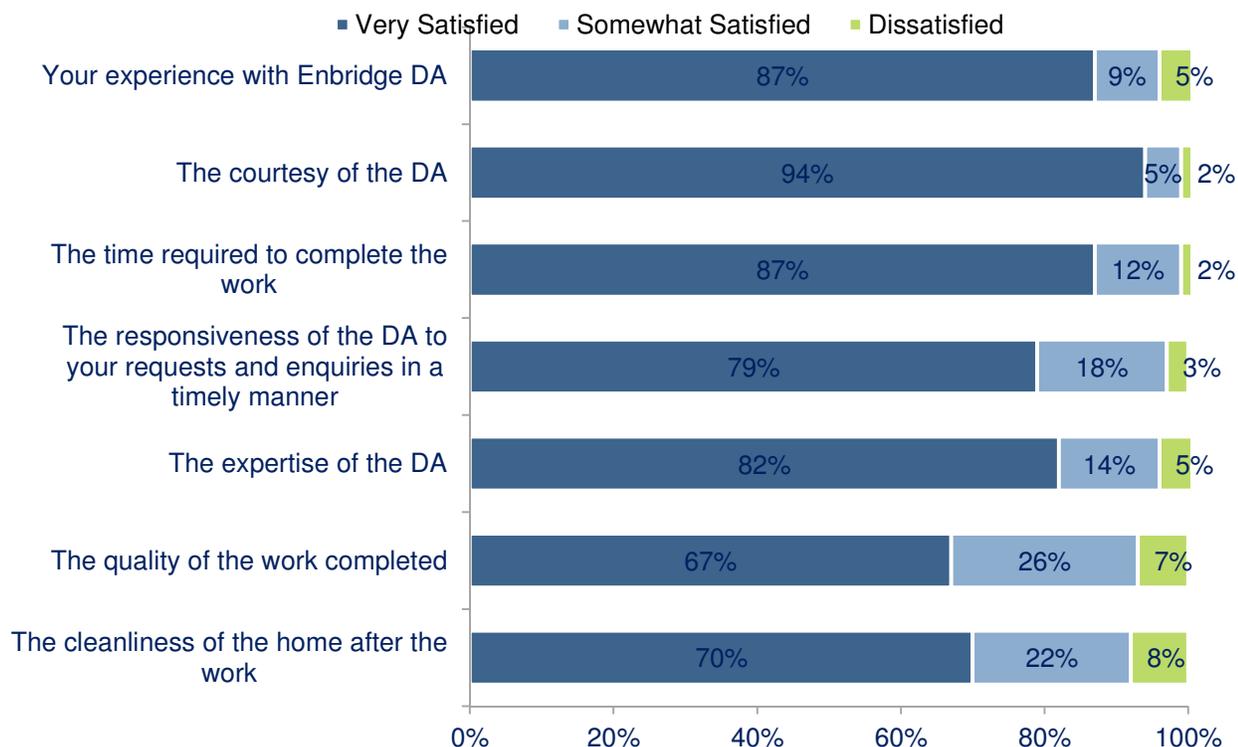
Experience with the Delivery Agent

Almost all the participants (96%) were satisfied with their overall experience with the DA, with the majority (87%) reporting being very satisfied. The small number of participants (three respondents) who were less satisfied indicated that the DA was not knowledgeable, did not finish the work and did not take care of the property.

Respondents were asked about their satisfaction with specific aspects of their contact with the DA. As shown in the chart below, all the aspects concerning the DA's service delivery received positive overall ratings. More than nine participants out of ten were satisfied with the courtesy of the DA, the time required to complete the work, the expertise of the DA, the responsiveness of the DA to their requests



and enquiries in a timely manner, the quality of the work completed and the cleanliness of the home after the work.



Source S3c -S5: Now talking about your experience with Enbridge Delivery Agent – How satisfied would you say that you are with... (n=70)
Don't know and not applicable removed from calculation

Figure 17: Satisfaction with the Delivery Agent

Satisfaction with the Program and its Aspects

The level of satisfaction with the HWP program was extremely high, with 77 percent of the participants surveyed saying they were “very satisfied” and 19 percent “somewhat satisfied”. The participants explained their satisfaction toward the overall program by citing the following reasons: an improvement in comfort at home (30%), work or upgrades of high quality (26%), money saved or lower energy bills (22%), professional and knowledgeable DA (13%), and the fact that without the program, some participants could not have afforded the upgrades (10%).

“They did a very good job. They acted on it quickly, it was very efficient. There wasn't a lengthy wait”.

“It's all free with a nice perk. Great program!”

“I see improvement on the heat in the house, the house is more warm”.



In areas where clients were satisfied others were not. The few participants who were dissatisfied explained that they had not noticed a difference in the comfort at home and the home was not much warmer (7%), they were disappointed in the quality of the work or upgrades (4%) and the work was left unfinished (4%).

The process of taking part in the program was found to be easy by 82 percent of the participants. Thanks to their participation, the participants learned about what they can do to conserve energy. Seventy-six percent were very satisfied to learn about this aspect and 20 percent were somewhat satisfied.

Nearly all the participants (97%) would recommend the EGD program to others.

Recommendations for Improvement

Half of the participants (49%) made no recommendations on how to improve the program. Meanwhile, two in ten (20%) would like to see more measures covered by the program and some participants would like to see an improvement in the quality of the work carried out (13%). A small number of participants suggested improving the communication or follow-up (9%) and advertising more about the program (7%).

2.3.5 Interviews with Delivery Agents

As part of the process evaluation, in-depth interviews were conducted with two DAs. The following subsections present the findings of these interviews. The Evaluator spoke with two of the three main program DAs as it was not possible to get in touch with the third DA during the evaluation.

Program Satisfaction

The two DAs interviewed have been involved with the program for a number of years. They both considered their involvement in the program as straightforward. One respondent mentioned the HWP was a complicated program, but this person still considered his involvement straightforward after delivering the program for a number of years.

In general, the DAs were very satisfied with the overall program and its eligibility requirement. The marketing and outreach activities conducted by EGD were also deemed satisfying, although one DA felt that EGD was spending a lot of money to market the HWP program without being sure that the marketing strategies were actually effective.

During the interviews, certain strengths of the program were highlighted. First, the DAs mentioned the HWP program favoured a positive relationship between EGD and its customers fostered by an alignment of the needs of both parties. Second, clear eligibility rules are appreciated as they facilitate the DAs' work in accepting or rejecting potential projects. Lastly, according to one DA, it is a great advantage that EGD understands the importance of keeping the program's participation process as



easy and simple as possible, and developing friendly and attractive communication when engaging with a high-barrier group, such as low-income households.

Relationship with Enbridge Gas Distribution

The DAs were very satisfied with their relationship with EGD, which includes regular meetings, good communication established over time, and a good level of understanding from EGD on the operational side. One DA said that the HWP program team is a strong one.

The DAs said they received the necessary information from EGD regarding all program aspects. The communication was described as dynamic; it was an exchange since DAs also provided information to EGD to try and make the program as effective as possible.

When discussing data-tracking, one DA mentioned EGD had a top-down approach, especially where it involved making changes to the tracking system. According to this DA, more upstream consultations would be appreciated since small changes in the forms can actually involve huge costs to implement.

Communication with Social Housing Providers

Each DA has worked with dozens of SHPs, with which the relationship and experience were usually positive, but not always. Even if an SHP often becomes great partners in the long run, both DAs agreed that there are limits to collaborating with them. One reason is that the number of SHP projects in Ontario that require these types of retrofits are decreasing. Another element is the heavy bureaucracy in such organizations, which greatly complicates and slows down the process and work to be done. This requires patience and “hand-holding” from the DAs, who think it is often worthwhile as each project includes a large number of units. In some cases, however, it takes a long time to get the approval of an SHP and this process turns out to be worthless when the first building tests prove to be negative (if, for example, the work cannot be undertaken for health and safety reasons). As a way to facilitate interaction with SHPs, one of the DAs mentioned that simplified paperwork could potentially help engaging with SHP. The Evaluator also suggests that pre-application tests be conducted before going through the complete paperwork.

Program Outreach and Marketing

The DAs are involved in program outreach in a coordinated effort with EGD to suggest and develop marketing strategies and materials. In terms of implementation, DAs target more SHPs and individual households, while EGD mostly conducts external marketing. Reaching out to individual households was described as challenging as low-income customers are difficult to identify among customers.

According to the DAs, successful outreach strategies vary over time and from one region to another, but referrals, postal drops, and bill inserts were mentioned as effective tools in consistently sparking interest. A similar finding was revealed by the participant survey, which showed that word-of-mouth and bill inserts represented the most common sources of awareness among respondents. The DAs mentioned that bill inserts make the phone ring a lot, though the actual proportion of eligible customers



making enquiries is sometimes low. One DA mentioned having successfully used EGD's website; potential participants can enter their contact information on the program website to receive more details and the DAs receive it directly. Cross-promotion was also viewed as very effective, especially when the DAs are involved in delivering more than one social program. If a person contacts a DA to participate in another program, they can promote the HWP program simultaneously. Some recommendations were shared by the DAs on program outreach and are further discussed below in the recommendation section.

Program Delivery and Barriers

The DAs play an important role in delivering the HWP program as they are responsible for the complete process from the pre-retrofit audit, the retrofit work, and the post-retrofit audit. To complete the retrofit work, the DAs work with external or internal contractors, and sometimes with both, depending on the regions where the customers are located. The DAs are responsible for managing contractors and overseeing the installation process. The experience with contractors was described as positive overall and the DAs keep a close eye on contractors to ensure that they do the work in a satisfactory manner. During the post-retrofit energy audit, all the projects are subject to quality assurance to validate whether the upgrades are properly installed. The DAs discuss about energy efficiency and ways to save energy with participants during one or both energy audits.

Customers usually have high expectations in terms of energy benefits and want to get as many upgrades as possible. In that context, some participants do not understand that some upgrades are excluded from the retrofit work because they do not meet the cost-effectiveness threshold or because of health and safety issues (moisture, asbestos, old electric wiring, etc.). In other cases, participants do not understand that certain upgrades obviously associated with household energy efficiency, such as replacing windows, are not implemented in their home because they are not part of the program offerings.

Overall, the DAs mentioned few complaints were made by participants even though there was some confusion from time to time. The complaints pertained to not getting certain measures done in houses or tidiness following the retrofit work. According to the DAs, between 2% to 10% of the participants decide to drop out from the program though they qualify and are offered a retrofit. This usually happens if a participant moves away, does not want to be disturbed or have anyone coming in the house, does not want the work to be completed because of inconvenience associated with it (for example, insulation requires drilling holes in the wall), or in some cases, because of mental health issues. In other cases, it is the DA who has to withdraw from a project without completing the work, though the participant is eligible, because there are too many health and safety-related repairs required and not enough budget available. According to the DAs, one of the challenges in delivering the HWP program is to operate with very tight budgets while trying to achieve high energy savings.



Impact of the Program

The DAs considered the program to have an influence, not on the overall residential market, but rather on each participating household by improving their comfort and financial situation. The majority of participants surveyed did actually notice an improvement in the comfort level at their homes as a result of the upgrades installed. According to the DAs, the HWP program also raises awareness about energy efficiency among program participants. This is in line with the fact that two thirds of the participants reported during the survey that they knew more about energy efficiency following their involvement in the program. However, according to the DAs, the financial constraints faced by participants greatly reduce their capacity to make any further impact, i.e., there is a slim chance they will prioritize spending money on implementing other energy efficiency measures themselves.

Recommendations for Improvements

The DAs highlighted that many efforts have been made over the years to improve the program. During the interviews, additional recommendations were made by the DAs regarding data-tracking, program design, and marketing and outreach. In terms of data-tracking, one DA suggested integrating all the fields into a single report sheet. Concerning program design, one DA mentioned that it would be great to see the two utilities, the EGD and the IESO, combining their programs which target low-income households.

A number of recommendations regarding marketing and outreach were made by the DAs. Billboards in low-income areas were mentioned by one DA as an additional outreach strategy to consider. Both DAs were aware of the high costs associated with program outreach and marketing and suggested the positive financial and marketing impacts that would arise from more collaboration with other provincial organizations. One DA suggested that co-promotion of the HWP program and the IESO's Home Assistance program would be enhanced as both programs often target the same households. Also, many opportunities can be found in the contact list of the Ontario Electricity Support Program (OESP), one of Ontario's largest social programs, which is run by the Ontario Energy Board (OEB). Even though the current policy may not facilitate this kind of information-sharing, it was recommended that EGD try to access this contact list to make the marketing efforts more effective in targeting the eligible households.

2.3.6 Interviews with Social Housing Providers

In-depth interviews were conducted with building managers of two social housing providers (SHPs). During one of these interviews, a facility maintenance supervisor was also present. The following subsections present the findings of these interviews.

Program Satisfaction

The respondents first heard of the HWP program through a DA, by email or on the DA's website. One SHP mentioned being very familiar with the program while the other was somewhat familiar.



Both SHPs claimed to be very satisfied with the overall program. The respondents decided to participate in the program since it provided an interesting opportunity to save energy and to retrofit old buildings. The SHPs were satisfied with the upgrades implemented.

Overall, the two SHPs recognized the numerous advantages of participating in the program and improving their buildings' energy efficiency. They both also found the program very informative.

Relationship with the Delivery Agents

The two SHPs were very satisfied with their overall experience with their respective DAs. One SHP was very satisfied with all the different aspects of the DA's work, namely the responsiveness of the DA to the requests and enquiries in a timely manner, the time to complete the work and the quality of the work completed. The other SHP was somewhat satisfied regarding the time to complete the work and the quality of the work which was said to be generally good except for a mistake by the contractors which increase the time and the work required to complete the retrofit.

The DAs were described as very helpful, especially in keeping the SHPs in the loop throughout the participation process. One SHP said it was a great team work. Both SHPs said they were satisfied with the information received as part of their participation, but one respondent mentioned there could have been more information on the insulation material used because of health concerns expressed by certain tenants.

Interactions with Customers and Program Outreach

The SHP mentioned they were responsible for reaching out to tenants living in their properties' units about the program. To encourage tenants to participate in HWP, a letter or verbal explanations were provided to them about the HWP program, the steps involved in the process, and the benefits associated with lower heating costs and increased home comfort. For both SHPs, all the eligible units (using natural gas as the heating source) in each organization participated in the program. Both SHPs said it was overall easy to have tenants participate in the program. One SHP mentioned the work was also done smoothly without affecting the tenants' daily life.

Barriers and Difficulties Regarding Program Delivery

In terms of the challenges concerning the program, one of the SHPs mentioned the length of time needed to conduct the energy audits which involved more than one visit in the units, and was more than what the organization was comfortable with. The other SHP referred to the challenges associated with undertaking the retrofit in old buildings; some additional electrical work was required for safety reasons when the upgrades are being installed.

Some concerns were expressed by tenants. Some tenants were uncomfortable to let people come into their homes; others were concerned about the dust that would be created by the work; others were worried about the health-related consequences of the work to be done. However, overall, all the eligible units in the two SHPs interviewed participated in the program.



Recommendations for Improvements

All the respondents made very positive comments about their experience with the program. Both SHPs would recommend the program to other organizations without hesitation. Few recommendations were made on how to improve the program. One SHP suggested that more information be provided in advance about the upgrades to be done, especially concerning the products installed. The other SHP recommended extending the program's outreach to other buildings to allow them to benefit from the program.

2.4 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions and recommendations concerning the key research areas covered by the HWP program process evaluation.

Program Design and Management

The HWP program was designed to achieve energy savings in low-income single-family homes. The program is delivered through experienced DAs, who have strong links to the social service providers and succeed in reaching out to the hard-to-reach low-income customer group. The interviews with the DAs showed that EGD adopted a collaborative and coordinated approach to delivering and managing the HWP program. The DAs said they were in regular contact with EGD and had plenty of opportunities to provide input on the program. An excellent communication channel has been established between EGD and the DAs over time.

Moreover, the HWP program has a logic model and a process map, two useful tools to help identify any gaps in the program design and delivery and ensure good internal communication.

Recommendation No. 1: Define and monitor program performance indicators.

As with the evaluation of the HEC program, the Evaluator recommends defining and monitoring additional performance indicators (in addition to the current CCM of natural gas saved) based on the outcomes as a way to improve the program management. These target metrics are expected to not only help quantify program objectives and outcomes, but also facilitate regular follow-up and monitoring. The performance indicators should be linked to the program activities and desired outcomes outlined in the logic model. Examples of performance indicators include the numbers of customers making applications, projects completed, and SHPs contacted, as well as the customers' levels of awareness and satisfaction related to the program.

To maintain a collaborative approach, the DAs should be involved in the process of defining program metrics. Doing so would also make it easier to align the program's delivery with the performance indicators, especially if these indicators tend to evolve and change over time. However, a multi-year planning approach should be favoured wherever possible.



Program Database and Documentation

It was found that the HWP program database contained the main information required for program management and process evaluation purposes. Overall, the database was clear and well structured. The Evaluator noticed a good level of consistency among the various data-entry fields and no irregularities were found. However, the Evaluator noted some differences between the different DAs' tabs. EGD is currently working on standardizing the DAs' templates.

Recommendation No. 2: Further complement the program database with some additional participant information.

To further improve the database contents, additional participant information could be included, such as the participants' email address, and the pre-retrofit and post-retrofit house energy consumption values. The Evaluator's previous experience suggests that adding this information could help improve data analysis quality and facilitate follow-up and evaluations. Since documenting additional information requires additional work, the Evaluator recommends involving the DAs as early as possible in the process to find the best way to collect and document these kinds of additional information.

Program Delivery and Participation Process

The HWP program is marketed and delivered through DAs, who are well established in their communities and have strong links to social service providers. By offering free upgrades, the HWP program enables installing energy-efficient upgrades and generating energy savings, which would be unlikely to happen otherwise. To this end, the HWP program offers a simple and easy participation process, as proven by the private participants' very high satisfaction level. SHP managers' and tenants' interest in the program was also found to be strong. Although the DAs faced some challenges in working with SHPs, both parties found their relationship to be generally positive.

Recommendation No. 3: Make SHP buildings pass a pre-application test for screening purposes.

Some SHP buildings are old and thus quite unlikely to meet program requirements related to health and safety concerns (moisture, asbestos, old electric wiring, etc.). The Evaluator suggests conducting a pre-application test on SHP buildings that are considered having higher health or safety-related risks before going through the complete paperwork required for their participation in HWP. Considering that the complete application process can often take a long time to finish, implementing such a pre-qualification and screening procedure would avoid wasting time completing the application process and seeking approval for those buildings that potentially do not qualify for the program for health and safety reasons.

To ease customers' health-related concerns, more information about the material to be used in the retrofit work could be shared with the SHPs once the pre-test and application process is completed.



Doing so would help tenants with health concerns make an informed decision about whether to participate in the program.

Program Marketing and Outreach

In most cases, participants found out about the program through word-of-mouth and bill inserts. A high level of program awareness achieved through word-of-mouth is usually a good indicator of the satisfaction level among participants, as demonstrated by the survey results. The main reasons cited for participating in the HWP program were similar to the benefits advocated in the program brochure and website (improve the insulation, lower the energy bills/save money, and increase the comfort at home). This finding indicates that EGD's marketing materials adequately convey the key messages. It was found that 52 percent of the survey respondents first heard about the HWP program through one of EGD's marketing tools (the three main ones being bill inserts, direct mail, and the website). According to the DAs, the website was useful in promoting the program.

General Observation

Overall, the HWP program was found to be satisfying to all the parties involved (the private participants, the DAs, and the SHPs). The program has succeeded in reaching out to the hard-to-reach low-income customer group and enabling implementing energy-efficient upgrades in those homes, which would not have been able to otherwise. The Evaluator found the HWP program's overall design, management, delivery process and marketing to be effective.



APPENDIX I HEC BENCHMARKING TABLE



Table 4: HEC Program Benchmarked against Other Utilities' Similar Programs

Program Design	Eligibility Criteria				Program Offerings				Total Incentive Amount (Including Energy Audits) ²
	Heat Sources	Customer	Specific Criteria	Eligible Upgrades	Energy Audit Incentive	Included with Energy Audit	Type of Rebate	Prescriptive Rebates ¹	
Enbridge Gas Distribution: Home Energy Conservation									
A pre-work house energy audit to receive a list of recommended upgrades and conduct a post-work audit to determine eligibility based on savings achieved	Natural gas	Homeowner or renter	<ul style="list-style-type: none"> › Reside in a designated eligible area › Have an active EGD account › Complete at least 2 upgrades › Use a certified energy auditor to complete audits 	<ul style="list-style-type: none"> › Attic insulation › Wall insulation › Basement wall insulation › Exposed floor insulation › Air sealing (at least 10% reduction) › Window replacement › High-efficiency furnace/boiler › High-efficiency water heater › Drain water recovery system 	Up to \$500 for pre and post energy audits, not including HST	Energy report	Based on gas savings	N/A	<ul style="list-style-type: none"> › Up to \$1,000 to achieve 15-24% savings › Up to \$1,600 to achieve 25%-49% savings › Up to \$2,100 to achieve 50% or more savings
Union Gas: Home Reno Rebate									
A pre-work house energy audit to receive a list of recommended upgrades and conduct a post-work audit	<ul style="list-style-type: none"> › Natural gas › Oil › Propane › Wood 	Homeowner	<ul style="list-style-type: none"> › Own a house (detached, semi-detached, row town or mobile) › Be a Union Gas customer or reside in a franchise area › Complete at least 2 upgrades › Complete the 2 audits in less than 120 days 	<ul style="list-style-type: none"> › Insulation (basement, wall and attic) › Air sealing › Furnace/boiler › Wood-burning system › Water heater › Window/Door/Skylight replacement 	Up to 500\$ for both audits	Energy report	Based on upgrades installed	<ul style="list-style-type: none"> › \$1,000 for furnace/boiler › \$375 for wood/pellet heating › \$500 for water heater › \$80 per window, door or skylight › \$250 per additional measure 	<ul style="list-style-type: none"> › Up to \$5,000 › 100\$ towards a smart thermostat after completing the post-work audit
Manitoba Hydro: Energy Evaluations									
Online energy audit to receive a custom report with recommended upgrades	<ul style="list-style-type: none"> › Natural gas › Electricity 	Homeowner	<ul style="list-style-type: none"> › Have lived in the house for at least 1 year › Have an active Manitoba Hydro account › Use the house as a principal residence (by owner or tenant) 	N/A (customer applies to receive specific rebates from other Manitoba programs after performing upgrades)	Free online audit	Energy report	N/A	Offered via other programs	N/A

^{1,2}The incentive and rebates are expressed in the currency of the country in which the program is offered.

DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution

Final Report



Program Design	Eligibility Criteria				Program Offerings				
	Heat Sources	Customer	Specific Criteria	Eligible Upgrades	Energy Audit Incentive	Included with Energy Audit	Type of Rebate	Prescriptive Rebates ¹	Total Incentive Amount (Including Energy Audits) ²
Énergie et ressources naturelles Québec : Rénoclimat									
A pre-work house energy audit to receive a list of recommended upgrades and conduct a post-work audit to determine eligibility based on savings achieved	<ul style="list-style-type: none"> › Electricity › Natural gas › Propane › Oil 	Homeowner (individuals or business)	<ul style="list-style-type: none"> › Own a house, duplex, triplex or multi-unit building (4-20 units) The house must be: <ul style="list-style-type: none"> › No more than 3 stories › A maximum of 600 m² › Inhabitable all year round with a permanent foundation › Inhabited for at least 1 year › Improve the house's EnerGuide score by at least 1 point 	<ul style="list-style-type: none"> › Insulation (roof, attic, basement, exposed floor and exterior wall) › Air sealing › Heat recovery ventilator › Domestic hot water heater › Drain water heat recovery system › Central electronic thermostat › Geothermal heating system › Air-source heat pump 	Free for both audits (Costs apply to subsequent participation)	<ul style="list-style-type: none"> › Energy report › Label for electric panel 	Based on energy savings and rebates	<ul style="list-style-type: none"> › Up to \$975 for roof insulation › Up to \$1,635 for basement insulation › Up to \$1,300 for crawl space insulation › Up to \$2,440 for wall insulation › \$245 for exposed floor insulation › \$245 - \$490 for air sealing › \$490 for heat recovery ventilation › \$730 for water heater › \$165 for drain water heat recovery › \$50 for central thermostat › \$650 for air-source heat pump › \$2,115 - \$5,365 for geothermal 	<ul style="list-style-type: none"> › Incentive available only when the <u>EnerGuide</u> score is increased by at least 1 point › Multiplication factors applied to air sealing rebate in buildings with more than 2 units › Additional per unit rebate for fuel switch to electricity in multi-unit buildings
Efficiency Nova Scotia (ENS) : Home Energy Assessment									
A pre-work house energy audit to receive a list of recommended upgrades eligible for rebates and conduct a post-work audit	Electricity	Homeowner	<ul style="list-style-type: none"> › Own a house (detached, semi-detached, row town, mobile, or year-round cottage) <u>The house must be:</u> › On a permanent foundation › Inhabited for at least 6 months 	<ul style="list-style-type: none"> › Insulation (foundation, ceiling, roof, attic, exterior wall and exposed floor) › Air sealing › Air source & ductless heat pump › Wood or pellet heating system › Windows, doors and skylights › Heat recovery ventilation › Drain water heat recovery › Solar and geothermal heating › Heat pump or solar water heater 	A cost of \$99 (paid by participants) for Audit D Free Audit E	Energy report	Based on upgrades installed	<ul style="list-style-type: none"> › Up to \$900 for ceiling insulation › Up to \$1,250 for foundation insulation › Up to \$1,800 for wall insulation › Up to \$700 for a ductless heat-pump (\$150 for each additional unit) › Up to \$1,750 for each air source and air-to-water heat pump › Up to \$800 for wood/pellet stove › Up to \$1,750 for wood/pellet furnace › Up to \$2,500 for geothermal › Up to \$350 for heat pump water heater › Up to \$1,250 for solar water heater 	Up to a maximum of: <ul style="list-style-type: none"> › \$3,000 for at least 1 upgrade › \$4,000 for at least 3 upgrades › \$5,000 for at least 4 upgrades



ECONOLER

**DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution**

Final Report

Program Design	Eligibility Criteria				Program Offerings				Total Incentive Amount (Including Energy Audits) ²
	Heat Sources	Customer	Specific Criteria	Eligible Upgrades	Energy Audit Incentive	Included with Energy Audit	Type of Rebate	Prescriptive Rebates ¹	
Efficiency Maine : Home Energy Savings									
Household energy audit to receive a custom list of recommended upgrades eligible for rebates	<ul style="list-style-type: none"> › Natural gas › Electricity › Oil › Propane › Wood 	Homeowner	<ul style="list-style-type: none"> › Own a 1 to 4-unit residential building <u>The house must be:</u> › A principal, year-round residence for occupants › Finished (not in construction) 	<ul style="list-style-type: none"> › Insulation (attic, wall and basement) › Air sealing › Wood or pellet heating system › Air source and ductless heat pump › High-efficiency furnace/boiler › Geothermal 	\$400 rebate for Audit D (no Audit E)	<ul style="list-style-type: none"> › Energy report › 6 hours of air sealing 	Based on upgrades installed	<ul style="list-style-type: none"> › Up to \$2,100 for insulation › \$250-\$750 for ductless heat pump › \$500 for central heating systems (or \$1,000 for natural gas furnace) › \$500 for pellet/wood stove › \$5,000 for wood/pellet furnace/boiler or geothermal › \$100 to combine air sealing with another upgrade 	Up to a maximum of \$5,000
Mass Save : Home Energy Assessment									
A pre-work house energy audit (including direct-install measures) to receive a custom list of recommended upgrades eligible for rebates	<ul style="list-style-type: none"> › Natural gas › Oil › Propane › Wood › Coal › Electricity 	Homeowner	Own and live in a 1 to 4-unit building or single house	<ul style="list-style-type: none"> › Insulation and air sealing › Heating and cooling equipment › Domestic hot water heater 	Free Audit D (no Audit E)	<ul style="list-style-type: none"> › Energy report › Air sealing (walls, windows and doors) › Installation of: <ul style="list-style-type: none"> - LED light bulbs - Water-saving devices › Power strips 	Based on upgrades installed	<ul style="list-style-type: none"> › \$3.50 per sq.ft. of wall insulation › \$3.00 per sq.ft. of floor over garage and cathedral ceiling insulation › Up to \$500 for ductless heat pumps › \$750 for heat pump water heater › \$500 for central AC and heat pump › Up to \$1,600 for heating and water heating equipment 	75% of costs up to \$2,000 for insulation
		Tenant/Renter	Rent a house	<ul style="list-style-type: none"> › Efficient appliances › Additional rebates for the landlord 	Free Audit D (no Audit E)	<ul style="list-style-type: none"> › Energy report › Installation of: <ul style="list-style-type: none"> - LED light bulbs - Water-saving devices › Power strips 	Based on upgrades installed	<ul style="list-style-type: none"> › Up to \$200 to replace refrigerators › Up to \$400 to replace clothes washers 	N/A

DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution

Final Report



Program Design	Eligibility Criteria				Program Offerings				
	Heat Sources	Customer	Specific Criteria	Eligible Upgrades	Energy Audit Incentive	Included with Energy Audit	Type of Rebate	Prescriptive Rebates ¹	Total Incentive Amount (Including Energy Audits) ²
Mass Save : Home Energy Assessment (suite)									
A pre-work house energy audit (including direct install measures) to receive a custom list of recommended upgrades eligible for rebates	<ul style="list-style-type: none"> › Natural gas › Oil › Propane › Wood › Coal › Electricity 	Landlord	Own and rent a 1 to 4-unit building or single house	<ul style="list-style-type: none"> › Insulation › Heating and cooling equipment › Domestic hot water heater › Efficient appliances 	Free Audit D (no Audit E)	<ul style="list-style-type: none"> › Energy report › Air sealing (walls, windows and doors) › Installation of: <ul style="list-style-type: none"> - LED light bulbs - Water-saving devices › Power strips 	Based on upgrades installed	<ul style="list-style-type: none"> › \$3.50 per sq.ft. of wall insulation › \$3.00 per sq.ft. of floor over garage and cathedral ceiling insulation › Up to \$500 for ductless heat pumps › \$750 for heat pump water heater › \$500 for central AC and heat pump › Up to \$1,600 for heating and water heating equipment 	90% of costs, up to \$3,000 for insulation per unit (If all units participate in a 2 to 4-unit building)
		Multi-family	<ul style="list-style-type: none"> › Own or manage a residential complex with more than 5 units › Obtain approval from the owner 	<ul style="list-style-type: none"> › Insulation and air sealing › Lighting, controls and sensor › Heating and cooling equipment › Domestic hot water measures › Efficient appliances › Custom site-specific upgrade 	Free Audit D (no Audit E)	Energy report	Based on upgrades installed	Site-specific custom improvements	Case by case, % of overall project costs



**DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution**

Final Report

Program Design	Eligibility Criteria				Program Offerings				
	Heat Sources	Customer	Specific Criteria	Eligible Upgrades	Energy Audit Incentive	Included with Energy Audit	Type of Rebate	Prescriptive Rebates ¹	Total Incentive Amount (Including Energy Audits) ²
Pacific Gas & Electricity Company (PG&E) : Home Upgrade									
A pre-work house energy audit to receive a custom list of upgrades eligible for rebates	› Natural gas › Electricity	Homeowner or Tenant	› Reside in a detached home or in a building with 2 to 4 units › Obtain approval from the property owner (for tenants) › Complete at least 3 upgrades › Earn a minimum of 150 points	› Insulation (attic and wall) › Air sealing (at least 15% reduction) › Duct-sealing or replacement › High-efficiency water heater › High-efficiency air-conditioner › Windows	None	Energy report	Depends on savings	› Points assigned to each upgrade › Rebates start at \$1,500 and \$100 for each additional 10 points	› Up to \$3,000 › Up to \$6,500 for 45% or more energy savings
Pacific Gas & Electricity Company (PG&E) : Multifamily Rebates									
Based on savings determined from whole-building energy modeling	› Natural gas › Electricity	Building Owners and Managers	› Own a residential building with 5 or more units › Minimum 10% energy savings	› Insulation (attic and wall) › Air sealing (at least 15% reduction) › Duct sealing or replacement › High-efficiency water heater › High-efficiency air-conditioner › Windows	› \$100 per unit (up to 200 units) › \$25 per unit with 25% or more savings	Energy report	Based on savings	Whole building energy modeling	› \$600 per unit at 10% energy savings › Up to \$2,250 per unit with 50% or more energy savings



APPENDIX II HWP BENCHMARKING TABLE

Table 5: HWP Program Benchmarked against Other Utilities’ Similar Programs

Program Provider	Program Name	Eligibility Criteria				
		Heat Source	Customer	Specific Criteria	Free Eligible Upgrades	Additional Rebates
Enbridge Gas Distribution	Home Winterproofing	Natural gas	Homeowner Tenant Social Housing Provider	<ul style="list-style-type: none"> › Have an active EGD account › Pay the natural gas bill › Live in a house built prior to 1980 › Obtain the landlord’s consent (for the tenant) › Meet the household income eligibility criteria or participate in an eligible governmental assistance program 	<ul style="list-style-type: none"> › Insulation (attic, (basement and wall) › Air sealing › CO detectors › Water-saving products › Programmable thermostats › Drain-water heat recovery unit › Heat reflector panels 	› N/A
Union Gas	Home Weatherization Program	Natural gas	Homeowner Tenant	<ul style="list-style-type: none"> › Pay a Union Gas bill › Have a natural gas furnace › Live in a house built before 1975 › Obtain the landlord’s consent (for the tenant) › Meet the household income eligibility criteria or participate in an eligible governmental assistance program 	<ul style="list-style-type: none"> › Insulation (attic, basement and wall) › Air sealing › Water-saving products › Programmable thermostats 	› N/A

**DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution**

Final Report



Program Provider	Program Name	Eligibility Criteria				
		Heat Source	Customer	Specific Criteria	Free Eligible Upgrades	Additional Rebates
Independent Electricity System Operator (IESO)	Home Assistance Program	Electricity	Homeowner Tenant Social Housing Provider	<ul style="list-style-type: none"> › Live in a non-profit housing property › Be the primary or secondary utility account holder listed on the bill › Obtain the landlord's consent (for the tenant) › Own or manage residential housing of a maximum of 3 storeys high and less than 6,400 sq. ft. › Meet the household income eligibility criteria or participate in an eligible governmental assistance program 	<ul style="list-style-type: none"> › Insulation (attic and basement) › Air sealing › Efficient lighting › Smart power bars › Water-saving products › Programmable thermostats › Appliance replacement 	› N/A
Manitoba Hydro	Power Smart Affordable Energy Program	Natural gas Electricity	Homeowner Tenant Landlord Building Owner	<ul style="list-style-type: none"> › Live in or rent all year-round a single detached or semi-detached home (townhouse, row house, multiple house) on permanent foundations Or › Own an apartment building And › Have a Manitoba Hydro account › Meet the household income eligibility criteria or participate in an eligible governmental assistance program 	<ul style="list-style-type: none"> › Insulation (crawl space, basement, wall and attic) › Water-saving products › Energy-efficient lighting › Window sealing (only apartment buildings) › Pipe insulation (only apartment buildings) 	<ul style="list-style-type: none"> › 3,000\$ for a high-efficiency natural gas furnace Or › \$9.50/month during 5 years for a high-efficiency natural gas boiler
Énergie et ressources naturelles Québec	Éconologis	Electricity Natural gas Propane Oil	Homeowner Tenant	<ul style="list-style-type: none"> › Own or rent a house › Pay the heating bill › Have not participated in the program in the last 5 years (for the same house) › Have not participated in the program in the last 3 years (for a different house) › Meet the household income eligibility criteria 	<ul style="list-style-type: none"> › Insulation of electric outlets on exterior walls › Air sealing › Water-saving products › Programmable thermostats 	› N/A

**DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution**

Final Report



Program Provider	Program Name	Eligibility Criteria				
		Heat Source	Customer	Specific Criteria	Free Eligible Upgrades	Additional Rebates
Efficiency Nova Scotia (ENS)	Home Warming	Electricity	Homeowner	<ul style="list-style-type: none"> › Own a single-unit house as a primary residence and provide proof of ownership › Reside year-round in the house › Not have previously received upgrades through the current or previous program › Meet the household income eligibility criteria 	<ul style="list-style-type: none"> › Insulation (crawl space, basement, wall and attic) › Air sealing › Mechanical ventilation › Water management › Appliance replacement › CO detector › Dehumidifier 	› N/A
Efficiency Maine	Low Income Weatherization	Natural gas Electricity Oil Propane Wood	Homeowner Tenant	<ul style="list-style-type: none"> › Pay the heating bill › Participate for the first time › Reside year-round in the house › Meet the household income eligibility criteria or own or live in a single- or double-wide mobile home or a house with a value of \$80,000 or less 	<ul style="list-style-type: none"> › Air sealing › LED bulbs › Water-saving products 	<ul style="list-style-type: none"> › \$1,000 for an Audit D and basic upgrades › \$1,000 per insulation zone › Up to \$2,000 for a heating system
Mass Save	Energy Efficiency and Weatherization Assistance Programs	Natural gas Oil Propane Wood Coal Electricity	Homeowner Tenant Landlord	› Meet the household income eligibility criteria	<ul style="list-style-type: none"> › Insulation and air sealing › Heating system › Efficient lighting › Appliance replacement › Water-saving products › Dehumidifier and AC 	› N/A
			Building owner or manager	<ul style="list-style-type: none"> › Own or manage a residential complex with 5 units or more in which at least half of the units are income-eligible › Be serviced by one or more of the eligible Energy Efficiency Program Administrators 	<ul style="list-style-type: none"> › Insulation and air sealing › Heating system › Water heating system › Efficient lighting › Appliance replacement › Ventilation 	



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**DSM Conservation Programs – Process Evaluation
Enbridge Gas Distribution**

Final Report

Program Provider	Program Name	Eligibility Criteria				
		Heat Source	Customer	Specific Criteria	Free Eligible Upgrades	Additional Rebates
Pacific Gas & Electricity Company (PG&E)	Energy Savings Assistance Program	Natural gas Electricity	Homeowner Tenant	<ul style="list-style-type: none"> › Live in a house, mobile home or apartment that is at least 5 years old › Meet the household income requirement 	<ul style="list-style-type: none"> › Insulation and air sealing › Heating system › Water-heating system › Efficient lighting › Appliance replacement › Water-saving products 	› N/A



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HOME RENO REBATE PROGRAM OFFERING

UNION GAS

Final Report

Process Evaluation

October 10, 2019



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ABBREVIATIONS

CEA	Certified energy auditor
D assessment	Pre-renovation energy assessment
DSM	Demand-side management
E assessment	Post-renovation energy assessment
GIF	Green Investment Fund
HRR	Home Reno Rebate
HVAC	Heating, ventilation, and air conditioning
IESO	Independent Electricity System Operator
QA	Quality assurance
SO	Service organization
Union	Union Gas



TABLE OF CONTENTS

INTRODUCTION	1
1 PROGRAM OVERVIEW	2
2 EVALUATION APPROACH	6
3 EVALUATION RESULTS	9
3.1 Program Theory and Logic Model	9
3.2 Program Participation	11
3.3 Participant Perspectives	13
3.4 Service Organization and Certified Energy Advisor Perspectives.....	19
3.5 Program Processes	25
3.5.1 Delivery Process	25
3.5.2 Data Tracking and Monitoring Process.....	28
3.5.3 Program Database	30
3.5.4 Quality Assurance.....	31
KEY FINDINGS AND RECOMMENDATIONS	33
APPENDIX I PROGRAM MANAGEMENT AND MARKETING STAFF INTERVIEW GUIDE	39
APPENDIX II DATA TRACKING AND REPORTING AND MARKET RESEARCH STAFF INTERVIEW GUIDE.....	45
APPENDIX III SERVICE ORGANIZATION INTERVIEW GUIDE	50
APPENDIX IV CERTIFIED ENERGY AUDITOR INTERVIEW GUIDE.....	58
APPENDIX V HRR PROGRAM OFFERING THEORY	67



LIST OF TABLES

Table 1: Evaluation Approach	6
Table 2: Recommendations for Improvement.....	18
Table 3: CEA and SO Suggestions for Increasing the Number of Upgrades per Participant	21
Table 4: CEA and SO Suggestions on How to Increase Uptake in the Insulation Measure	21
Table 5: CEA and SO Suggestions on How to Improve Data Tracking and Reporting	23
Table 6: SO Program Satisfaction.....	24
Table 7: CEA Program Satisfaction.....	24
Table 8: CEA and SO Suggestions on How to Improve the Program	25
Table 9: Cost-Benefit Analysis of Recommendations.....	38

LIST OF FIGURES

Figure 1: HRR Program Offering Logic Model.....	10
Figure 2: Annual Participation of Union Gas Customers.....	12
Figure 3: Breakdown of HRR Projects by the Number of Upgrades in Each Project.....	12
Figure 4: Sources of Program Awareness.....	13
Figure 5: Percentages of Participants who Visited Websites before Deciding to Participate in the HRR program offering.....	14
Figure 6: Satisfaction with the HRR Program Offering	14
Figure 7: Overall Experience with the HRR Program Offering by Month	15
Figure 8: Satisfaction with the Pre-Renovation Assessment (D Assessment)	16
Figure 9: Satisfaction with the Post-Renovation Assessment (E Assessment)	17
Figure 10: Reasons for Not Implementing the Remaining Recommended Measures.....	17
Figure 11: HRR Delivery Process Steps	27
Figure 12: HRR Data Tracking and Reporting Process	29



EXECUTIVE SUMMARY

This report presents the results of the process evaluation of the Enbridge Gas Inc., operating as Union Gas (hereinafter referred to as Union),¹ Home Reno Rebate² (HRR) program offering. The HRR program offering takes a holistic approach to achieving energy savings by helping homeowners understand improvement opportunities throughout their home and encouraging them to install upgrades that generate long-lasting energy savings. To do so, the program offers financial incentives for pre-renovation energy assessments (D assessments), energy efficiency upgrades, and post-renovation energy assessments (E assessments).

Summary of the Evaluation Approach

This evaluation covers the 2018 program year from January 1 to December 31 inclusively. The main objectives of the HRR process evaluation are to:

- › Identify opportunities to improve the efficacy of program offerings and implementation efforts;
- › Determine whether the data entry and quality assurance processes are sufficiently robust, efficiencies can be gained, or enhancements need to be made.

To meet the evaluation objectives, Econoler (hereinafter the Evaluator) completed the following activities:

- › A program database and documentation review;
- › Interviews with Union program staff;
- › Interviews with service organizations (SOs) and certified energy auditors (CEAs);
- › A Union market research survey results review.

Process Evaluation Key Findings and Recommendations

The following presents an overview of the Evaluator's key findings and recommendations resulting from the Home Reno Rebate program offering process evaluation.

The HRR program offering's logic model and program theory are well documented. This documentation enables the program administrator to carefully consider likely program outcomes and ensure that the strategic approaches lead to the desired results. The Evaluator made a few adjustments to the program theory and logic model to better reflect the current program strategy. The logic model should be continuously adapted to reflect any program changes and changes in external factors. The program theory includes a few performance indicators linked to the expected long-term program outcomes, which is a good practice.

¹ As of January 1, 2019, Union Gas and Enbridge Gas Distribution were merged into one utility under the legal name Enbridge Gas Inc.

² As of May 1, 2019, the Home Reno Rebate program was rebranded with Enbridge's Home Energy Conservation program into one program called the Home Efficiency Rebate program.



Recommendation No. 1: Define additional performance indicators to correspond with the adjusted logic model and track all performance indicators linked to program objectives.

The program successfully engaged a large number of participants. The HRR program offering is designed to have a significant impact on the residential market by adhering to a whole-house approach to achieving long-term energy savings. Although achieved energy savings are not covered by the scope of this evaluation, the high uptake of the program in the marketplace and the positive feedback from partners indicate the appeal of the program offering.

The HRR program offering effectively leverages its partner network for program promotion and delivery. Union has developed a strong network of partners to promote and deliver the program. Union collaborates with SOs that work with participants through all stages of the program. SOs' work with their networks of CEAs who perform the energy assessments and collaborate with contractors who play an important role in generating participant leads. Union also contributes to program awareness through its website, advertising or bill inserts.

There is high satisfaction among partners with respect to their working relationships and communication between CEAs, SOs and Union. The HRR program offering relies on SOs and CEAs to facilitate the delivery of the program. Therefore, communication and collaboration among partners are essential. The CEAs surveyed were very satisfied with their relationship with Union (with the satisfaction levels ranging from 8 to 9 on a 10-point scale). Surveyed SOs were also very satisfied with their relationship with Union (with the satisfaction levels ranging from 8 to 10 on a 10-point scale). SOs appreciate Union's openness, availability, efficiency at providing information and quick turnaround in answering questions or responding to issues.

The program relies heavily on furnace replacements and contractor referrals, which should be considered when measuring free-ridership. Contractor referrals (mostly from HVAC contractors) are a main driver for program participation. Since contractor referrals are a key driver for program participation, it is necessary to take contractors' recommendations into account in the free-ridership measurement. Otherwise, the free-ridership level may be overestimated.

The program uses furnace replacement opportunities as an entry point into the program to engage homeowners and encourage participants to implement other measures to improve the efficiency of their home. The program data shows that 88% of HRR projects included a furnace upgrade and 79% included air sealing.

Recommendation No. 2: Investigate current practices among contractors for pairing air sealing with furnace replacements to assess what target of air sealing should remain incentivized by the program and counted in the minimum number of upgrades to be implemented.



Recommendation No. 3: When assessing free-ridership as part of the net impact evaluation, measure the influence of recommendations made by program partners (contractors and CEAs) on the types of upgrades installed by participants.

Union staff reported a low number of unconverted assessments. The program covers the cost of pre and the post-renovation energy assessments and reimburses participants upon completion of the post-renovation energy assessment, which is a good practice for maximizing the number of participants completing both the D and the E assessments. However, the number of unconverted assessments, while available in Parachute, was not tracked in the master database.

Recommendation No. 4: Track and monitor the number of unconverted assessments.

Opportunities remain for better communicating the benefits of potential upgrades. CEAs try to encourage participants to install more upgrades by educating them on potential energy and cost savings during the D assessment.

In total, 61% of participants installed the minimum number of upgrades required by the program. Participants identified financial constraints as the main barrier to not implementing the recommended measures, which was followed closely by a belief that their homes did not need the upgrades. Moreover, the only two aspects that received relatively lower satisfaction ratings from participants are related to the level of information shared about ways to reduce energy use.

The EnerGuide Homeowner Information sheet and the Renovation Upgrade Report are provided to homeowners to educate them on energy saving opportunities in their home. However, results indicate that further efforts could be made to better communicate energy assessment results in a simplified, easy to digest manner, including the benefits of potential upgrades, to minimize lost opportunities. This was also identified by the SOs and CEAs interviewed.

Recommendation No. 5: Provide CEAs with an additional tool(s) to better communicate the benefits of recommended measures, such as an online tool that allows participants to analyze the costs, rebates and benefits of the measures.

Insulation is the largest untapped opportunity for achieving gas savings in participating houses. All interviewed CEAs mentioned that insulation is one of the most frequently recommended upgrades. However, only 35% of participants installed insulation under HRR. The main recommendation from program partners on how to increase insulation uptake is to increase the rebate amount for this measure.



Recommendation No. 6: Consider ways to increase uptake in insulation upgrades, such as increasing the rebate amount or better communicating the benefits of installing insulation (as per Recommendation 5 above).

The HRR program offering provides a satisfying customer experience. Most participating customers were very satisfied with their overall experience with the HRR program offering, the ease of participating in the program and their interactions with the CEA during both assessments. Union's market research results show that overall satisfaction with the program varied somewhat among SOs. Union provides feedback to SOs on how they compare to their peers.

Recommendation No. 7: Continue to monitor participant satisfaction among SOs to respond quickly to any changes in satisfaction levels.

Length of time to receive payment impacts participant satisfaction. Union's market research findings show that overall satisfaction with the program declines when payment is received later than expected. Reducing the time for issuing the rebate, as suggested by 15% of surveyed participants, could therefore increase overall satisfaction with the HRR program offering. Several factors impact the time required for issuing the rebate and Union has taken steps to target a number of these factors. Union staff and SOs both indicated that delays occur when there is confusion in identifying the right person to receive program rebate.

Cheques are issued at the end of the participation process, after the project application has been fully approved. Union aims to have cheques mailed out to participants 120 days after submission of the E assessment. However, other steps to be completed before submitting the E assessment sometimes result in delays. Customers do not receive automatic updates on their application status. If customers are curious about the status of their cheque, they may contact Customer Care or their CEA.

Recommendation No. 8: Consider ways to identify the correct program participant to avoid delays in processing applications, for example, by validating participant information earlier in the participation process (i.e. during the D assessment).

Recommendation No. 9: Provide customers with notices when their project application is received and approved.

The program data tracking, monitoring and reporting process is complete and effective and follows best practices. The process is automated where possible and utilizes tools that provide automatic checks, error flags and warnings. Union has updated processes to adapt to increased project volume and continuously reviews and improves processes to accommodate program changes and implement any efficiencies to streamline processes.

The Parachute system meets the data needs of SOs and Union. Both CEAs and SOs are satisfied with the Parachute system and Union's data-tracking and reporting process. Union staff also reported satisfaction with the Parachute system because it improves data integrity and consistency, allows for efficient resolution of data discrepancies with SOs and CEAs and improves the ability to plan based on the volume of applications.



The data reporting process among SOs is inconsistent. The Evaluator found inconsistent practices among SOs. First, some SOs have project files approved by NRCan prior to inputting the data into Union's Parachute system while others do not. Second, there are inconsistencies among SOs in whether issues identified during the NRCan review are corrected in Parachute or not. Submitting files to Union prior to NRCan's review is seen as a way to reduce delays in the project approval process. However, the practices should be consistent among SOs.

Recommendation No. 10: Make SO practices for NRCan file approval consistent. If the program data is inputted into Union's Parachute system prior to NRCan approval, monitor a sample of project files and NRCan-approved files, sampled over at least a year, to confirm that the difference between the two groups of files is minor and no adjustment is needed.

The master database³ is well organized and clear and contains the main information required for program management and evaluation purposes. Several pieces of information, although not essential, could be added to support program monitoring and track potential lost opportunities.

The process of adding projects to the master database involves copy-pasting project information into the file and might thus introduce errors.

Recommendation No. 11: Add information to the master database to support program monitoring and planning, as well as a future program strategy. More specifically:

- › Include all the recommended measures and their savings potential shown in the D assessment to enable a better understanding of the measures that have not been implemented by participants to inform future program design and marketing strategies.
- › Include the overall savings potential from the D assessment.

Recommendation No. 12: Add safeguards in the master database to reduce the risk of introducing errors. Consider locking formulas in the spreadsheet so that they cannot be tampered with accidentally (e.g. locking the savings formulas in Columns DV and DZ).

The HRR QA protocol is sufficient with some room to improve consistency among SOs. The HRR program offering largely relies on NRCan QA processes to ensure data quality and integrity. All SOs interviewed each have a designated QA specialist and reported following NRCan's protocol in conducting internal QA audits. All interviewed SOs followed the documentation retention protocols in Union's SO agreement. However, only one of the three SOs had a written QA process and there were some inconsistencies in how errors found in NRCan's QA audits were corrected in Union's system. A 2018 QA activity performed by Union found differences of less than 2% between NRCan's file data and Parachute.

Recommendation No. 13: Ensure that SOs consistently follow the QA guidelines in SO agreements and that practices for making corrections based on QA audits are consistent among SOs.

³2018 RHRR MASTER FILE FINAL-For Econoler.xls.



INTRODUCTION

Enbridge Gas Inc., operating as Union Gas (Union),⁴ has administered demand-side management (DSM) programs in the province of Ontario for the last 20 years. Union programs are meant to help Ontarians improve the energy efficiency of their homes and workplaces by installing high-efficiency equipment and changing their behaviours to become more energy efficient.

Econoler was engaged by Union to evaluate its residential program, the Home Reno Rebate (HRR) program offering.⁵ Union works in collaboration with service organizations (SOs) and certified energy advisors (CEAs) across the province to deliver the program and offer rebates on energy-efficient measures and products such as insulation, air sealing, heating systems and windows. This evaluation focuses on assessing the HRR program offering and implementation, as well as determining if the processes for data tracking, reporting, and quality assurance are adequate and sufficient. This evaluation covers the 2018 year from January 1 to December 31 inclusively.

Econoler (hereinafter the Evaluator) was in charge of coordinating and supervising all evaluation activities, developing data-collection instruments, conducting in-depth interviews, as well as preparing the evaluation report.

⁴ As of January 1, 2019, Union Gas and Enbridge Gas Distribution were merged into one utility under the legal name Enbridge Gas Inc.

⁵ As of May 1, 2019, the Home Reno Rebate program was merged with Enbridge's Home Energy Conservation program into one program called the Home Efficiency Rebate program.



1 PROGRAM OVERVIEW

Program Goals and History

Launched by Union in 2012, the HRR program offering takes a holistic approach to achieving energy savings by helping homeowners understand improvement opportunities throughout their home and encouraging them to install upgrades that generate long-lived energy savings. To do so, the program offers financial incentives for pre-renovation energy assessments (D assessments), energy efficiency upgrades, and post-renovation energy assessments (E assessments).

The HRR program offering also provides energy information to customers through the energy assessment and is therefore a critical vehicle of energy literacy among Union residential customers. At the onset of the program in 2012, Union customers had to have a natural gas furnace or boiler to be eligible for the HRR program offering. In 2016 and 2017, Union coordinated with the Government of Ontario and the Independent Electricity System Operator (IESO) to respectively offer the Green Investment Fund (GIF) and the Whole Home Pilot in conjunction with the HRR program offering. These partnerships provided the opportunity for Union and its partners to enhance the existing HRR program offering, increase participation regardless of home heating fuel types, and support activities that also reduce electricity consumption in retrofitted homes. These partnerships expanded the reach of the program into the following markets:

- › GIF extended eligibility to homes that use oil, propane or wood as their primary heating fuel and incremental natural gas customers.
- › The Whole Home Pilot expanded the target market to include electrically heated homes.

In addition, through the Whole Home Pilot, all qualifying HRR participants could receive rebates on electric ENERGY STAR® appliances, including refrigerators, freezers, dehumidifiers, window air-conditioners, clothes washers and electrically commutated motors on central heating or air-conditioning systems. The GIF funding also allowed Union to launch a behavioural offering, as well as provided increased incentives on HRR eligible measures, a rebate of \$100 on smart thermostats to all qualifying participants, and a rebate for air source heat pumps (ASHP). Since the Whole Home Pilot and GIF funding ended on October 1, 2018 and November 1, 2018 respectively, the HRR program offering has now gone back to the reduced incentive levels, for which only Union customers with natural gas heating systems are eligible.



Program Eligibility

The HRR program offering is available to Union residential customers living in detached and semi-detached, as well as townhouses and mobile homes with natural gas furnaces or boilers as the main heating source. To be eligible for the HRR program offering, participants must install at least two of the following energy upgrades or products:

- › Attic insulation;
- › Exterior wall insulation;
- › Basement wall insulation;
- › Air sealing;
- › Window, door and skylight replacements with a certified ENERGY STAR model;
- › High-efficiency natural gas furnace or boiler;
- › High-efficiency natural gas water heater.

Program Incentives

The HRR program offering offers up to \$550 to cover the cost of the pre and post-renovation energy assessments. The cost is reimbursed to participants upon completion of the post-renovation energy assessment and approval of the project application.

For all the eligible upgrades installed, prescriptive rebates are available, thus allowing participants to know exactly how much they will receive from the program. Union established the rebates by balancing the amounts in proportion to the incremental cost and the savings potential of the measures.

Since 2016, customers completing more than two upgrades also qualify for a \$250 bonus for each additional upgrade installed to encourage them to achieve more energy savings. The bonus rebate did not apply to smart thermostats, air source heat pumps in non-electrically-heated home or the measures introduced through the Whole Home Pilot.

In 2016, the maximum rebate payment (the cap) for each home ranged from \$2,500 to \$5,000, which was the sum of all the assessment costs, measure rebates and the bonus rebate, where applicable. The \$5,000 maximum did not apply to smart thermostats, air source heat pumps or the measures introduced through the Whole Home Pilot.



Program Delivery and Partners

Over the years, Union has developed a strong network of partners to deliver the HRR program offering. Union collaborates with 10 SOs, which work with participants through all stages of the program, educating them on the program, scheduling and delivering D and E assessments and providing results to Union. SOs work with their network of CEAs who conduct energy assessments, identify potential energy-saving measures and prepare a report for and deliver it to participants. SOs also collaborate with contractors, educating them on the program because contractors are a key generator of participant leads.

Homeowners can register by phone by contacting a SO in their area that pre-qualifies customers and provides additional program information. Once eligibility is confirmed, homeowners are scheduled for a pre-renovation assessment with a CEA who then visits the home to perform the pre-renovation assessment, including a blower door test.

During the pre-renovation assessment, the CEA collects information about the home to determine current home energy use and profile and develop a list of potential upgrades that could be eligible for incentives. Based on the pre-renovation energy assessment, the CEA prepares a report for the customer, recommending applicable energy upgrades. The customer then hires a contractor to implement at least two of the upgrades recommended. Customers may also complete the work themselves. Following completion of the upgrades, the customer contacts the SO that completed the pre-renovation assessment to conduct a post-renovation energy assessment. This second assessment must be completed within 120 days after the first assessment. The CEA calculates the new home energy rating, using Natural Resources Canada's EnerGuide Rating System, and then provides the data to their SO to be submitted to Union or directly submits the data to Union. Union verifies and reviews the application. Once the application is approved, the homeowner is mailed a rebate cheque for the qualifying upgrades implemented in the home.

Program Marketing and Outreach

Over the years, Union has used traditional marketing tactics, such as mass media and targeted promotions, to create awareness among its customers and encourage program participation. Union has also provided SOs with promotional materials, training and ongoing engagement and coaching to help them deliver the HRR program offering and generate participant leads.

In the spring of 2018, Union focused on digital marketing as its primary marketing tactic. The objective was to raise customer awareness about undertaking a D assessment prior to starting any work to generate awareness about the offering and, in turn, more fulsome knowledge of the opportunities in the home to facilitate a holistic approach that includes energy efficiency; in the fall, the focus was to generate increased program take-up as the weather got colder.



Union used the following marketing tools and tactics:

- › Newspaper and radio advertisements in major cities across Union's program delivery area;
- › Digital tactics, including targeted Facebook posts, LinkedIn ads, YouTube ads and online banner advertisements on websites;
- › Search engine marketing to ensure the HRR website was prominently displayed when key words were searched;
- › Bill inserts;
- › Flyers and door hangers, distributed by SOs and CEAs;
- › Posters for use at various trade shows and events;
- › Print advertisements in several industry-specific publications, such as Canadian Contractor, Contracting Canada, Contractor Advantage, and Renovation Contractor.





2 EVALUATION APPROACH

The main objectives of the HRR evaluation are as follows:

- › Identify opportunities to improve the efficacy of the program offering and implementation efforts;
- › Determine if the processes for data entry and quality assurance are sufficiently robust or whether efficiencies can be gained or enhancements need to be made.

The Evaluator identified key research questions aimed at achieving the aforementioned objectives. Table 1 below outlines the evaluation objectives and maps them to the research questions and methods. The evaluation focused on participants’ perspectives and projects of Union customers only because, starting November 1, 2018, non-Union customers were no longer eligible for the HRR program offering.

Table 1: Evaluation Approach

Evaluation Objective	Research Question	Method
Program offering and implementation	Are there opportunities to improve the efficacy of the program offering, including eligibility requirements?	<ul style="list-style-type: none"> › Union staff interviews › SO interviews › CEA interviews › Program documentation review › Union Market Research survey results review
	Are there opportunities to improve program awareness and communications?	
	Using Union’s Market Research results, what is participant satisfaction with the program, including impacts of the postal strike on customer satisfaction?	
	What, if any, are the difficulties or barriers to program delivery?	
	What is partner satisfaction with the program, including their interactions with Union and SOs?	
Data tracking, processes and quality assurance	Is the program administration and delivery approach, including activities of SOs, internal processes, and risk mitigation, effective and efficient?	<ul style="list-style-type: none"> › Union staff interviews › SO interviews › CEA interviews › Program documentation review › Union Market Research survey results review
	Is the program theory and logic model complete and relevant?	
	Is program tracking, monitoring, and reporting complete and effective?	
	Does the CEA-facing system meet the data needs of CEAs and Union?	
	Do the quality control and assurance measures in place ensure program data integrity?	
	Are program processes consistent with program intentions?	
	Do the SOs adhere to the documentation retention protocols outlined in Union’s agreements with SOs?	



The Evaluator first held a kick-off meeting with Union staff and conducted a preliminary program documentation review to learn about the main program components and mechanisms and inform the data-collection instruments. Then, specific evaluation activities were undertaken as described in the following subsections.

Union Staff Interviews

The Evaluator conducted interviews with program staff responsible for program management, market research, data tracking, and reporting. The interviews provided insight into the program offering and delivery, marketing methods, participant and partner experiences, program processes, data tracking, as well as reporting and quality assurance.

The guides used for the interviews are outlined in Appendix I and Appendix II.

SO Interviews

Union provided the Evaluator with a list of SOs participating in the HRR program offering, from which the Evaluator selected the three organizations with the highest number of applications. All three responded to our request for an interview. Altogether, they accounted for over 60% of all 2018 applications.

The respondents were guaranteed confidentiality so that the information they provided does not identify themselves or their organizations. Responses are provided in the following section to show the opinions expressed through the interview process. These passages represent respondents' views only and it may not be accurate to draw population-wide conclusions considering the small sample size.

The guide used for conducting the interviews with SOs is outlined in Appendix III.

CEA Interviews

Union provided the Evaluator with a list of CEAs participating in the HRR program offering, among whom the Evaluator intended to select and interview five. The Evaluator randomly selected three CEAs from each of the largest SOs and two CEAs from every other SO, for a total of 18 CEAs. Then, this list was shortened to nine CEAs by removing those CEAs who no longer work for a SO. Five CEAs responded to our request for an interview. Altogether, they accounted for 5% of all the 2018 applications.

The respondents were guaranteed confidentiality so that the information they provided does not identify themselves or their organizations. Responses are provided in the following section to show the opinions expressed through the interview process. These passages represent the prevailing views held by the interview respondents only; it may not be accurate to draw population-wide conclusions considering the small sample size.

The guide used for conducting the interviews with CEAs is outlined in Appendix IV.



Program Documentation Review

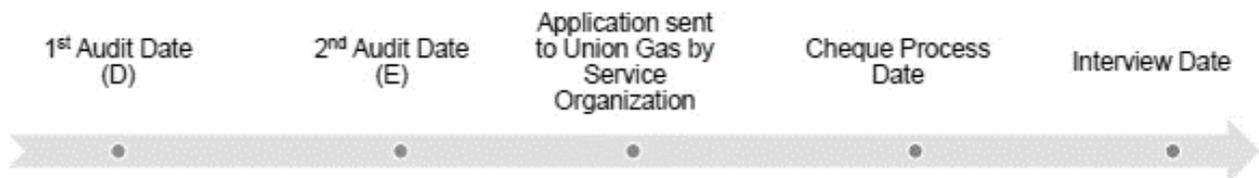
The Evaluator reviewed the following program documents and sources of information as part of this assignment:

- › Union website;
- › Union DSM Annual Report;
- › Union 2015-2020 DSM Plan;
- › Program theory and logic model;
- › Program data process;
- › Program full process;
- › Program database;
- › NRCan EnerGuide quality assurance procedures;
- › Program terms and conditions;
- › Service organization agreement;
- › Participant acknowledgement form;
- › Program marketing material.

Union Market Research Survey Results Review

The Evaluator reviewed Union market research on the HRR program offering. From February 2018 to January 2019, NRG Research conducted a survey with 1,672 customers and 662 non-customers who participated in the HRR program offering. Participants were contacted by telephone in the calendar month after the month that their rebate cheque was mailed out to them by Union.

The data collected was reported monthly, based on the month the interview took place. The following chart illustrates the participation process steps before the interview date:





3 EVALUATION RESULTS

This section presents the results of the process evaluation, provides a review of the program theory and logic model, presents an analysis of 2018 program participation as well as the participants', SOs' and CEAs' perspectives, and reports on the findings on program processes.

3.1 Program Theory and Logic Model

A logic model is a diagram representation that illustrates the causal links between program activities and the likely outputs and outcomes in the market, while the program theory describes these causal links in words. The logic model should reflect the current program strategy and is therefore expected to evolve to reflect program changes and adapt to changes in external factors. Illustrating the program logic can reveal deficiencies in program focus or effort and help ensure that all those involved know what the program seeks to accomplish. In addition, the logic model for which performance indicators have been established is a relevant management tool for monitoring intended program outcomes.

The HRR program offering has a well-documented program theory and logic model that describes how the program is expected to work and how it contributes to the intended or observed outcomes. Developed at the program design stage, the theory and model illustrate the intended program strategy. To better illustrate the current program strategy, the Evaluator made a few adjustments to the program theory and logic model, including the following three most noteworthy changes:

- › Better illustration of the role of contractors in generating participant leads. Initially, this responsibility was planned to be more on the SO side.
- › Addition of the post-renovation assessment (the E assessment) as an intermediate outcome.
- › Integration of the educational part of the program in the form of a long-term outcome.

The updated logic model is depicted in Figure 1 below.

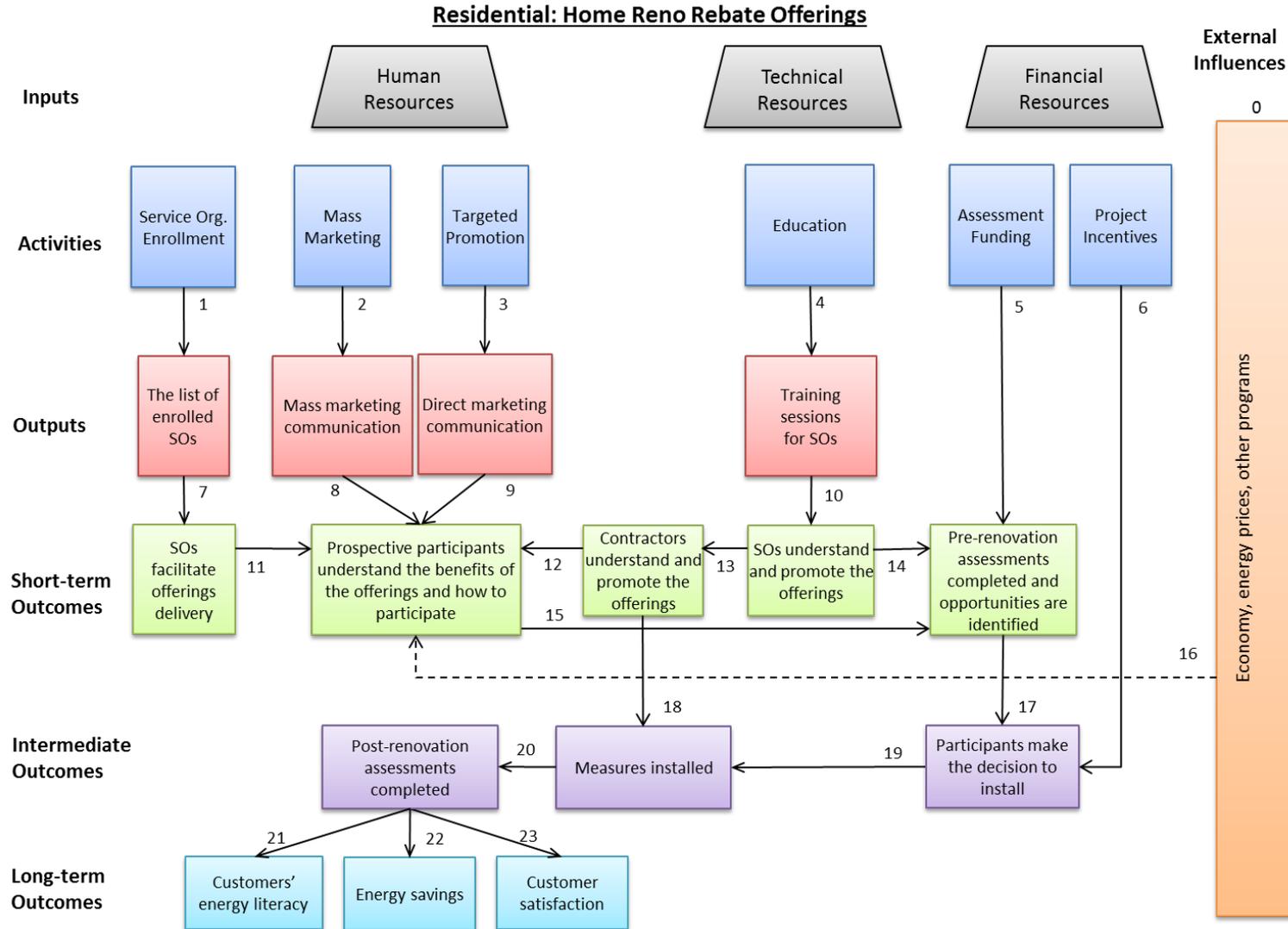


Figure 1: HRR Program Offering Logic Model



The program theory includes performance indicators for the long-term expected program outcomes, which is good practice. To improve program management, the Evaluator suggests adding other performance indicators to track and monitor expected program outcomes. These performance indicators are based on the outcomes outlined in the logic model and are expected to not only help quantify program objectives and outcomes, but also facilitate regular follow-up and monitoring. All the performance indicators and monitoring approaches should be included in the program documentation. Such indicators include the conversion rate between the D and E assessments, the number of energy efficiency measures installed per participant, the number of E assessments completed, and participant literacy about their homes' energy efficiency. Union currently tracks a number of these indicators; however, new indicators should be tracked and all indicators should be monitored for program management. The updated program theory is presented in Appendix V.

3.2 Program Participation

The HRR program offering has had significant uptake and has consistently met the cumulative natural gas savings targets set in Union's 2015-2020 DSM Plan. From January 2018 through December 2018, a total of 16,118 projects were completed by Union customers and their applications were submitted and approved in this period. These projects are those completed by Union customers with natural gas heating systems and do not include any additional projects attributed to GIF or the IESO Whole Home Pilot. As presented in Figure 2 below, Union Gas customer participation has grown significantly since 2015. The onset of additional incentives available for Union customers from the GIF program and IESO Whole Home Pilot was a key driver for increased participation in 2017 and 2018. Furnaces and air sealing were the top two types of upgrades installed in 2018.

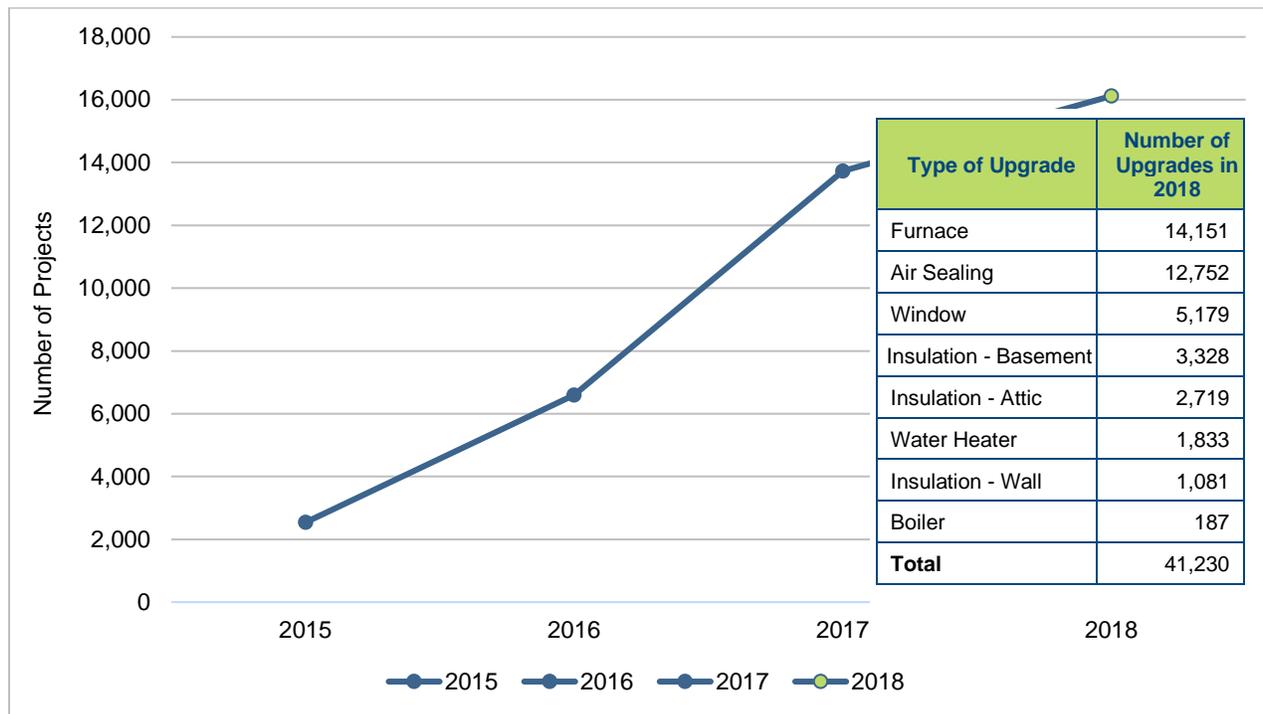


Figure 2: Annual Participation of Union Gas Customers

Figure 3 below breaks down completed projects by the number of upgrades installed in each individual project. More than half of participants (61%) installed the minimum number of upgrades required by the program. On average, 2.6 upgrades were installed in each project.⁶

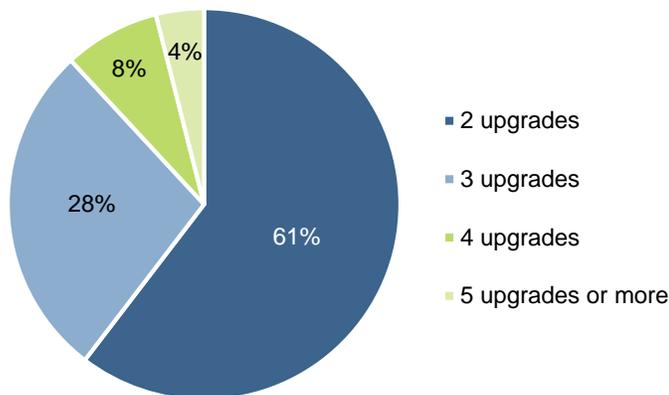


Figure 3: Breakdown of HRR Projects by the Number of Upgrades in Each Project

⁶ This average does not include smart thermostats, which were solely GIF funded or IESO funded measures.



Overall, 88% of energy efficiency projects included a furnace upgrade and 79% included air sealing. The majority (69%) of projects included both furnace and air sealing. Insulation was implemented in 35% of projects. The average cost of upgrades (not including incentives) installed was \$8,148.

3.3 Participant Perspectives

The following subsections present the main findings of the survey conducted and analyzed through Union’s market research. In all, 1,672 Union customers who participated in the HRR program offering were surveyed.

Program Awareness and Outreach

Half of participants (50%) learned about the program from a contractor or professional, mostly HVAC contractors, indicating that the latter are a key entry point into the program. As outlined in Figure 4 below, Union also contributed to program awareness through its website, advertising, or bill inserts.

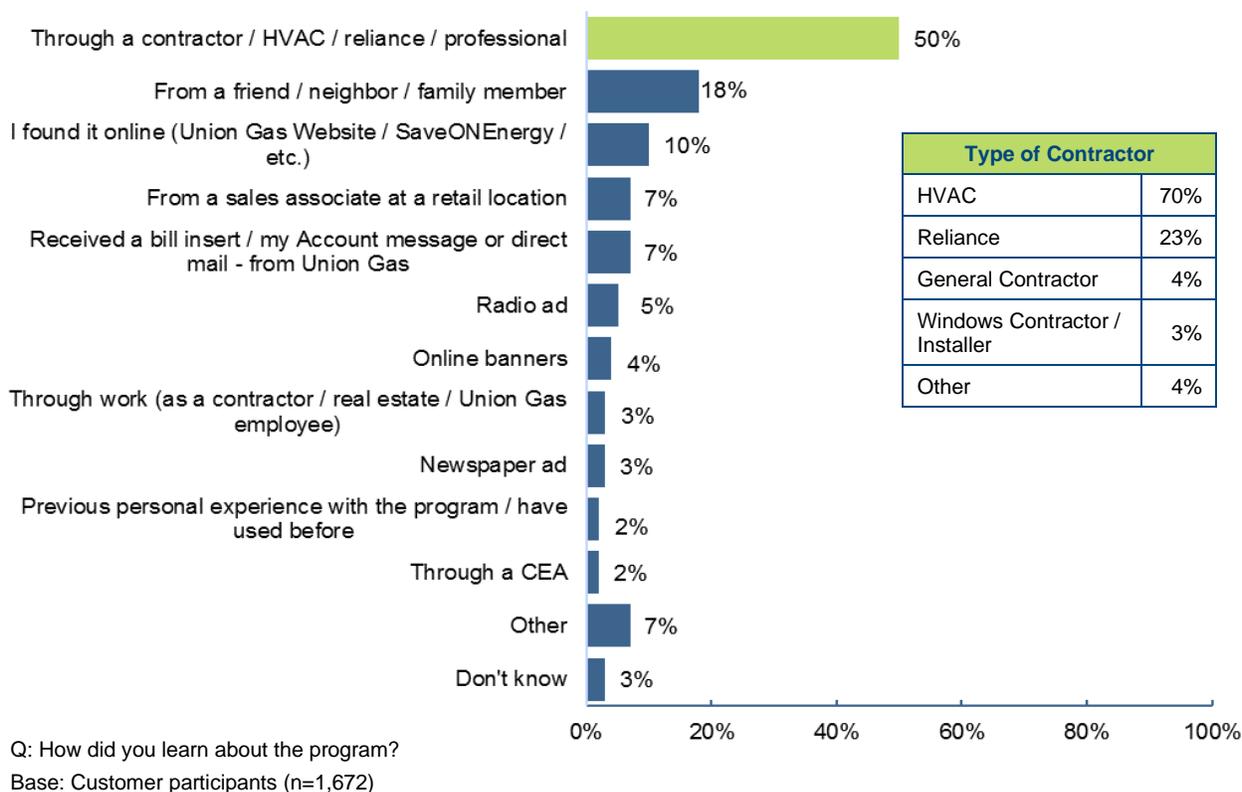
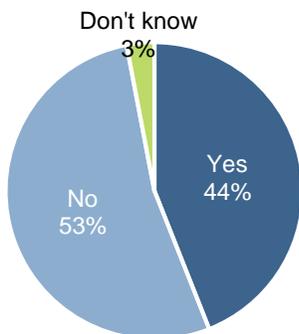


Figure 4: Sources of Program Awareness

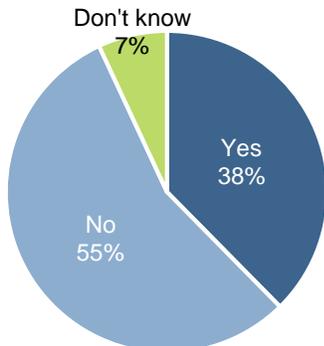
Websites are a key source of information for participants; just over half of participants visited at least one of the three websites listed below prior to deciding to participate in the program. The Union website was visited by 44% of participating customers.



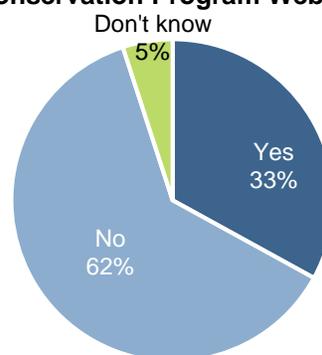
Union Gas Website



SaveON Energy Website



Ontario Home Energy Incentive Conservation Program Website



Q: Before deciding to participate in the HRR program offering, did you visit the SaveON Energy website for more information? Visit the Union Gas website for more information? Visit the Ontario Home Energy Incentive Conservation Program website for more information?

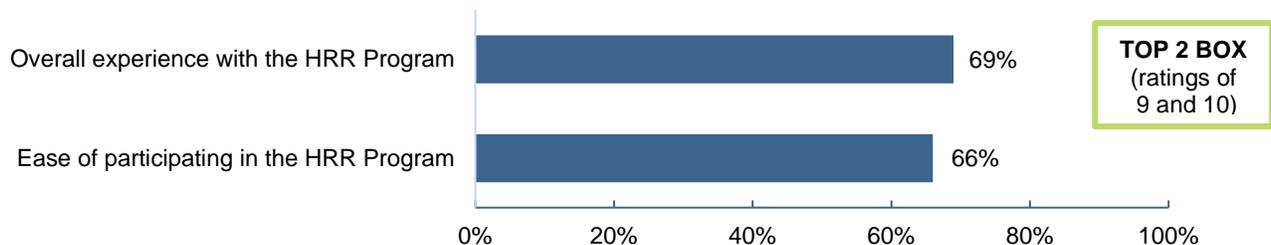
Base: Customer participants (n=1,672)

Figure 5: Percentages of Participants who Visited Websites before Deciding to Participate in the HRR program offering

Satisfaction

Participants were asked about their satisfaction with the overall program and specific aspects of the pre and post-renovation assessments. The following figures present only the top two boxes, or ratings of 9 and 10 on a 10-point scale where 1 means “very dissatisfied” and 10 means “very satisfied”.

The HRR program offering achieved a very high level of satisfaction. Indeed, 69% of participating customers were very satisfied with their overall experience with the HRR program offering. Two-thirds (66%) were also very satisfied with the ease of participating in the program. Union’s market research reports that satisfaction results vary somewhat by SO, which suggests that there may be opportunities to share best practices across organizations.



Q: Thinking about your overall experience, how satisfied were you with the following? Please use a scale from 1 to 10 where 1 means “Very Dissatisfied” and 10 means “Very Satisfied”.

Base: Customer participants (n=1,672)

Figure 6: Satisfaction with the HRR Program Offering



The survey results were analyzed by month to see if the 2018 Canada Post strike⁷ had a negative impact on participant satisfaction. The Evaluator looked at participating customers who were interviewed in December 2018 and January 2019 (i.e. whose cheque had been sent in November and December 2018) because they would have been most likely to be affected by the strike. The results indicate that the postal workers’ strike did not impact overall satisfaction with the HRR program offering. Figure 7 below indicates that most participants interviewed in December 2018 and January 2019 expressed a very high level of satisfaction with their overall experience with the HRR program offering. Figure 7 also reveals that participating customers who were interviewed in June 2018 and September 2018 (i.e. whose cheque had been sent in May and August 2018) were less likely to be very satisfied with their overall experience with the HRR program offering. Decreases in satisfaction observed in June and September 2018 likely related to certain cheques arriving later than expected.

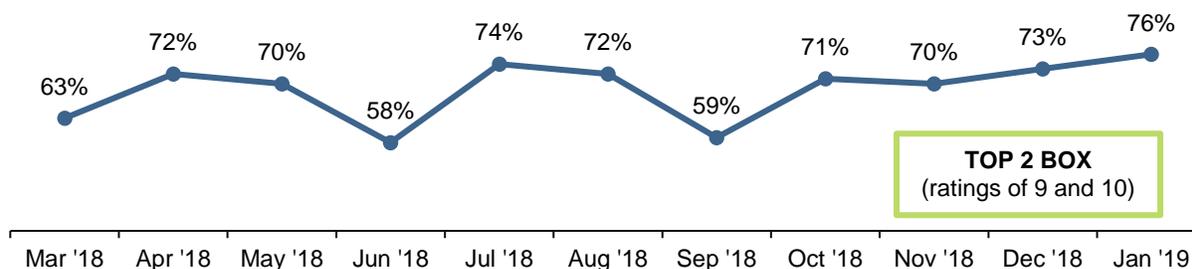
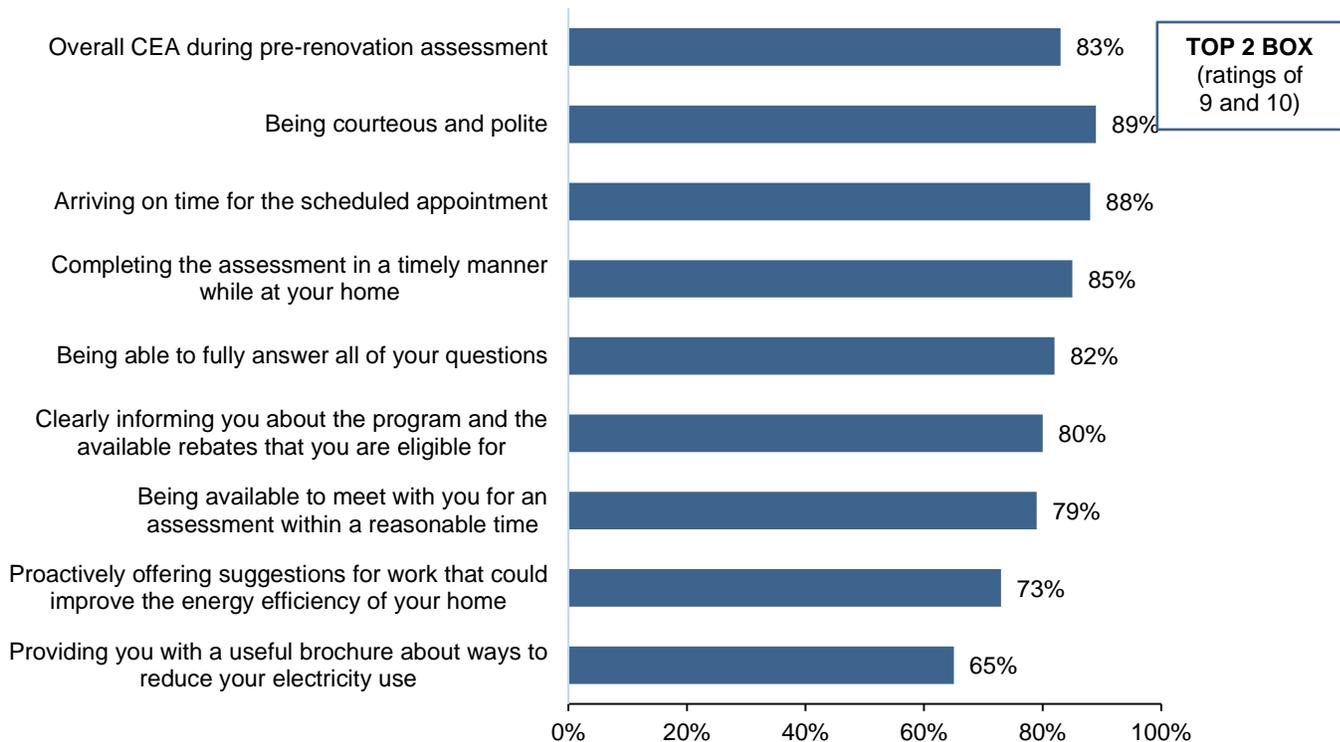


Figure 7: Overall Experience with the HRR Program Offering by Month

Participants were asked about their satisfaction with specific aspects of their interaction with the CEA during the pre-renovation assessment (D assessment). Overall, most customers (83%) were very satisfied with the CEA who came to their home to conduct the D assessment. Most were very satisfied with the courtesy demonstrated by the CEA (89%), the CEA’s punctuality (88%), and completion of the assessment in a timely manner (85%). As shown in Figure 8 below, the two aspects that received relatively lower positive ratings relate to the level of information shared about ways to reduce electricity use.

⁷ The Canada Post strike began on October 22, 2018 and ended on November 27, 2018.

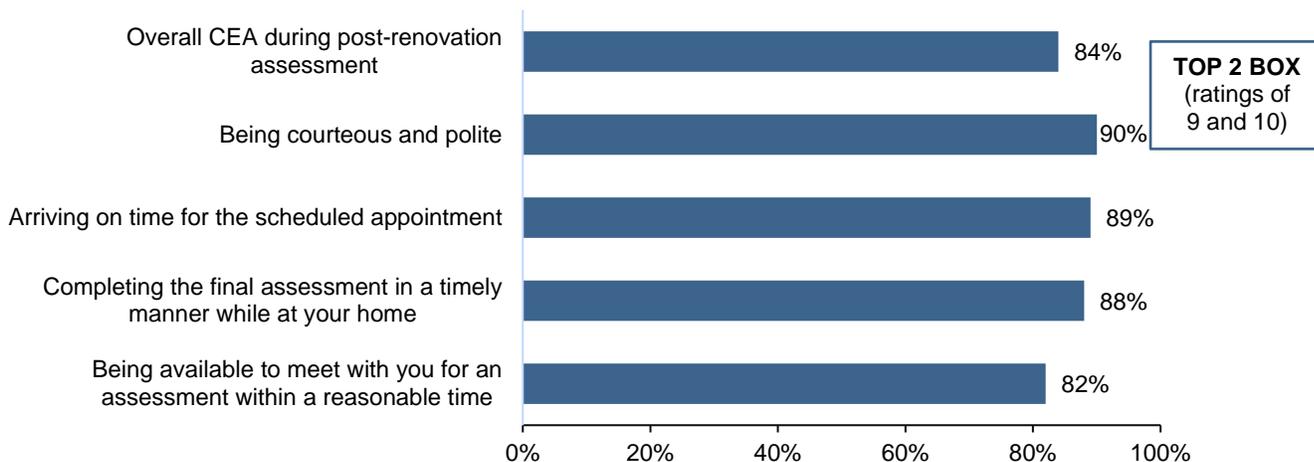


Q: Thinking about the CEA who came to the home for the pre-renovation assessment, how satisfied were you with the following aspects of service? Q: And just thinking about the pre-renovation assessment, done before the renovation work, how satisfied, overall, were you with the CEA?

Base: Customer participants who dealt with a CEA

Figure 8: Satisfaction with the Pre-Renovation Assessment (D Assessment)

Respondents were also asked about their satisfaction with specific aspects of their interaction with the CEA during the post-renovation assessment (E assessment). Again, customers were satisfied overall (84%) with the CEA who came to their home to conduct the E assessment. The survey results indicate a high level of satisfaction with the courtesy demonstrated by the CEA (90%), the CEA’s punctuality (89%), and completion of the assessment in a timely manner (88%).



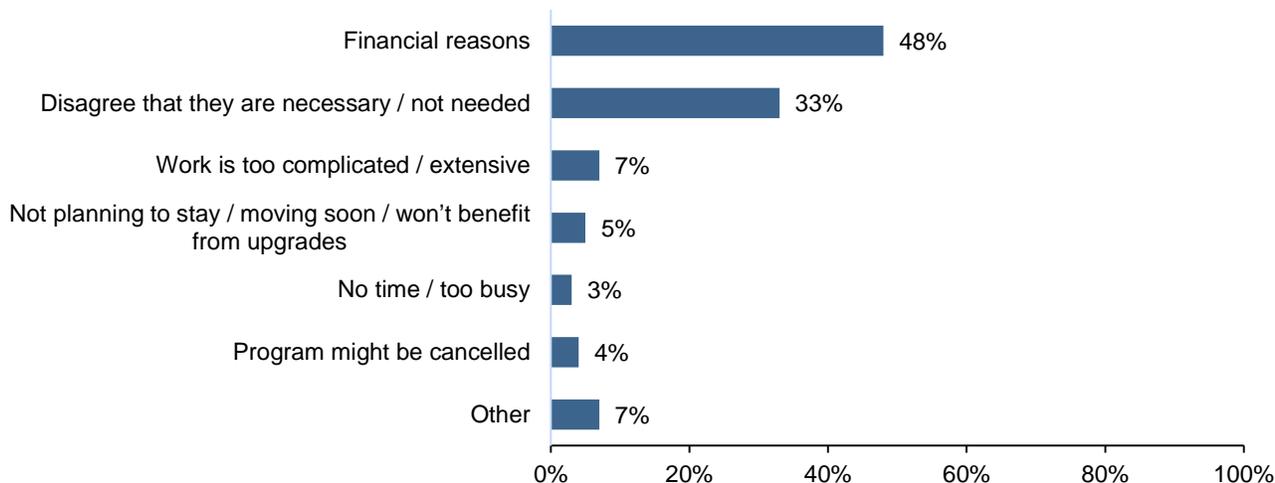
Q: Thinking about the CEA who came to the home for the post-renovation assessment, how satisfied were you with the following aspects of service? Q: And just thinking about the post-renovation assessment, how satisfied, overall, were you with the auditor?

Base: Customer participants who dealt with a CEA

Figure 9: Satisfaction with the Post-Renovation Assessment (E Assessment)

Barriers

Among the reasons cited by participants who chose not to complete all the recommended measures, 48% identified financial constraints as the major barrier and 33% believed that their home did not need the upgrades (see Figure 10 below). These results indicate that further efforts could be made to better inform participants about energy assessment results, including the benefits of potential upgrades, to minimize lost opportunities.



Q: What would you say is the reason that you do not intend to complete the remaining recommended measures in the next 12 months?

Base: Customer participants who received a report (n=248)

Figure 10: Reasons for Not Implementing the Remaining Recommended Measures



Participant Recommendations for Improvement

Nearly half of respondents (48%) made no recommendations on how to improve the program. Respondents who did make suggestions recommended receiving the rebate more quickly (15%), improving customer service (8%), increasing the rebates (8%) and advertising the program more or in a better way (7%).

Union’s market research findings highlight that overall satisfaction with the program declines when payment arrives later than expected. Reducing the time for issuing the rebate, as suggested by 15% of surveyed respondents, could help increase overall satisfaction with the HRR program offering. However, the Evaluator notes that the satisfaction level with the HRR program offering is already high.

Table 2: Recommendations for Improvement

Recommendations	Proportion of Respondents
Receive the rebate more quickly / Less wait after work is completed	15%
Improve customer service (communication, service, knowledge, etc.)	8%
Larger rebates / Raise the maximum rebate / More eligible items	8%
Advertise more / Make it more visible	7%
Keep the program / Concerned provincial gov't will shut down the program	5%
More information regarding process/timelines	5%
Improve rebate process (mistakes, lost papers, etc.)	5%
Use better contractors / Not satisfied with work done/recommend contractors	3%
More detailed reports/assessments / More info regarding usage	2%
Free assessment / Less costly	2%
Improve website / Not user-friendly	1%
Longer time window to complete process / 3 months is not enough	1%
Faster assessment / Less wait for appointment	1%
Improve application process / Easier application	1%
Faster approval / Long wait after assessment	1%
Other	3%
No improvements / Everything was good / Satisfied with the program	48%
Q: Thinking about your entire experience with the Home Reno Rebate program, do you have any comments or suggestions for improvement of the program? Base: Customer participants (n=1,672)	



3.4 Service Organization and Certified Energy Advisor Perspectives

This section presents the findings from the in-depth interviews held with SOs (n=3) and CEAs (n=5) that were involved in implementing HRR projects in 2018. The interviews were conducted with managers from the SOs.

For CEAs, each interviewed CEA worked for a different SO, thus representing a broad range of experiences. All five CEAs reported that conducting energy assessments is their primary occupation and that they have been involved with the program for at least over one year.

Program Outreach

All interviewed SOs and CEAs reported that the vast majority of program participants learned about the program through contractors, notably when looking at the possibility of installing a new furnace. One SO promoted the program using other means (e.g. lawn signs, ads on Kijiji) but saw no impact from these efforts. All three SOs promoted the program to contractors. The SOs provided program information and training to contractors through face-to-face or telephone interactions, mail-outs, emails, and flyers. One SO reported promoting the program at trade conferences and workshops. One SO promoted the program among participants during home inspections.

The SOs reported that, even with promotion and contractor training, contractors did not always clearly communicate program details to participants. Frequent changes to the program offering and Ontario's energy policy over the last year have exacerbated this challenge. One SO reported some contractors had stopped promoting the program because they were frustrated by the changes. In addition, the changes and cuts made to other Ontario energy programs added to the confusion among contractors and participants who thought the program might be cut. One SO reported that there was also some confusion between the HRR program offering and Union's low-income program.

Program Communication

SOs were asked about their relationship with CEAs and Union. Interviewed SOs hire the CEAs with whom they work as subcontractors. The SOs consider their relationships with CEAs to be very good, as indicated by their responses ranging from 8 to 10 on a 10-point scale where 1 means "very dissatisfied" and 10 means "very satisfied". The SOs provide a range of support to CEAs. All SOs provide scheduling and booking services for CEAs, as well as training and support to CEAs for meeting NRCan and program requirements. Two of the three interviewed SOs also provide support for data entry into the NRCan and Union system.

SOs also reported high satisfaction in their relationship with Union (with satisfaction levels ranging from 8 to 10 on a 10-point scale). SOs appreciate Union's openness and availability, efficiency in providing information and quick turnaround in answering questions or responding to issues, particularly compared to other Ontario program administrators with whom they work.



CEAs reported high satisfaction in their relationship with SOs (with satisfaction levels ranging from 8 to 10 on a 10-point scale). CEAs reported communicating with SOs almost daily via text messages, email, or in person. CEAs appreciate any support provided by SOs to lessen their workloads (e.g. scheduling, booking, and modelling), thereby allowing CEAs to spend more time in the field.

The majority of interviewed CEAs interact with Union only through the Parachute portal. CEAs were very satisfied in their relationship with Union (with satisfaction levels ranging from 8 to 9 on a 10-point scale). When asked about opportunities to provide input on the program, three of the five interviewed CEAs indicated that they would welcome additional opportunities to provide input and feedback on the program to Union.

Both SOs and CEAs were also very satisfied with the training and information provided to them by Union, noting that there is no additional information, training, or technical information they would like to receive from Union.

Program Delivery and Barriers

SOs are in contact with participants prior to D assessments. SOs reported spending time with potential participants prior to scheduling D assessments to assess the potential for upgrades in their home and ensure that program requirements are well understood and participants qualify for the program.

SOs reported that at least three or four potential upgrades are recommended in the D assessment report; CEAs reported that three to nine upgrades are typically recommended. The upgrades most frequently mentioned by interviewed CEAs were insulation (5 respondents), furnaces (3 respondents), air sealing (2 respondents) and windows (2 respondents).

All CEAs reported discussing potential upgrades with participants during the D assessments, with four of the five reporting that they urged participants to contact them by phone or email if they had questions or required clarifications. All CEAs reported educating participants on potential energy and cost savings during the D assessments to encourage participants to install more upgrades. One CEA mentioned that participants are especially receptive to the idea that they can have more rebates if they implement more upgrades. Aside from information passed on to participants by CEAs during the D assessments, interviewed SOs did not take any other specific actions to encourage customers to implement upgrades beyond what customers might have initially considered.

All three SOs and two CEAs reported that the least likely upgrade to be implemented by participants are tankless water heaters because of the costs, relatively low incentives, and homeowner skepticism about the technology. CEAs also mentioned that windows (3 respondents) are unlikely to be implemented as they are too costly compared to the incentive amount and there is a lower sense of urgency for such upgrades compared to replacing a broken or aging furnace.

SOs and CEAs were unanimous in noting that the largest untapped opportunity for gas savings in participating houses is insulation.



In 2018, participants implemented an average of 2.6 upgrades.⁸ CEAs and SOs were asked about their recommendations for increasing the number of upgrades per participant. Their suggestions are summarized in Table 3 below.

Table 3: CEA and SO Suggestions for Increasing the Number of Upgrades per Participant

Suggestion	Number of CEA Respondents	Number of SO Respondents
Increase incentives overall	2	2
Increase incentives for windows and attic insulation	1	
Increase incentives for tankless water heaters		1
Increase participants' understanding of the benefits of the EE measures	1	
Increase CEA knowledge of potential opportunities in newer homes	1	
Improve contractor awareness through a contractor network		1
Provide financing to minimize upfront investment for participants		1

SOs and CEAs were also asked about how to increase uptake in the insulation measure. Two CEAs suggested allowing homeowners to install insulation themselves, which is actually permitted under the program. This result suggests that CEAs could be further educated on the fact that participants are permitted to do the work themselves as part of the HRR program offering. Their other ideas are summarized in Table 4 below.

Table 4: CEA and SO Suggestions on How to Increase Uptake in the Insulation Measure

Suggestion	Number of CEA Respondents	Number of SO Respondents
Increasing rebates for insulation	2	
Allowing header insulation to qualify for the program		1
Increasing the maximum pre-upgrade R-value to quality	1	
Determining the rebate amount based on the increase in the R-value rather than the achieved R-value	1	

Program Tracking and Reporting

SOs and CEAs were interviewed about the program data tracking and reporting processes.

⁸ This average does not include smart thermostats, which were solely GIF funded or IESO funded measures.



After CEAs complete the D and E assessments, they typically submit detailed data about the participant and assessment results to the SO. As part of the SO agreement, SOs must verify the data provided by CEA and submit completed files to Parachute, Union's online data tracking tool, within 30 days following completion of the D or E assessment. SOs also submit these files to NRCan. All three interviewed SOs perform some form of internal verification and review of the data, prior to submitting it to Union, to identify typing errors, omissions and any missing required documents.

The internal data tracking and reporting processes vary across SOs. Two interviewed SOs enter all the data into Parachute for their CEAs and one SO delegates the responsibility for Parachute data entry to CEAs. One SO uses in-house CEAs to complete the modelling for CEAs who gather data in the field.

CEAs estimated that data tracking and reporting takes, on average, 30 minutes for the pre-assessment and 25 minutes for the post-assessment. All five CEAs reported that it typically takes 15 days or less to submit their final applications to Union after completing the E assessment. One CEA reported that a delay may occur if participants do not submit all the proper documentation and another noted occasional delays in waiting for NRCan to approve the file.

The time reported by SOs to process data once it is provided by CEAs varies: one SO reported one day, another under a week, and another up to one month. The SOs that enter data into Parachute for the CEAs reported longer processing times. The longest time was reported by the SO who also does in-house modelling for field CEAs. SOs reported that Union's process between the application and cheque payment has been streamlined and improved over time.

There are inconsistencies in the SOs' approaches to seeking NRCan's review prior to file submission to Union. One of the three SOs submits data to Union prior to NRCan approval. For the other two that wait for NRCan approval prior to submitting to Union, any issue identified during NRCan's approval process is corrected prior to submitting to Union. Union staff said that inputting program data into Parachute prior to NRCan review means less delay in the process for participants and shorter turnaround times to receive their payments after their project is completed.

All SOs reported having kept all their program documentation since their participation in the program, thus following the documentation retention guidelines set out in their SO agreement.

There was high satisfaction among partners with Union's data-tracking and reporting process. CEAs reported a satisfaction level ranging from 9 to 10 on a 10-point scale. SOs reported a satisfaction level ranging from 7 to 10; they again highlighted Union's responsiveness and professionalism with data tracking and reporting. One SO reported being significantly more satisfied with Union's processes than with other program administrators with whom they work.

One SO has developed a software system for CEAs to use on tablets to streamline data entry and minimize errors. In the future, this SO would like to integrate this software with Union's system to further increase data entry efficiency and quality.



On how to improve the data tracking and reporting process, one SO suggested there should be more clarity regarding the exact participant name to be entered in Parachute because there is confusion as to when the name shown on a property tax bill should be included. Such confusion slows down the process because it requires more back-and-forth verification among Union, SOs, CEAs, and potentially participants. This and other suggestions provided by SOs and CEAs on how to improve the data tracking and reporting process are summarized in Table 5 below.

Table 5: CEA and SO Suggestions on How to Improve Data Tracking and Reporting

Suggestion	Number of CEA Respondents	Number of SO Respondents
Providing tablets to CEAs to allow them to electronically record data when in the field	2	
Automating energy savings calculations (i.e. information not required by NRCan)	1	
Allowing Parachute users to correct errors on a previous page without erasing the data entered in subsequent pages	1	
Providing status updates on participant approvals and incentive payments to CEAs	1	
Clarifying the exact name of the participant to be provided in Parachute		1

Satisfaction

SO satisfaction with the program overall and various program elements was mixed (see Table 6 below). Although two SOs were satisfied with the program overall, one was less satisfied, noting decreases in incentives and the challenge of keeping EAs and contractors informed and trained on program changes.

SOs were less satisfied with Union program marketing and outreach activities, stating that more outreach by Union would be helpful, particularly to potential participants. One SO noted that there is some confusion in the market between the HRR program offering and the low-income program.

Two of the three interviewed SOs were satisfied with eligible measures, whereas one SO was less satisfied, stating that some requirements, particularly for insulation, could be further optimized to allow more participants to be eligible.

SO satisfaction with program incentive structures varied; one SO was very satisfied with the easy-to-follow incentive structures and two SOs were less satisfied. One SO would like incentives to be reallocated among measures, prioritizing furnaces and tankless water heaters. Another SO suggested that the program not include air sealing as an eligible measure in the two-measure requirement because it is often part of the furnace upgrade.



Table 6: SO Program Satisfaction

	Top 2 Box (9 to 10)	Middle 2 Box (7 to 8)	Bottom 6 Box (1 to 6)
Program overall	0	2	1
Union marketing and outreach	0	1	2
Eligible measures and equipment	0	2	1
Incentive structures	1	0	2

Rating on 1-10 scale: 1 = Not at all satisfied, 10 = Very satisfied

CEAs were more satisfied with the program overall. CEAs reported being very satisfied with the program incentive structures but were less satisfied with eligible measures, suggesting that other measures (e.g. insulation for basement headers and exposed floors) could be included in the offering. Three CEAs wanted to see increased efforts by Union to promote the program. CEA satisfaction with various program elements is presented in Table 7 below.

Table 7: CEA Program Satisfaction

	Top 2 Box (9 to 10)	Middle 2 Box (7 to 8)	Bottom 6 Box (1 to 6)
Program overall	2	2	1
Union marketing and outreach	1	2	2
Eligible measures and equipment	1	3	1
Incentive structures	2	3	0

Rating on 1-10 scale: 1 = Not at all satisfied, 10 = Very satisfied

Recommendations for Improvement

In addition to the ideas outlined in Table 4 and Table 5 above, CEAs and SOs were asked if they had any other suggestions on how to improve the program. Their suggestions are summarized in Table 8 below. Increasing contractor awareness and providing tools that communicate the benefits of the recommended measures to participants were the most commonly made suggestions.



Table 8: CEA and SO Suggestions on How to Improve the Program

Suggestion	Number of CEA Respondents	Number of SO Respondents
Increase contractor awareness.	2	
Engage participants and assist with their decision-making after the D assessment, provide an online tool (similar to Energy Efficiency Alberta) that allows participants to analyze the costs, rebates, and benefits of recommended measures.		1
Develop tools to help CEAs communicate potential for savings during the D assessment.	1	
Increase the length of time allowed for participants to complete their upgrades after the D assessment.		1
Allow participants to keep their files open, allowing them to receive rebates for additional upgrades after their first two measures are completed and assessed.		1
Increase participant awareness through marketing.	1	
Increase incentives for windows.	1	

3.5 Program Processes

The Evaluator reviewed the program processes for program delivery, data tracking and monitoring, as well as the program database and quality assurance activities.

3.5.1 Delivery Process

The delivery process for the HRR program offering includes screening participants for program eligibility, completion of a D assessment and report, completion of an E assessment after upgrades are completed, project submission by the SO, review and approval by Union, and finally participant payment. A SO agreement⁹ signed between Union and all SOs outlines SOs’ obligations in the HRR process. The process steps associated with SOs and CEAs are further discussed above in Subsection 3.4.

Program rules dictate that participants must complete their E assessment no later than 120 days after completing the D assessment. The Evaluator found that the average period between the D assessment and E assessment was 88 days. If circumstances do not allow participants to complete the D and E assessments within 120 days, CEAs can request an extension. These requests are approved on a case-by-case basis to provide some flexibility to customers. Overall, 20% of participants had over 120 days elapse between the D and E assessments. The average time taken to complete the process from D assessment to application submission was 133 days.

⁹ Home Reno Rebate 2019 Participation Service Agreement – FINAL – January 2019.



After the D and E assessments are completed, CEAs or SOs enter the participant information and assessment results into Union's Parachute system.

Union staff reported that there had been some issues with the length of time taken between the E assessment and the time to submit a project in Parachute, and files surpassing a 30-day period caused frustration among customers. The average time between the E assessment and the project submission date was 45 days. In all, 48% of files had surpassed a 30-day period between the E assessment date and the application date.

Union has been working with SOs to reduce the time taken between the E assessment and project submission by tracking time taken for projects and sending monthly reports to SOs. Staff reported that with this tracking and reporting to SOs, the period between the E assessment and project submission has been reduced. Staff echoed what was reported by SOs: one reason for delays could be the confusion between Union and CEAs in identifying the right participants who are supposed to receive payment.

Once the data is entered into Parachute, Union's processes for reviewing the data, approving files, and issuing cheques are carried out. Union aims to have cheques mailed to participants 120 days after the E assessment is submitted in Parachute. If customers are curious about the status of their cheque, they may contact Customer Care or their CEA. Application approval and cheque payment dates were not available in the master database provided to the Evaluator.

The participant pays the cost of the D assessment and is only reimbursed for this expense when the E assessment is completed. The Evaluator finds that this is a good practice to minimize the number of customers dropping out of the program. Union staff estimate that about 10% of customers do not complete the E assessment after the D assessment; however, this data is not formally tracked. The Evaluator recommends tracking the data required to monitor the unconverted rate over time.

Figure 11 below summarizes the various HRR delivery steps and the key evaluation findings related to each.



Figure 11: HRR Delivery Process Steps



3.5.2 Data Tracking and Monitoring Process

The data tracking and monitoring process begins with SOs and CEAs submitting data into Parachute. As per the SO agreement, SOs are responsible for ensuring data accuracy. As noted in Subsection 3.4, all three interviewed SOs conducted some form of data quality control, e.g. reviewing for typos and ensuring all required documentation is included.

Once the data is entered into Parachute, Union's processes for reviewing the data, approving the file and reporting the data into Union's master database are carried out. The master database includes measure details for each participant, the adjusted savings of each participant, and inputs for cost-effectiveness analysis.

Union staff indicated that the Parachute system has many advantages in terms of efficacy and data integrity, including the following:

- › Automatic checks: for example, if the two-measure minimum is not covered or some items are missing, CEAs receive an error message and cannot submit a project application.
- › Features to ensure the integrity of data submitted by SOs/CEAs, such as filters for outliers of certain key measures (e.g. savings) and drop-down lists to ensure data consistency.
- › The ability for back-and-forth communication among Union and SOs and CEAs through the system to efficiently resolve issues.
- › A capacity that allows Union to see program volume and adjust staff allocations as needed.

As noted in Subsection 3.4, both SOs and CEAs were satisfied with Union's data-tracking and reporting process, including Parachute. One challenge with Parachute noted by Union staff was that changes to the software took many iterations and testing with the external developer.

Each project submitted into Parachute is reviewed by Union staff. If there are issues with the data, these are corrected by Union staff or sent back via Parachute to allow SOs or CEAs to make modifications. Union's project review begins by ensuring that the participant's application is linked to a Union account to ensure the applicant's eligibility and that the cheque is mailed to the correct address. Union uses an input tool that automatically uploads extract data from Parachute, thus allowing for one-by-one project reviews. The input tool comprises several automatic verification tools, including a check for duplicates. The tool also has flags and warnings for:

- › Savings that are too low or too high;
- › Whether the savings verification notes are reasonable and sufficiently detailed;
- › Coherent dates: the D and E assessment dates must not be the same;
- › Costs that are too low or too high;
- › Incorrect assessment costs.



The criteria for triggering a warning have been established by Union data-tracking and reporting staff based on trial and error and observations about the database, but Union staff noted that these criteria could be refined with a technical review. Once a project is verified, the project information is automatically populated to Guardian, Union’s record-keeping system.

Once one batch containing information about 300 projects is created in Guardian, it is sent to a supervisor for final review and approval. The Union data and tracking supervisor carries out spot checks on data to ensure flagged problems are properly addressed. Once approval is granted, payment cheques are sent to participants and the files are moved into Union’s master database.

Projects are added to the master database by copying and pasting files. The master database contains formulas for calculating annual energy savings and other elements (e.g. incremental costs). The Evaluator notes that because entering data into the master database involves copy and paste by several staff members, there are possibilities for making errors or tampering with files (e.g. modifying a formula or failure to pull the formula down to cover all applicable fields).

Figure 12 below presents the key evaluation findings on the data tracking and monitoring process.

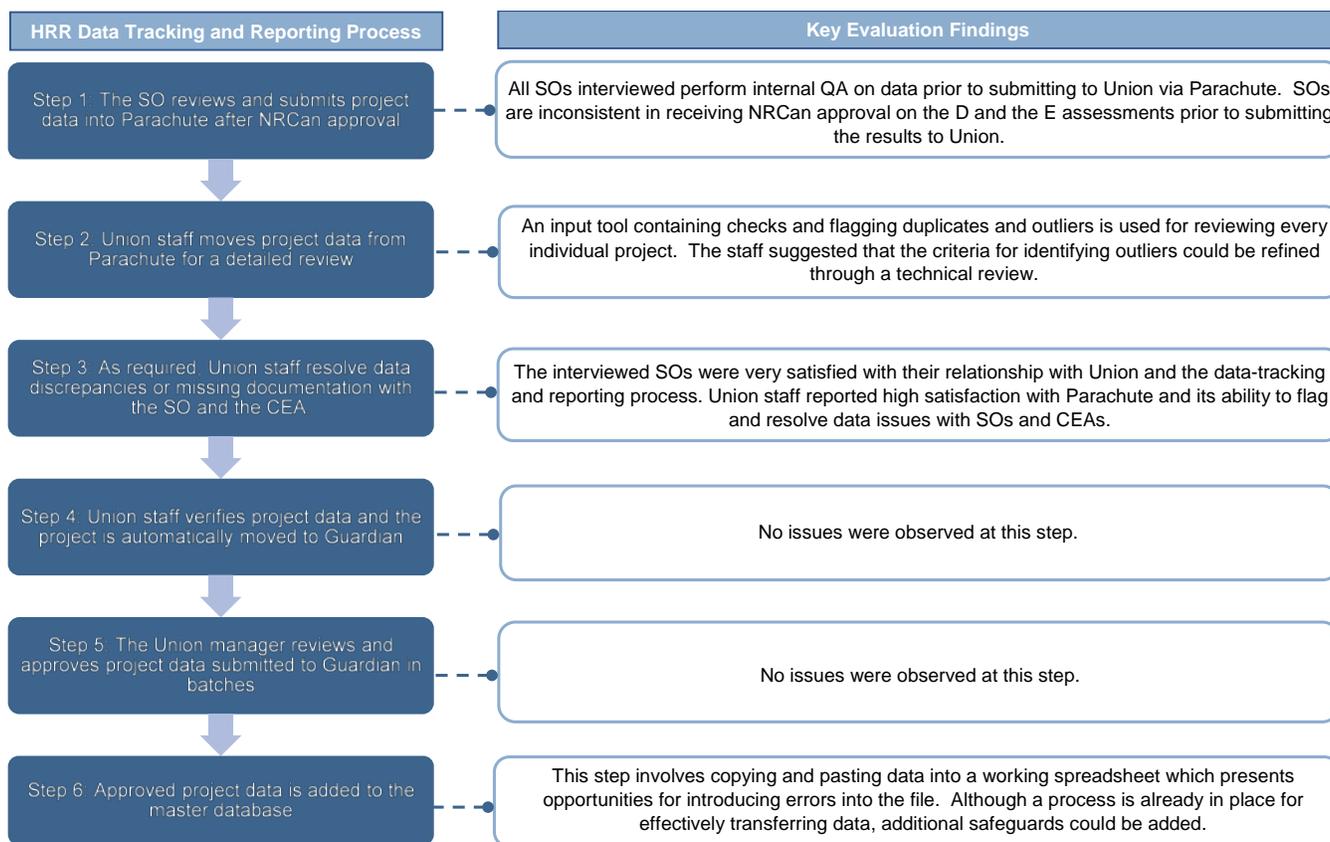


Figure 12: HRR Data Tracking and Reporting Process



3.5.3 Program Database

The Evaluator reviewed the master database by focusing on the following aspects:

- › Clarity and organization;
- › Availability of fields required for program management and evaluation;
- › Methods in place allowing analysis and preventing data entry errors.

The review did not include an examination of data integrity in the master database.

As discussed above, the HRR program offering master database¹⁰ is an Excel spreadsheet containing participant data for approved HRR program applications. The master database serves as a centralized repository of project information gathered from SOs using the Parachute system. The Evaluator did not review the Parachute fields; however, ideally, the Parachute fields should match the master database fields to facilitate Union's work in consolidating the information and avoiding data-handling errors.

The Evaluator reviewed the contents of the master database and found it well organized and clear overall. Except for a few acronyms and fields related to cheque payment, the master database was clear and easy to understand from a third-party perspective. The database included helpful comments to explain the database fields. The Evaluator noticed one comment related to Column DQ ("Total Adjusted TRC"), which did not appear to align with the formula in the column.

The Evaluator found that all the information required for evaluation and program monitoring was included in the database. The master database contained three principle worksheets. The "Pivot" worksheet summarizes the number of participants across the three sources of incentives (i.e. DSM, GIF and IESO) offered by the program in 2018. The "IESO Pivot" worksheet summarizes the projects receiving IESO incentives. The worksheet entitled "Deep Measures Collective Track" contains the details on each project, including participant contact information, the D and E assessment file numbers, Union account numbers, house details (year built and surface area), the type and number of energy efficiency upgrades implemented (furnace, air sealing, etc.), installation cost of each measure, the SO and CEA that completed the assessments, the dates when the D and E assessments were conducted, and the pre and post-renovation annual gas consumption savings values.

Several kinds of information, although not essential, could be added to support program monitoring and track potential lost opportunities:

- › Include all recommended measures and their savings potential from the D assessment to enable better understanding of which measures have not been implemented by participants to inform future program design and marketing strategies;
- › Include the overall savings potential in the D assessment;

¹⁰ 2018 RHRR MASTER FILE FINAL-For Econoler.xls



- › Track those participants who have completed the D assessments but have not implemented the recommended measures; this information is available in Parachute and could therefore be added to the master database.

The Evaluator found the format of the database cells to be consistent, for example the format for dates, which makes data analysis easier. The database also contains two validation columns to prevent data entry errors. The Evaluator recommends making the following modification to the database to identify and minimize data entry errors:

- › Lock the formulas in the spreadsheet so that they cannot be tampered with accidentally (e.g. locking the savings formulas in Columns DV and DZ).

Overall, the HRR program offering master database is clear, well organized, and contains the necessary information for program monitoring and evaluation. With the additions and modifications recommended above, the database will provide even more useful information for program planning and further ensure the quality of reported data.

3.5.4 Quality Assurance

Quality assurance (QA) activities ensure that quality-related issues and problems are identified and resolved to ensure the quality and accuracy of program outcomes and results. A key aspect of the HRR program offering is the results of the D and E assessments performed by CEAs using NRCan's EnerGuide rating system. Through this system, NRCan mandates that both SOs and CEAs fulfill a number of quality control and quality assurance responsibilities.¹¹ Therefore, Union relies heavily on NRCan's quality control and assurance protocol to ensure the accuracy and integrity of program results. Some additional quality assurance activities have been undertaken or delegated by Union to SOs through the SO Service Agreement. The principal quality assurance activities for the HRR program offering are outlined below.

The QA obligations included as part of the SO agreement are:

- › SOs are expected to have an internal quality assurance process to be applied to all HRR program offering related work;
- › SOs are expected to conduct regular audits on completed assessments to ensure the accuracy of information submitted to NRCan and Union;
- › SOs are to complete all the activities needed to meet all NRCan QA requirements.

¹¹ EnerGuide Rating System Quality Assurance Procedures Version 15.5, May 2018.



As part of the EnerGuide program, NRCan has specified the training requirements for CEAs, as well as the modelling and reporting requirements and the roles and responsibilities of CEAs and the SOs. NRCan mandates that SOs have a designated QA specialist responsible for overseeing and coordinating SO QA activities, including performing internal quality assurance and reporting activities. SOs must produce a quality assurance report every six months, including QA audit results.¹²

The NRCan QA protocol also includes elements for performing follow-up based on audit results to address issues found during QA activities. In addition, the NRCan QA protocol mandates that any errors found must be corrected in NRCan's system and updated reports and labels must be provided to homeowners if the corrections result in a rating change of 5% or more. NRCan also performs external QA audits at its discretion; SOs with high volumes and working in a region with an incentive program may be prioritized for QA review.

The Evaluator found that all interviewed SOs each had a designated QA specialist, but only one of the three interviewed SOs had a written internal QA process. SOs reported following NRCan quality assurance protocols, with some SOs reporting that their processes went beyond NRCan's requirements.

NRCan performed external QA audits in 2018 on files submitted by all interviewed SOs. SOs reported that NRCan audited 1.5% to 2% of their project files in 2018. Two of the three SOs reported making corrections in Union's system if errors were found. All SOs reported providing CEAs with a summary of NRCan's results to pinpoint the issues and suggest areas for improvement. Union does not receive QA reports from SOs or NRCan and does not require correcting errors in its system.

In 2018, Union undertook a QA activity to ensure that the shift to the 90% methodology¹³ was successful and did not introduce errors in the data. This process involved matching the Parachute records with the NRCan home data using the file number to verify the savings data. The findings of this QA activity revealed that the savings discrepancy between the two systems was low at less than 2%. In addition, individual errors were sent back to SOs for correction and systematic errors were flagged to allow the SOs and CEAs concerned to deal with them.

¹² Please note that the term "audit" in this section means the QA audits conducted by SOs or CEAs and not assessments of participants' homes.

¹³ The 90% methodology adjusts project savings to reflect a furnace baseline technology with an AFUE of 90% efficiency instead of the existing furnace that is modelled in the E assessment.



KEY FINDINGS AND RECOMMENDATIONS

The following presents an overview of the Evaluator's key findings and recommendations from the Home Reno Rebate program process evaluation.

The HRR program offering's logic model and program theory are well documented. This documentation enables the program administrator to carefully consider likely program outcomes and ensure that the strategic approaches lead to the desired results. The Evaluator made a few adjustments to the program theory and logic model to better reflect the current program strategy. The logic model should be continuously adapted to reflect any program changes and changes in external factors. The program theory includes a few performance indicators linked to the expected long-term program outcomes, which is a good practice.

Recommendation No. 1: Define additional performance indicators to correspond with the adjusted logic model and track all performance indicators linked to program objectives.

The program successfully engaged a large number of participants. The HRR program offering is designed to have a significant impact on the residential market by adhering to whole-house approach to achieving long-term energy savings. Although achieved energy savings are not covered by the scope of this evaluation, the high uptake of the program in the marketplace and the positive feedback from partners indicate the appeal of the program offering.

The HRR program offering effectively leverages its partner network for program promotion and delivery. Union has developed a strong network of partners to promote and deliver the program. Union collaborates with SOs that work with participants through all stages of the program. SOs work with their networks of CEAs who perform the energy assessments and collaborate with contractors who play an important role in generating participant leads. Union also contributes to program awareness through its website, advertising or bill inserts.

There is high satisfaction among partners with respect to their working relationships and communication between CEAs, SOs and Union. The HRR program offering relies on SOs and CEAs to facilitate the delivery of the program. Therefore, communication and collaboration among partners are essential. The CEAs surveyed were very satisfied with their relationship with Union (with the satisfaction levels ranging from 8 to 9 on a 10-point scale). Surveyed SOs were also very satisfied with their relationship with Union (with the satisfaction levels ranging from 8 to 10 on a 10-point scale). SOs appreciate Union's openness, availability, efficiency at providing information and quick turnaround in answering questions or responding to issues.

The program relies heavily on furnace replacements and contractor referrals, which should be considered when measuring free-ridership. Contractor referrals (mostly from HVAC contractors) are a main driver for program participation. Since contractor referrals are a key driver for program participation, it is necessary to take contractors' recommendations into account in the free-ridership measurement. Otherwise, the free-ridership level may be overestimated.



The program uses furnace replacement opportunities as an entry point into the program to engage homeowners and encourage participants to implement other measures to improve the efficiency of their home. The program data shows that 88% of HRR projects included a furnace upgrade and 79% included air sealing.

Recommendation No. 2: Investigate current practices among contractors for pairing air sealing with furnace replacements to assess what target of air sealing should remain incentivized by the program and counted in the minimum number of upgrades to be implemented.

Recommendation No. 3: When assessing free-ridership as part of the net impact evaluation, measure the influence of recommendations made by program partners (contractors and CEAs) on the types of upgrades installed by participants.

Union staff reported a low number of unconverted assessments. The program covers the cost of pre and the post-renovation energy assessments and reimburses participants upon completion of the post-renovation energy assessment, which is a good practice for maximizing the number of participants completing both the D and the E assessments. However, the number of unconverted assessments, while available in Parachute, was not tracked in the master database.

Recommendation No. 4: Track and monitor the number of unconverted assessments.

Opportunities remain for better communicating the benefits of potential upgrades. CEAs try to encourage participants to install more upgrades by educating them on potential energy and cost savings during the D assessment.

In total, 61% of participants installed the minimum number of upgrades required by the program. Participants identified financial constraints as the main barrier to not implementing the recommended measures, which was followed closely by a belief that their homes did not need the upgrades. Moreover, the only two aspects that received relatively lower satisfaction ratings from participants are related to the level of information shared about ways to reduce energy use.

The EnerGuide Homeowner Information sheet and the Renovation Upgrade Report are provided to homeowners to educate them on energy saving opportunities in their home. However, results indicate that further efforts could be made to better communicate energy assessment results in a simplified, easy to digest manner, including the benefits of potential upgrades, to minimize lost opportunities. This was also identified by the SOs and CEAs interviewed.



Recommendation No. 5: Provide CEAs with an additional tool(s) to better communicate the benefits of recommended measures, such as an online tool that allows participants to analyze the costs, rebates and benefits of the measures.

Insulation is the largest untapped opportunity for achieving gas savings in participating houses. All interviewed CEAs mentioned that insulation is one of the most frequently recommended upgrades. However, only 35% of participants installed insulation under HRR. The main recommendation from program partners on how to increase insulation uptake is to increase the rebate amount for this measure.

Recommendation No. 6: Consider ways to increase uptake in insulation upgrades, such as increasing the rebate amount or better communicating the benefits of installing insulation (as per Recommendation 5 above).

The HRR program offering provides a satisfying customer experience. Most participating customers were very satisfied with their overall experience with the HRR program offering, the ease of participating in the program and their interactions with the CEA during both assessments. Union's market research results show that overall satisfaction with the program varied somewhat among SOs. Union provides feedback to SOs on how they compare to their peers.

Recommendation No. 7: Continue to monitor participant satisfaction among SOs to respond quickly to any changes in satisfaction levels.

Length of time to receive payment impacts participant satisfaction. Union's market research findings show that overall satisfaction with the program declines when payment is received later than expected. Reducing the time for issuing the rebate, as suggested by 15% of surveyed participants, could therefore increase overall satisfaction with the HRR program offering. Several factors impact the time required for issuing the rebate and Union has taken steps to target a number of these factors. Union staff and SOs both indicated that delays occur when there is confusion in identifying the right person to receive program rebate.

Cheques are issued at the end of the participation process, after the project application has been fully approved. Union aims to have cheques mailed out to participants 120 days after submission of the E assessment. However, other steps to be completed before submitting the E assessment sometimes result in delays. Customers do not receive automatic updates on their application status. If customers are curious about the status of their cheque, they may contact Customer Care or their CEA.

Recommendation No. 8: Consider ways to identify the correct program participant to avoid delays in processing applications, for example, by validating participant information earlier in the participation process (i.e. during the D assessment).

Recommendation No. 9: Provide customers with notices when their project application is received and approved.



The program data tracking, monitoring and reporting process is complete and effective and follows best practices. The process is automated where possible and utilizes tools that provide automatic checks, error flags and warnings. Union has updated processes to adapt to increased project volume and continuously reviews and improves processes to accommodate program changes and implement any efficiencies to streamline processes.

The Parachute system meets the data needs of SOs and Union. Both CEAs and SOs are satisfied with the Parachute system and Union's data-tracking and reporting process. Union staff also reported satisfaction with the Parachute system because it improves data integrity and consistency, allows for efficient resolution of data discrepancies with SOs and CEAs and improves the ability to plan based on the volume of applications.

The data reporting process among SOs is inconsistent. The Evaluator found inconsistent practices among SOs. First, some SOs have project files approved by NRCan prior to inputting the data into Union's Parachute system while others do not. Second, there are inconsistencies among SOs in whether issues identified during the NRCan review are corrected in Parachute or not. Submitting files to Union prior to NRCan's review is seen as a way to reduce delays in the project approval process. However, the practices should be consistent among SOs.

Recommendation No. 10: Make SO practices for NRCan file approval consistent. If the program data is inputted into Union's Parachute system prior to NRCan approval, monitor a sample of project files and NRCan-approved files, sampled over at least a year, to confirm that the difference between the two groups of files is minor and no adjustment is needed.

The master database¹⁴ is well organized and clear and contains the main information required for program management and evaluation purposes. Several pieces of information, although not essential, could be added to support program monitoring and track potential lost opportunities.

The process of adding projects to the master database involves copy-pasting project information into the file and might thus introduce errors.

Recommendation No. 11: Add information to the master database to support program monitoring and planning, as well as a future program strategy. More specifically:

- › Include all the recommended measures and their savings potential shown in the D assessment to enable a better understanding of the measures that have not been implemented by participants to inform future program design and marketing strategies.
- › Include the overall savings potential from the D assessment.

¹⁴2018 RHRR MASTER FILE FINAL-For Econoler.xls.



Recommendation No. 12: Add safeguards in the master database to reduce the risk of introducing errors. Consider locking formulas in the spreadsheet so that they cannot be tampered with accidentally (e.g. locking the savings formulas in Columns DV and DZ).

The HRR QA protocol is sufficient with some room to improve consistency among SOs. The HRR program offering largely relies on NRCan QA processes to ensure data quality and integrity. All SOs interviewed each have a designated QA specialist and reported following NRCan’s protocol in conducting internal QA audits. All interviewed SOs followed the documentation retention protocols in Union’s SO agreement. However, only one of the three SOs had a written QA process and there were some inconsistencies in how errors found in NRCan’s QA audits were corrected in Union’s system. A 2018 QA activity performed by Union found differences of less than 2% between NRCan’s file data and Parachute.

Recommendation No. 13: Ensure that SOs consistently follow the QA guidelines in SO agreements and that practices for making corrections based on QA audits are consistent among SOs.

Recommendation Summary

Table 9 below provides a summary of the recommendations and a high-level analysis of the benefits and costs of implementing recommendations. The table is colour-coded. In the Benefit column, green indicates that a recommendation has higher importance for ensuring and improving the effectiveness of program offering, delivery or processes; yellow indicates relatively lower importance. In the Cost column, green indicates lower cost and yellow represents higher cost.



Table 9: Cost-Benefit Analysis of Recommendations

Recommendation		Benefit	Cost
1	Define additional performance indicators to correspond with the adjusted logic model and track all performance indicators linked to program objectives.		
2	Investigate current practices among contractors for pairing air sealing with furnace replacements to assess what target of air sealing should remain incentivized by the program and counted in the minimum number of upgrades to be implemented.		
3	When assessing free-ridership as part of the net impact evaluation, measure the influence of recommendations made by program partners (contractors and CEAs) on the types of upgrades installed by participants.		
4	Track and monitor the number of unconverted assessments.		
5	Provide CEAs with an additional tool(s) to better communicate the benefits of the recommended measures, such as an online tool that allows participants to analyze the costs, rebates, and benefits of the measures.		
6	Consider ways to increase uptake in insulation upgrades, such as increasing the rebate amount or better communicating the benefits of installing insulation (as per Recommendation 5 above).		
7	Continue to monitor participant satisfaction among SOs to respond quickly to any changes in satisfaction levels.		
8	Consider ways to identify the correct program participant to avoid delays in processing applications, for example, by validating participant information earlier in the participation process (i.e. during the D assessment).		
9	Provide customers with notices when their project application is received and approved.		
10	Make SO practices for NRCAN file approval consistent. If the program data is inputted into Union’s Parachute system prior to NRCAN approval, monitor a sample of project files and NRCAN-approved files, sampled over at least a year, to confirm that the difference between the two groups of files is minor and no adjustment is needed.		
11	Add information to the master database to support program monitoring and a future program strategy.		
12	Add safeguards in the master database to reduce the risk of introducing errors.		
13	Ensure that SOs consistently follow the QA guidelines outlined in SO agreements and that practices for making corrections based on QA audits are consistent among SOs.		



APPENDIX I PROGRAM MANAGEMENT AND MARKETING STAFF INTERVIEW GUIDE

Date:

Interviewee Name:

Interviewer:

Table 1: Research Objectives and Associated Questions

Research Issue	Associated Questions
Respondent Roles and Responsibilities	Q1
Program Offering and Implementation	
Are there opportunities to improve the efficacy of the program offering, including eligibility requirements?	Q2-Q15
Are there opportunities to improve program awareness and communications?	Q38-Q44
Using Union’s Market Research results, what is participant satisfaction with the program, including impact of postal strike on customer satisfaction?	Q45
What is partner (CEAs) satisfaction with the program, including their interactions with Union and service organizations?	Q21-Q26, Q27
Processes and Program Delivery	
Is the program administration and delivery approach, including activities of SOs, internal processes and risk mitigation, effective and efficient?	Q16-Q28
Is the program theory and logic model complete and relevant?	Q7, Q16
What, if any, are the difficulties or barriers to program delivery?	Q16-Q28, Q44
Data tracking and Quality Assurance	
Is program tracking, monitoring and reporting complete and effective?	Q29-Q32
Is the CEA facing system meeting the data needs of CEA and Union?	Q23, Q27, Q31
Are the quality control and assurance measures in place ensuring program data integrity?	Q33-Q37
Are program processes consistent with program intentions?	Q16, Q17
Are the SOs adhering to the documentation retention protocols outlined in Unions’ agreements with SOs?	Q20, Q35
Successes, Challenges and Opportunities	Q46-Q50
Documentation Request	Q52



Green text: instructions for interviewer

INTRODUCTION

As you know, we are undertaking a process evaluation of the Home Reno Rebate (HRR) program. As part of this evaluation, we are collecting information from program staff about the program's overall offering, implementation, management, processes, successes, challenges and areas for improvement.

Is it okay if I record our discussion to make sure that I capture everything?

Respondent's Roles and Responsibilities

Q1. Please describe your role in the **HRR program offering** and main responsibilities working on the HRR program offering and how long you have been working in this role? [For each individual present]

Program Offering and Implementation

Program Goals and Objectives

Q2. Based on our review of the documentation, we understand that the **HRR program offering** was introduced in 2012 and developed to help homeowners understand opportunities for energy savings throughout their home and encourage them to install multiple deep, long-lasting measures, such as insulation, high-efficiency windows, tankless water heaters, furnaces and boilers. Could you provide additional insight into your perspective on the program's primary purpose?

Q3. We understand that in 2018 your target metric was 8,010 homes and your draft result achieved is 16,118 homes, over 200% of the metric. Is this metric based on homes that have installed measures and completed a post-assessment?

Q4. Why do you think you achieved over-target in 2018?

Q5. We understand that 2018 reached the maximum achievement, which is capped at 200%. Is the cap based on budget constraints? Was there any change in program when the cap was close to being reached or achieved? [Probe: program no longer accepts new participants, shift in marketing]

Q6. The DSM Plan mentions the following objectives and goals. How do you track and monitor how the program is doing relative to these goals? [Probe: any targets?]

Quantitative objectives:

- Generate long term savings
- Avoid lost opportunities

Qualitative objective:

- Encourage a holistic approach to energy efficiency



Q7. We understand from the logic model that we were provided that customer satisfaction is a long-term outcome for the program. Is this correct? Is there a quantitative goal for customer satisfaction?

Coordination with Other Offers

Q8. We understand that Union also has a Behavioural offering funded by the Green Investment Fund (GIF) which launched in 2017. Can you describe how the Behaviour program intersects with the HRR program offering? [PROBE: cross-promotion, targets]. Has this connection had a positive impact for HRR program offering? If yes, how?

Q9. We understand the program coordinated with IESO for the Whole Home pilot in 2017 and that this pilot ended in November 1, 2018. We understand that through the pilot, gas participants would also be eligible for rebates on electric appliances and that additional funds were provided for the pre and post assessments to cover assessment of electric measures. The following questions are to understand how this pilot may have impacted gas participants, program processes and partners in 2018.

- Did this pilot have an impact on gas participants while it was in place? [PROBE: increased awareness of program, increased interest]
- What was the impact of the pilot on CEAs or SOs while it was in place? [PROBE: volume of work, reporting]

Q10. We understand that in 2016 Union was provided additional funding from the government of Ontario's Green Investment Fund (GIF) to enhance the HRR offering. This funding was used to expand the target market for HRR to include gas heated homes outside of Union's franchise area as well as homes in Union's franchise that use oil, propane or wood as their primary heating fuel, with some additional measures added. The funding also allowed rebates to be increased for all existing HRR measures to drive higher participation and provide smart thermostat to all qualifying homes. This evaluation focuses on Union gas participants with gas heaters or boilers, so we have some questions to understand how the GIF and the enhanced offering may have impacted gas participants or program processes and partners in 2018.

- What was impact of the enhanced offering on CEAs and/or SOs? [PROBE: Volume of work, reporting]
- How did the increased incentives for Union gas participants impact participation?



Program Offer

- Q11. Aside from ending of Whole Home Pilot and GIF funding have there been any other changes to the program in 2018?
- Q12. Do you have any plans to make changes to the program? [IF SO] Which ones?
- Q13. We understand that a bonus rebate of \$250 is offered to encourage participants to install more than two measures. What is the uptake of the bonus rebate? Has it been successful in encouraging additional measures?
- Q14. The program summary data we received shows air sealing and furnaces as by far the most popular measures installed as part of the program. Why do you think that is? [PROBE: In 2017: Air Sealing =11,725, Furnaces= 11,758, Windows = 4445; cost-effectiveness, energy savings, synergies between measures]
- Q15. What is the rate of participants that complete a pre-assessment but do not install measures as part of the program? What, if anything, is done to recruit these participants?

Program Delivery

- Q16. Please guide me through the process that a participant goes through to take part in HRR from initial contact to final contact between SOs, Union Gas and the participant?

Partners and Market Actors (SOs, CEAs and contractors)

Now, I would like to talk to you about the role of Service Organizations (SOs), Certified Energy Advisors (CEAs) and contractors in implementing and delivering the program.

- Q17. We understand the SOs are responsible for scheduling pre-and post-energy assessments with participants, employing CEAs to perform the assessments and recommending eligible upgrades and submitting all required paperwork to Union on behalf of the participant. Is this correct? Am I missing any other SO responsibilities?
- Q18. How do you find and recruit SOs to work with the program?
- Q19. How do you communicate with SOs about the program?
- Q20. What is required of SOs in terms of providing documents, data tracking and reporting?
- Q21. Please describe the role of the participating CEAs?
- Q22. How do CEAs qualify for the program?
- Q23. What is required of CEAs in terms of documents, data tracking, reporting, etc.?
- Q24. Do you communicate with CEAs about the program?
- Q25. Do you communicate with contractors about the program?



Q26. What tools and training, if any, have you provided to...

- a. SOs?
- b. CEAs?
- c. Contractors?

Q27. Did you experience any challenges with SOs, CEAs or contractors? [PROBE: recruitment, qualifications, quality]

Q28. Have there been any problems or complaints from customers about the program?

- a. [IF SO] What are the problems/complaints? Are there trends?
- b. [IF SO] Have these been addressed? How?

Data Tracking and Quality Assurance

Q29. How does your team monitor program performance including tracking participants and projects for HRR?

Q30. How well is the current tracking process meeting your needs? [Probe: data availability, timing of reporting]

Q31. I understand that Parachute is the system used by SOs to input participant data, including data from the pre and post assessment. Is the Parachute system meeting Union's needs?

Q32. What changes would you like to see, if any, to the current tracking process?

Q33. We understand that the program relies on, in part, NRCan QA processes completed as part of certification and use of EnerGuide and HOT2000 for quality assurance. What, if any, additional QA activities are undertaken by Union for this program? Any documentation? [Probe: Internal QA checks, DSM audit, Project verification, site inspections]

Q34. [IF Q33 = Site Inspection, project verification]. Please describe your project verification/site inspection protocols. [Probe: documentation, sampling]

Q35. What QA activities are expected of the SOs? [Probe: Data integrity]

Q36. Is there a process in place to track performance of contractors? What happens if there is a problem with a contractor (e.g. poor installation)?

Q37. Are there any current challenges with QA/QC or data reporting with the program? If yes, do you have suggestions on how these challenges could be addressed?



Marketing and Awareness

- Q38. Based on our review of the documentation, we understand that Union Gas and SOs both have responsibilities for implementing the HRR program offering. Who is responsible for marketing the program?
- Q39. The DSM report states that many tactics are used to market this program: mass-media, digital tactics, TV, bill inserts, flyer and door hangers distributed by CEAs and posters at trade shows and events. Which ones would you say are the primary ones?
- Q40. Are you aware of any other advertising or marketing activities done by the SOs and CEAs to promote the program?
- Q41. Do contractors promote the program? If so, how?
- Q42. How, if any, did the program cross-promote other Union programs to participants?
- Q43. Are the SOs responsible for recruiting participants? If so, how do the SOs identify participants?
- Q44. What do you think are the key barriers to customer participation in the program?
- Q45. We understand that Union Market Research fields an ongoing survey to a sample of HRR participants to measure satisfaction with the program. How do you use the results of these surveys? [Probe: program improvements, targeted marketing, CEA feedback, validation of type of project]

Successes, challenges, and opportunities

- Q46. What do you see as key successes of the program?
- Q47. What are key challenges for the program?
- Q48. What opportunities do you see for the program going forward?
- Q49. What would you like to learn from this process evaluation?
- Q50. Is there anything else about the program that we have not discussed that you feel should be mentioned?

Thank you very much for your valuable feedback.



APPENDIX II

DATA TRACKING AND REPORTING AND MARKET RESEARCH STAFF INTERVIEW GUIDE

Date:

Interviewee

Interviewer:

Table 1: Research Objectives and Associated Questions

Research Issue	Associated Questions
Respondent Roles and Responsibilities	Q1
Program Offering and Implementation	
Are there opportunities to improve the efficacy of the program offering, including eligibility requirements?	N/A
Are there opportunities to improve program awareness and communications?	N/A
Using Union’s Market Research results, what is participant satisfaction with the program, including impact of postal strike on customer satisfaction?	Q2-Q14
What is partner (CEAs) satisfaction with program, including their interactions with Union and service organizations?	N/A
Processes (Program Delivery)	
Is the program administration and delivery approach, including activities of SOs, internal processes and risk mitigation, effective and efficient?	Q7-Q8
Is the program theory and logic model complete and relevant?	N/A
What, if any, are the difficulties or barriers to program delivery?	N/A
Data tracking and Quality Assurance	
Is program tracking, monitoring and reporting complete and effective?	Q15-Q20, Q36-Q40
Is the CEA facing system meeting the data needs of CEA and Union?	Q18
Are the quality control and assurance measures in place ensuring program data integrity?	Q28-Q35
Are program processes consistent with program intentions?	Q28
Are the SOs adhering to the documentation retention protocols outlined in Unions’ agreements with SOs?	N/A
Successes, Challenges and Opportunities	Q10-Q11, Q36-Q39



Green text: instructions for interviewer

INTRODUCTION

As you know, we are undertaking a process evaluation of the Home Reno Rebate (HRR) program. As part of this evaluation, we are collecting information from program staff about the program's overall offering, implementation, management, processes, successes, challenges and areas for improvement.

Is it okay if I record our discussion to make sure that I capture everything?

Respondent's Roles and Responsibilities

[FOR MARKET RESEARCH AND DATA TRACKING AND REPORTING]

Q1. Please describe your role in the **HRR program offering** and main responsibilities working on the HRR program offering and how long you have been working in this role? [For each individual present]

Market Research

[SECTION FOR MARKET RESEARCH STAFF]

Q2. We understand that Union Market Research fields an ongoing survey to a sample of HRR participants to measure satisfaction with the program. The objectives of the participant survey are to:

- Measure overall satisfaction with the program
- Measure overall satisfaction with the energy advisor that completed the pre-and post-renovation assessments
- Identify opportunities for improvement in the participant experience
- Validate the type of renovation projects that the participant has completed
- Reinforce that this is a Union Gas/Gov't of Ontario/IESO program for attribution purposes
- Improve understanding of the participants (e.g. demographics) of the program to support future marketing efforts; and
- Measure perceptions of Union's brand and reputation

Am I missing or mischaracterizing any objectives of the participant research?

Q3. Can you describe the sampling method?

Q4. What is the methodology of this participant survey? [PROBE: Survey conducted in house? Phone or online? Frequency?]

Q5. What is your response rate? Any challenges in getting your targeted response?

Q6. How did you select survey questions?



- Q7. Who utilizes the results of this research?
- Q8. How do you share the results of the research?
- Q9. How often do you adjust the questions of the survey?
- Q10. What are the most challenging objectives of the survey to meet? Why?
- Q11. Do you have any ideas on how these challenges could be addressed?
- Q12. Now a few questions about the impact of postal strike on customer satisfaction. Do you have any data indicating changes in customer satisfaction? Does the participant survey database include the date of the mailed cheque?
- Q13. Have you conducted any other market study to support the HRR program offering?
- Q14. Is there anything else about the program that we have not discussed that you feel should be mentioned?

Thank-you very much for your time.

Data Tracking and Reporting

[SECTION FOR DATA TRACKING AND REPORTING STAFF]

- Q15. What HRR program offering data needs are your team responsible for and who are the users?
- Q16. I understand that data tracking and reporting for HRR is done through three tools: (1) Parachute, the system used by SOs to input program data, including data from the pre and post assessment; (2) a master excel spreadsheet that uses data from Parachute to calculate program savings by home; and (3) Guardian, a tracking database used to track program at a participant-level. In a few moments, I would like to discuss each of these systems in turn, but first, am I missing or misunderstanding any key components of program data tracking and reporting?
- Q17. Can you walk me through how these three data systems are used and linked in the HRR data tracking and reporting process? [PROBE: Are common fields automatically updated?]
- Q18. We understand that the master list calculates savings to be claimed through DSM, applying the 90% methodology and calculating TRC. What is the 90% methodology?

Partners and Market Actors (SOs, CEAs and contractors)

Now, I would like to discuss the role of SOs and CEAs in data tracking and reporting and QA.

- Q19. We understand the SOs are responsible for scheduling pre- and post-energy assessments with participants, employing CEAs to perform the assessments and recommending eligible upgrades and submitting all required paperwork to Union on behalf of the participant. Is this correct? Am I missing any other SO responsibilities?
- Q20. How do you communicate with SOs about the program?



Q21. What is required of SOs in terms of documents, data tracking, reporting etc.?

Q22. What is required of CEAs in terms of documents, data tracking, reporting etc.?

Q23. Do you communicate with CEAs about the program? If yes, how?

Q24. What tools or training, if any, have you provided to...

- a. SOs?
- b. CEAs?

Q25. How well is the Parachute system meeting Union's needs? [Probe: data available, data integrity, timing of reporting]

Q26. Do you experience any challenges with SOs or CEAs? [Probe: responsiveness, volume and timeliness of corrections]

Q27. Do you have any ideas on how these challenges could be addressed?

Data Review and Quality Assurance

Q28. Please describe your data review process? Any documentation? [Probe: internal audits by senior staff, frequency]

Q29. Who is responsible for preventing duplicates in data and reviewing application data comprehensiveness?

Q30. [If Q23 = Union] How are duplicates prevented? Documentation?

Q31. [If Q23 = Union] How are inaccurate or incomplete applications dealt with? Documentation?

Q32. How is data integrity safeguarded? [Probe: input masks, reasonableness checks on data entry]

Q33. Are there any other QA/QC activities related to data tracking and reporting that we haven't already discussed?

Q34. Is there any reporting on QA activities done for the program? [Probe: SO reporting on QA activities, internal QA reporting] If yes, can these be shared?

Q35. How would you improve the QA/QC process?

Q36. What do you see as the key strengths of the program data tracking and reporting?

Q37. At a high-level, what impact, if any did the Whole Home Pilot and enhanced GIF offering have on data tracking and reporting?

Q38. Has there been any challenges data tracking and reporting with the program that we have not discussed?

Q39. Do you have suggestions on how these challenges could be addressed?



Rebate Processing

- Q40. The next set of questions relates to rebate processing. We understand that your team is responsible for rebate processing to ensure customers receive their rebate cheques. Please guide me through the process from where your team steps in to when the customer receives a rebate cheque. Any documentation?
- Q41. Are there any metrics associated with tracking this the rebate process? [Probe: length of time from submission of file to cheque being cut, customer satisfaction] If yes, what is performance against targets? Why?
- Q42. Are there any current challenges with rebate processing? [Probe: length of time from submission of file to cheque being cut, volume]
- Q43. Do you have any ideas on how these challenges could be addressed?

We are almost finished.

- Q44. Have there been any problems or complaints from customers about the program?
- a. [IF SO] What are the programs/complaints? Are there trends?
 - b. Have these been addressed? How?
- Q45. Is there anything about the program that we have not discussed that you feel should be mentioned?

Thank-you for your time.



APPENDIX III SERVICE ORGANIZATION INTERVIEW GUIDE

Date & Time:

Interviewee Name:

Company Name:

Interviewer:

Table 1: Overview of Data Collection Activity

Descriptor	This Instrument
Instrument Type	Telephone Interview
Estimated Time to Complete	20-30 minutes
Population Description	Service Organizations
Contact List Size	
Completion Goal	3
Contact List Source	Enbridge Gas operating as Union Gas
Fielding Firm	Econoler

Table 2: Research Issue and Associated Questions

Research Issue	Associated Questions
Respondent Roles and Responsibilities	A1-A3
Program Offering and Implementation	
Are there opportunities to improve the efficacy of the program offering, including eligibility requirements?	C1-C10, E1
Are there opportunities to improve program awareness and communications?	B1-B3
Using Union's Market Research results, what is participant satisfaction with the program, including impact of postal strike on customer satisfaction?	NA
What is partner (CEAs) satisfaction with program, including their interactions with Union and service organizations?	D3, D5, E1, E3, F7
Processes and Program Delivery	
Is the program administration and delivery approach, including activities of SOs, internal processes and risk mitigation, effective and efficient?	C1-C10, D1-D6
Is the program theory and logic model complete and relevant?	NA
What, if any, are the difficulties or barriers to program delivery?	A4, C3



Research Issue	Associated Questions
Data tracking and Quality Assurance	
Is program tracking, monitoring and reporting complete and effective?	F1-F8
Is the CEA facing system meeting the data needs of CEA and Union?	F1-F8
Are the quality control and assurance measures in place ensuring program data integrity?	G1-G9
Are program processes consistent with program intentions?	A4, C1-C10
Are the SOs adhering to the documentation retention protocols outlined in Unions' agreements with SOs?	G3
Successes, Challenges and Opportunities	H1-H2

INTRODUCTION

Hello, may I speak with **[Contact name]**?

My name is **[Interviewer name]** and I'm calling from Econoler on behalf of Union Gas. Union Gas has contracted Econoler to evaluate the Home Reno Rebate program.

- Person responsible available **[CONTINUE]**
- Person responsible currently unavailable **[ARRANGE CALL BACK WITH THE RIGHT PERSON]**
- Refused **[THANK AND TERMINATE]**

Your responses will be kept confidential and we will not share the information you provided in a way that could identify your individual or corporate responses. [READ IF NECESSARY: The results of this evaluation will only be used to improve the program and will not affect your involvement in the program.]

Context

One of the main goals of this interview is to collect information to assess program outreach and delivery, barriers to participation, program communication, program data tracking and reporting, quality assurance and possible program improvements.

Our discussion should take about 20-30 minutes.

Do you have any questions before we begin?



Respondent's Role and Involvement

The first questions will be about your business and your involvement with the Union Home Reno Rebate program.

- A1. What is your title and role?
- A2. How would you describe your involvement within the Home Reno Rebate program?
- A3. How long have you been involved with the program?
- A4a. Do you consider your involvement in the program as straight forward or complicated?
 - Straight forward
 - Complicated
- A4b. If "Complicated", please indicate what makes your involvement in the program complicated?

Program Outreach

I would now like to discuss program outreach.

- B1. Do you promote the Home Reno Rebate program to potential participants? If so, how?
- B2. Besides that, how do potential participants learn about the Home Reno Rebate program?
- B3. Are there elements of the program that you find are generally not well-understood by participants? If so, which ones?

Program Delivery and Barriers

- C1. What is your level of contact with the customer prior to their D-assessment audit? [Probe: Scheduling audit, pre-qualification].

[IF C1 includes Pre-qualification, ASK C2 – C3]



- C2. Can you describe how you screen potential participants prior to their D assessment? [Probe: Union customer with active account, owns a detached, semi-detached, townhouse or mobile home, has a natural gas furnace/boiler as heating source]

- C3. How do you ensure that participant applying for Home Reno Rebate is the bill-payer?

- C4. Do you review the content of the pre-assessment and post-assessment report submitted by the CEAs?
 IF SO:
 - a. What do you look at?
 - b. How many energy-efficient upgrades would you say are typically recommended in the pre-assessment report and what are they?
 - c. Which upgrades recommended in the assessment report are not typically implemented by participants? Why?

- C5. Do you do any follow-up with participants as part of their participation in the program? [Probe: after D assessment]

- C6. [ASK IF C5= YES] How, if at all, do you attempt to encourage customers to implement upgrades beyond what they may have initially considered?

- C7. The program data indicates that participants implement on average 2.8 measures per home. What can be done to encourage participants to implement more upgrades?

- C8. And specifically, for insulation, what do you think can improve the participant uptake of this measure?

- C9. From your perspective, what is the largest untapped opportunity for gas energy savings in participating houses?

- C10. Who do you feel has the most influence in deciding the type of upgrades to be implemented in participating homes?
 - Homeowner
 - Certified Energy Auditor
 - Contractor
 - Other, specify: _____



Communication with Certified Energy Auditors and Union

- D1a. Now talking about your working relationship with Certified Energy Auditors. How many Certified Energy Auditors do you work with?
- D1b. Are the CEAs you work with employees of your company or independent contractors?
- D2. What support do you provide to the CEAs? [Probe: training, administrative support]
- D3. How do you usually communicate with the Certified Energy Auditors?
- D4. Using a scale from 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied”, overall, how satisfied are you with the working relationship you have with the Certified Energy Auditors? Why?
- D5. Now talking about your relationship with Union. How do you usually communicate with Union?
- D6. Still on a scale of 1 to 10, overall, how satisfied are you with the relationship you have with Union? Why?
- D7a. Do you believe that Union gives you sufficient opportunity to provide input on the program?
- Yes
- No
- D7b. If no, what else can Union do to involve Service Organizations?



Satisfaction

E1. I have some questions about your satisfaction towards the program. Using a scale from 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied”, how satisfied are you with...?

Aspects of the program	Satisfaction Level (1 to 10)	If less than 8, please share the reason(s)
a) The overall program		
b) Program marketing and outreach activities initiated by Union		
c) Eligible measures and equipment		
d) Program incentive structures		

E2. Did you or anyone in your company receive training or information from Union about the program? If so, on which topic?

E3. If so, how satisfied are you with the information and/or training provided on a scale of 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied” ? Why?

If less than 8 → Why are you not more satisfied?

E4. Is there any additional information, training or technical support you would like to receive?

Program Processes

Now, here are some questions regarding the program processes and quality assurance.

F1. We understand that Certified Energy Auditors track and report the data captured in the energy assessment. Do they submit the data to you or directly into the Parachute system? [PROBE: If they submit to SO: Do you receive application files by batch? What frequency?]

[ASK F2 – F5 IF CEAs submit data to SO]

F2. Do the Certified Energy Auditors send pre-assessment data, and then post-assessment data, or do they send application upon final completion only?

F3. Can you walk me through your administrative process when receiving application data from the Certified Energy Auditors?



- F4. How do you report the program data to Union? At what frequency?

- F5. Approximately how many days does it take between receiving HRR application data from CEA and completing the administrative process for the pre-assessment? And for the post-assessment?
 Pre-Assessment:
 Post-assessment:

- F6. What can be done to reduce the time between the post-assessment audit and Union’s approval of the project for payment? [Probe: CEA side, SO side]

- F7. Using a scale from 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied”, how satisfied are you with the overall program tracking and reporting? Why?

- F8. What aspects of the data tracking and reporting system or process, if any, would you like to see changed or improved? How?

Quality Assurance

- G1. What verification activities, if any, do you undertake to ensure the quality control and accuracy of the data submitted to Union? Any other verification activities?

- G2. At what point in the process are the assessment files submitted to NRCan for approval? Are there any adjustments to data if errors or issues are identified during the NRCan approval process? [IF YES: Who is responsible for making the adjustments?]

- G3. How do you store and maintain files and documentation related to Union audits? [Probe: Length of time documentation is kept]

- G4. According to our information, you have processed 5,502 projects (or files) in 2018 as part of the Home Reno Rebate program. Is that right? If not, how many projects?



- G5. How many of these projects, if any, have gone through an internal quality assurance audit from you? [Probe: Level 1, Level 2, Level 3, Level 3 (new advisors), Level 4]

- G6. Do you have a quality assurance protocol? If so, can you send me a copy?

- G7. As a Service Organization, you may also have been audited by a Natural Resources Canada staff for quality assurance purposes. Besides usual processing done by NRCan, how many of your 2018 projects, if any, have gone through a quality assurance audit by NRCan?

- G8. Do you make any adjustments in the Parachute system if an issue is found in audits? [IF YES: On what basis do you make these adjustments? IF NO: Who is responsible for making the adjustments?]

- G9. Do you have a quality assurance report? If so, can you send me a copy?

Recommendations

We are almost done.

- H1. Do you have any concerns that we have not discussed with the way the program has been managed or delivered?

- H2. Do you have any suggestions on how to improve the Home Reno Rebate program?

END: Those are all the questions I have for you today.

I thank you very much for your collaboration and the time you took to answer our questions.



APPENDIX IV CERTIFIED ENERGY AUDITOR INTERVIEW GUIDE

Date & Time:

Interviewee Name:

Company Name:

Interviewer:

Table 1: Overview of Data Collection Activity

Descriptor	This Instrument
Instrument Type	Telephone Interview
Estimated Time to Complete	20-30 minutes
Population Description	Certified Energy Auditors
Contact List Size	
Completion Goal	5
Contact List Source	Enbridge Gas operating as Union Gas
Fielding Firm	Econoler

Table 2: Research Issue and Associated Questions

Research Issue	Associated Questions
Respondent Roles and Responsibilities	A1-A3
Program Offering and Implementation	
Are there opportunities to improve the efficacy of the program offering, including eligibility requirements?	C1-C9, E1
Are there opportunities to improve program awareness and communications?	B1-B3
Using Union’s Market Research results, what is participant satisfaction with the program, including impact of postal strike on customer satisfaction?	NA
What is partner (CEAs) satisfaction with program, including their interactions with Union and service organizations?	D3, D5, E1, E5, F7



Research Issue	Associated Questions
Processes and Program Delivery	
Is the program administration and delivery approach, including activities of SOs, internal processes and risk mitigation, effective and efficient?	C1-C10, D1-D6
Is the program theory and logic model complete and relevant?	NA
What, if any, are the difficulties or barriers to program delivery?	A4, C3, C4
Data tracking and Quality Assurance	
Is program tracking, monitoring and reporting complete and effective?	F1-F8
Is the CEA facing system meeting the data needs of CEA and Union?	F1-F8
Are the quality control and assurance measures in place ensuring program data integrity?	G1-G7
Are program processes consistent with program intentions?	A4, C1-C10
Are the SOs adhering to the documentation retention protocols outlined in Unions' agreements with SOs?	G3
Successes, Challenges and Opportunities	H1-H2

INTRODUCTION

Hello, may I speak with **[Contact name]**?

My name is **[Interviewer name]** and I'm calling from Econoler on behalf of Union Gas. Union Gas has contracted Econoler to evaluate the Home Reno Rebate program.

- Person responsible available **[CONTINUE]**
- Person responsible currently unavailable **[ARRANGE CALL BACK WITH THE RIGHT PERSON]**
- Refused **[THANK AND TERMINATE]**

Your responses will be kept confidential and we will not share the information you provided in a way that could identify your individual or corporate responses. [READ IF NECESSARY: The results of this evaluation will only be used to improve the program and will not affect your involvement in the program.]

Context

One of the main goals of this interview is to collect information to assess program outreach and delivery, barriers to participation, program communication, program data tracking and reporting, and possible program improvements.

Our discussion should take about 20-30 minutes.



Do you have any questions before we begin?

Respondent's Role and Involvement

The first questions will be about your business and your involvement with the Union Home Reno Rebate program.

A1. Are you part of a company or self-employed? What are your main functions? [PROBE: If company: Are you an employee of a Service Organization?]

A2. Besides doing energy audits, do [you /your company] also work as a contractor?

A3. How long have you been involved with the Home Reno Rebate program?

A4a. Do you consider your involvement in the Home Reno Rebate program as straight forward or complicated?

Straight forward

Complicated

A4b. If "Complicated", please indicate what makes your involvement in the program complicated?

Program Outreach

I would now like to discuss program outreach.

B1. Do you promote the Home Reno Rebate program to potential participants? If so, how?

B2. Besides that, how do potential participants learn about the Home Reno Rebate program? [PROBE: Do others recommend your services to potential participants?]

B3. Are there elements of the program that you find are generally not well-understood by participants? If so, which ones?



Program Delivery and Barriers

- C1. How many energy-efficient upgrades are typically recommended in your pre-assessment report and what are they?
- C2. How do you communicate the recommended energy-efficient upgrades to the participant? Anything else?
- Pre-assessment report
 - Discussion during pre-assessment
 - Follow-up after pre-assessment
 - Other, specify: _____
- C3. In general, are participants receptive to your suggestions of energy upgrades?
- C4. Which upgrades recommended in the assessment report are not typically implemented by participants? Why?
- C5. How, if at all, do you attempt to encourage customers to implement upgrades beyond what they may have initially considered?
- C6. Do you do any follow-up with participants after their pre-assessment audit?
- C7. The program data indicates that participants implement on average 2.8 measures per home. What can be done to encourage participants to implement more upgrades?
- C8. And specifically, for insulation, what do you think can improve the participant uptake of this measure?
- C9. From your perspective, what is the largest untapped opportunity for gas energy savings in participating houses?



C10. Who do you feel has the most influence in the type of upgrades to be implemented in participating homes?

- Homeowner
- Certified Energy Auditor
- Contractor
- Other, specify: _____

Communication with Service Organization and Union

D1. Now I would like to discuss your working relationship with Service Organizations. How many Service Organizations do you work with?

D2. How and how often do you usually communicate with the Service Organizations?

D3. Using a scale from 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied”, overall, how satisfied are you with the relationship you have with the Service Organizations? Why?

D4. Now thinking about your relationship with Union. How do you usually communicate with Union?

D5. Still on a scale of 1 to 10, overall, how satisfied are you with the relationship you have with Union? Why?

D6a. Do you believe that Union gives you sufficient opportunity to provide input on the program?

- Yes
- No

D6b. If no, what else can Union do to involve Energy Auditors?



Satisfaction

E1. Now I have some questions about your satisfaction towards the program. Using a scale from 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied”, how satisfied are you with...?

Aspects of the program	Satisfaction Level (1 to 10)	If less than 8, please share the reason(s)
a) The overall program		
b) Program marketing and outreach activities initiated by Union		
c) Eligible measures and equipment		
d) Program incentive structures		

E2. Did you or anyone in your company receive training or information from Union about the program? If so, on which topic?

E3. If so, how satisfied are you with the information and/or training provided on a scale of 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied” ? Why?

If less than 8 → Why are you not more satisfied?

E4. Did you or anyone in your company receive training or information from a SO about the program? If so, on which topic?

E5. If so, how satisfied are you with the information and/or training provided by the SO on a scale of 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied” ? Why?

If less than 8 → Why are you not more satisfied?

E6. Is there any additional information, training or technical support you would like to receive?



Program Processes

Now, here are some questions regarding the program processes.

- F1. We understand that as a Certified Energy Auditors, you track and report the data captured in the pre-assessment and also track and report annual gas savings on the post assessment. Is this correct? Do you submit this information to your SO or directly to Union using the Parachute system?

- F2. Can you walk me through your process for tracking and reporting pre-assessment and post-assessment data into the Union system? [PROBE: Any other administrative support? Frequency of reporting activity (e.g. daily, weekly)?]

- F3. Approximately how much time does data entry and reporting take for a pre-assessment audit? And for a post-assessment audit?
 Pre-Assessment:
 Post-assessment:

- F4. What are the administrative steps taken upon completion of the post-assessment audit to finally submit file to [IF F1 = SUBMIT TO SO, READ = SO; IF F1 = SUBMITS TO UNION, READ = Union]? Approximately how many days does it take between completion of post-assessment audit and submitting final application to the [IF F1 = SUBMIT TO SO, READ = SO; IF F1 = SUBMITS TO UNION, READ = Union]?

- F5. What additional support could Union or your SO provide to reduce the time between the completion of post-assessment and reporting to [IF F1 = SUBMIT TO SO, READ = SO; IF F1 = SUBMITS TO UNION, READ = Union]?

- F6. How do you ensure that participant applying for Home Reno Rebate is the bill-payer?

- F7. Using a scale from 1 to 10 where 1 means “very dissatisfied” and 10 means “very satisfied”, how satisfied are you with the program tracking and reporting? Why?

- F8. What aspects of the data tracking and reporting system or process, if any, would you like to see changed or improved? How?



Quality Assurance

- G1. Does NRCan approve your modelled post-assessment file (E file)? What happens if NRCan identifies errors or issues in a file during their review process?
- G2. What verification activities, if any, do you undertake to ensure the quality control of the data entered into Parachute? Any other verification activities? [Probe: review by others, admin support]
- G3. How do you store and maintain files and documentation related to Union audits? [Probe: Length of time documentation is kept]
- G4. According to our information, you have done [X] projects in 2018 as part of the Home Reno Rebate program. Is that right? If not, how many projects?
- G5. How many of your projects, if any, have gone through a quality assurance audit by your Service Organization?
- G6. As a Certified Energy Auditor, you may also have been audited by a Natural Resources Canada staff for quality assurance purposes. Besides usual processing done by NRCan, how many of your 2018 projects, if any, have gone through a quality assurance audit by NRCan?
- G7. Do you make any adjustments in the Parachute system if an issue is found in audits by either Service Organization or NRCan? [IF YES: How do you make these adjustments?]

Recommendations

We are almost done.

- H1. Do you have any concerns that we have not discussed with the way the program has been managed or delivered?
- H2. Do you have any suggestions on how to improve the Home Reno Rebate program?



END: Those are all the questions I have for you today.

I thank you very much for your collaboration and the time you took to answer our questions.



APPENDIX V HRR PROGRAM OFFERING THEORY

Link	Offering Theory Description	Performance Indicator(s)	Data Sources
0	UGL Residential Home Reno Rebate offering will be affected by external factors. These external factors include but are not limited to: cost of natural gas and electricity, other utility offerings, and the economy.	This link is not included within the scope of the defined evaluation approach.	-
1	UGL enrolls Service organizations (SOs). UGL develops a network of SOs that can guide customers through each stage of the offering. This activity involves identifying, pursuing and screening SOs for participation in the offering.	This link is not included within the scope of the defined evaluation approach.	-
2	UGL implements mass marketing and communication activities (e.g. radio, newspapers, billboard ads, outdoor signs, and digital media) to foster widespread awareness of the Home Reno Rebate offering. Information about the offering is provided to customers to foster participation in the Home Reno Rebate.	This link is not included within the scope of the defined evaluation approach.	-
3	UGL provides the SOs with targeted marketing materials (e.g. flyers for direct mail and door hangers) to homes that are likely to benefit from the offering.	This link is not included within the scope of the defined evaluation approach.	-
4	UGL provides training sessions to SOs. UGL provides training and coaching to help the SOs understand the structure of the HRR offering, how to sell energy efficiency, and how to provide a positive customer experience.	This link is not included within the scope of the defined evaluation approach.	-
5	UGL provides funding of up to \$550 for the cost of the pre and post-renovation assessments.	This link is not included within the scope of the defined evaluation approach.	-
6	UGL provides incentives to participants who install at least two of the recommended measures to offset the cost of energy efficient measures.	This link is not included within the scope of the defined evaluation approach.	-
7	SOs facilitate offering delivery. SOs guide customers through each stage of the offering, manage participant applications and hire certified energy advisors (CEAs) to conduct pre and post-renovation energy assessments.	This link is not included within the scope of the defined evaluation approach.	-
8,9,11,12	Informed customers understand benefits of the Home Reno Rebate offering and how to schedule a pre-renovation assessment.	This link is not included within the scope of the defined evaluation approach.	-



Link	Offering Theory Description	Performance Indicator(s)	Data Sources
10	SOs understand the offering and promote it to their contractor network.	This link is not included within the scope of the defined evaluation approach.	-
13	Contractors understand the offering and promote it to prospective participants.	This link is not included within the scope of the defined evaluation approach.	-
14, 15	SOs hire CEAs to conduct pre-renovation assessments and identify renovation options. The customer selects a SO that, in turn, hires a CEA to conduct a pre-renovation assessment. The CEA performs a site visit to establish a home energy consumption baseline and identify potential renovation options. The CEA reviews the results of the pre-renovation assessment with the participant and discusses renovation options.	This link is not included within the scope of the defined evaluation approach.	-
16	External factors such as energy prices and other program influences on prospective participants. Through other offerings or cross-promotional activities, participants learn about the HRR program offering and understand the benefits.	This link is not included within the scope of the defined evaluation approach.	-
17	Participants decide to install measures. Participants review opportunities identified by CEAs and decide to carry out renovations. Participants solicit contractor bids and select a contractor to install at least two of the measures recommended.	The conversion rate between the D and E assessments.	DSMT
18, 19	Measures are installed by contractors.	The number of measures installed by each participant.	DSMT
20	SOs hire CEAs to conduct a post-renovation assessment. The CEAs conduct post-renovation assessments by conducting site visits to establish home energy consumption after measure installation.	The number of E assessments completed.	DSMT
21	Participants have increased their level of energy efficiency awareness and energy literacy as a result of participating in the offering.	The proportion of participants who remember having received information about the energy efficiency of their home as part of their participation in the HRR program offering.	Participant surveys
22	Installed measures result in measured energy savings.	Net gas savings achieved by the offering.	Impact evaluation analysis
23	Participants are satisfied as a result of participating in the offering.	Satisfaction with the HRR program offering.	Participant surveys
		Satisfaction with SO and CEA interactions.	Participant surveys





2019 Commercial Offerings - Process Evaluation Report

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Contents

1	Executive Summary	5
1.1	Goals, Objectives and Scope	5
1.2	Methodology	5
1.3	Strengths of Offerings	6
1.4	Challenges, Barriers and Recommendations	8
1.5	Participant Experience and Satisfaction	11
2	Goals, Objectives and Scope	13
2.1	Goals and Objectives	13
2.2	Scope of Work	13
3	Methodology	15
3.1	Review of Offering Material	15
3.2	Review of Offering Data	15
3.3	Sampling, Interviews, and Surveys.....	15
3.4	Observations, Results and Recommendations	19
4	Review of Offering Material	20
4.1	Observations	20
4.2	Recommendations	21
5	Review of Data	23
5.1	Observations	23
5.2	Recommendations	24
6	Program and Sales Staff Perspectives	25
6.1	Goals, Implementation and Resources	25

6.2	Internal Team Engagement and Team Roles	28
6.3	Tracking and Measurement	30
6.4	Engaging Contractors or Trade Allies	31
6.5	Outreach and Marketing	32
6.6	Incentives	33
6.7	Customer Experience and Satisfaction	34
6.8	Summary of Strengths, Challenges/Barriers and Recommendations .	36
7	Direct Install Contractors Perspectives	41
7.1	Application and Incentive Processing	41
7.2	Outreach and Marketing	42
7.3	Offer Design	44
7.4	Customer Engagement and Satisfaction	44
7.5	Interaction with LEG and LUG	45
7.6	Summary of Strengths, Challenges/Barriers and Recommendations .	46
8	Participant Contractors Perspectives	49
8.1	Firmographics	49
8.2	Participant Contractors Feedback and Observations	49
8.3	Summary of Strengths and Challenges/Barriers	51
9	Participants Perspectives	52
9.1	Firmographics	52
9.1.1	Job Titles and Decision Makers	53
9.1.2	Commercial Sub-sector	56
9.1.3	Number of Employees	57
9.1.4	Occupancy Status	58
9.2	Portfolio Level Responses and Observations	60
9.2.1	Overall Customer Experience and Satisfaction	60
9.2.2	Application Process	64
9.2.3	Installation Process and Contractors	66
9.2.4	Incentive Processing	68
9.2.5	Suggestions for Future Improvements	68

9.3 Prescriptive Offering	69
9.3.1 Overall Customer Experience and Satisfaction.....	69
9.3.2 Application Process	74
9.3.3 Installation Process and Contractor	75
9.3.4 Incentive Processing.....	78
9.3.5 Suggestions for Future Improvements.....	79
9.4 Direct Install Offering	79
9.4.1 Overall Customer Experience and Satisfaction.....	80
9.4.2 Application Process	83
9.4.3 Installation Process and Contractors	84
9.4.4 Incentive Processing.....	86
9.4.5 Suggestions for Future Improvements.....	87
9.5 Custom Offering	87
9.5.1 Overall Customer Experience and Satisfaction.....	87
9.5.2 Application Process	91
9.5.3 Installation Process and Contractors	92
9.5.4 Incentive Processing.....	94
9.5.5 Suggestions for Future Improvements.....	95
10 Summary of Findings and Recommendations	97
10.1 Participant Experience and Satisfaction	97
10.2 Recommendations from Program and Sales Staff	98
10.3 Direct Install Contractors Recommendations.....	100
10.4 Participant Contractors Recommendations.....	101
10.5 Process Improvement Recommendations	102

1 Executive Summary

1.1 Goals, Objectives and Scope

The Ontario Energy Board (OEB) conducted a mid-term review of the 2015-2020 DSM Framework, and the OEB set out the requirement for Legacy Enbridge Gas (LEG) and Legacy Union Gas (LUG) to conduct process evaluations of their respective programs. The program year covered in this evaluation is 2019. This was the first year of the Enbridge/Union Gas merger where program delivery and sales teams were beginning to align internally but were still responsible for the delivery of two separate DSM plans. The LEG franchise territory was largely urban; centered on the Greater Toronto Area and Ottawa Region. The LUG franchise area was more rural covering smaller communities in Western, Eastern and Northern Ontario. The legacy utilities' customer profiles reflected their geographical differences with LUG serving a significant Agricultural and Industrial sector along with some very large customers. Each legacy utility employed a DSM delivery strategy that served their unique customer needs. Enbridge will continue to deliver the two legacy DSM plans until the next DSM plan is approved.

The overall objectives of the process evaluation include:

- Assisting program and offering designers and managers to continuously improve programs and offerings.
- Providing pertinent input for the development of next-generation programs and offerings based on the performance assessment of previous programs and offerings.

The conducted process evaluation assessed commercial offerings administered by LEG and LUG in the 2019 program year (PY). The specific offerings included in the evaluation are:

- Prescriptive
- Direct install
- Custom

The three offerings were delivered separately by LEG and LUG within their rate zones.

1.2 Methodology

The process evaluation included the following main task areas:

- Review of offering material
- Review of offering data
- Sampling, interviews and surveys to obtain perspectives from:
 - Program managers and sales staff
 - Contractors - Direct Install offering
 - Participant contractors

- Participants

EGI provided a data set of LEG and LUG participants for the relevant offerings. The data set included 1,075 LEG participants and 750 LUG participants. Email contact information was available for 277 LEG participants and 349 LUG participants. The 626 participants with email contact information were contacted to participate in a survey. A total of 56 participants completed the survey, which was comprised of 25 LEG participants and 31 LUG participants.

1.3 Strengths of Offerings

To assist program designers and managers to continuously improve programs and offerings, the process evaluation of 2019 included an assessment and identification of offering delivery strengths. The strengths identified through an evaluation of the offerings, which were delivered separately by LEG and LUG, provide guidance on processes that worked well. These processes can be considered for inclusion in the development of next-generation programs and offerings. The offering delivery strengths are summarized in Table 1-1. The strengths were identified through in-depth interviews (IDIs) with program and sales staff, Direct Install contractors and participant contractors.

Table 1-1: Offering Delivery Strengths

Topic	Offering Delivery Strengths	
Internal Team Engagement	Close collaboration and frequent communication amongst the program and sales staff	<ul style="list-style-type: none"> ▪ Frequent communication and close collaboration, including regular meetings and open lines of communications, between program and sales staff provided valuable insights into the continuous improvement of offers, expedited addressing ongoing issues, kept all staff updated and helped to address participant needs and questions.
Energy Advisors	Energy Advisors facilitate customers with the Custom offering	<ul style="list-style-type: none"> ▪ Program and sales staff perceived the Energy Advisors as a key element that drives the success of the Custom offerings. Energy Advisor worked to keep participants engaged by minimizing the effort to participate.
	Energy Advisors support of Direct Install contractors	<ul style="list-style-type: none"> ▪ Direct Install Contractors found it was beneficial to collaborate with Energy Advisors. The EAs assisted with the development of strategies, resolved issues regarding participation and closing projects at year-end.
	Dedicated Energy Advisors supporting participant contractors	<ul style="list-style-type: none"> ▪ Energy Advisors were perceived as an invaluable benefit to participant contractors. The dedicated EAs worked to assist contractors with recruitment, sharing offering updates, managed project tracking sheets and took on the task of filling in applications.
Engaging Contractors	Contractors managing application process	<ul style="list-style-type: none"> ▪ The LEG and LUG programs staff attributed the high level of satisfaction with the Prescriptive and Direct Install offering as the ease of participation, because contractors managed most of the application process.
Marketing	Successful direct marketing strategies	<ul style="list-style-type: none"> ▪ Direct marketing strategies that were named as being successful, are:

Topic		Offering Delivery Strengths
		<ul style="list-style-type: none"> ▪ Social media campaigns, which were effective at driving traffic to offer website. ▪ Direct mail to targeted customers who were on the Direct Install offer customer list. ▪ Direct marketing done by trade allies were very effective for the Prescriptive offer.
	Marketing material accessibility and collaborative development of marketing strategies with Direct Install contractors	<ul style="list-style-type: none"> ▪ Marketing material for both utilities was readily available, accessible, and included electronic and printed material to Direct Install contractors. ▪ The Direct Install contractors provided input as LEG and LUG developed the offering marketing material and marketing strategies. This collaboration resulted in successful marketing campaigns according to the contractors.
	Reputation of LUG and LEG brands	<ul style="list-style-type: none"> ▪ Direct Install contractors reported that their customers were familiar with the LEG and LUG brand. Their customers linked the LEG and LUG brands to reputable establishments and this brand recognition drove motivation to participate in the offering.
Application Process	Well established process and tracking system that is easy to operate	<ul style="list-style-type: none"> ▪ LEG program staff felt that the tracking system was easy to use as it runs independently and is supported by a well-established internal process. ▪ LUG program staff had an established Guardian system for application tracking, accompanied by an established internal review process.
	Straightforward application process	<ul style="list-style-type: none"> ▪ Participant contractors perceived the application process to be straightforward and required a level of effort that is aligned with the complexity levels of projects.
Incentives	An incentive structure providing incentive for mid-size projects and technical support for larger projects	<ul style="list-style-type: none"> ▪ Incentives for mid-size projects, these would be projects where the incentive is a significant portion, such as 50% or more, of the project cost, were very important as it tends to be a significant part of the total project cost. ▪ For larger projects, the technical support was more valuable and incentives were second most important, since the incentive did not constitute a significant portion of the project cost.
	Direct Install Incentives covering most of the project cost	<ul style="list-style-type: none"> ▪ LEG and LUG Direct Install Contractors regarded the offering’s incentives, which provides up to 90% of the cost of the equipment and installation, as the key strength and selling feature of the Direct Install offering.
	Satisfactory Prescriptive incentive amounts	<ul style="list-style-type: none"> ▪ According to the participant contractors, participants expressed a high level of satisfaction with the Prescriptive incentive amounts as they felt it was satisfactory.
	Fast incentive processing and payment	<ul style="list-style-type: none"> ▪ The processing and payment of incentives turnaround time was considered to be relatively fast which contributed to the participants high level of satisfaction with the incentive process.

1.4 Challenges, Barriers and Recommendations

Program and sales staff, Direct Install contractors and participant contractors identified challenges and barriers they experienced with the offerings. The challenges and barriers are discussed in Sections 6 to 8, and are summarized in Section 10. Recommendations to address the challenges and barriers were defined and are summarized in Sections 6 to 8. These recommendations, together with the recommendations resulting from the process evaluation of offering material and data, are summarized in Table 1-2. The summary of recommendations below does not provide the source of the recommendation. The detailed discussion of the recommendations and sources are included in Sections 6 to 8. The recommendations are listed according to topics.

Table 1-2: Summary of Recommendations

Topic	Recommendation
Free-ridership	<ul style="list-style-type: none"> ▪ Continually address free-rider mitigation strategies across the integrated team and share best practices from each of the legacy utilities in addition to providing clarity and guidance on the evaluation of savings and screening of free-riders.
Resources	<ul style="list-style-type: none"> ▪ Review and address resource constraint with internal sales team and the tracking and reporting team.
Offering Material	<ul style="list-style-type: none"> ▪ Ensure that each specific offer has a process map that is sufficiently detailed. ▪ Each offer should have its own logic model which provides rationale for each step in the process map and have an up-to-date summary sheet. ▪ Implement applications and data tracking for all offerings. This involves, for example, capturing customer’s involvement and all their applicable contact information to ensure application and data tracking is fully implemented. ▪ There is a need to target improving website usability and presentation, since the overall satisfaction with accessing online information was low. ▪ Ensure marketing materials include pertinent information in a clear manner.
Offering Design	<ul style="list-style-type: none"> ▪ When design changes are contemplated, promote collaboration between internal program and sales teams to define and plan implementation strategies. ▪ Add new and emerging technologies to the offers with the assistance of manufactures to expand the scope of the offerings, provide a wider selection of cost-effective solutions, and increase participation. ▪ Develop budget to provide more support for larger accounts in the historic LEG rate territory and more engagement with smaller commercial customers (less than 50,000 m3) in the historic LUG rate territory, to acquire new participants. ▪ Consider including in offerings a cost-effective strategy to provide technical support for smaller accounts. Smaller accounts have a more pressing need for technical and financial assistance, due to limited resources and understanding of what benefits or measures are available, appropriate and how to install it. ▪ Review and clearly define customer eligibility when customers participated in different offerings.
Incentive Structure	<ul style="list-style-type: none"> ▪ Continue providing higher incentive levels, which would allow for engaging broader and deeper tiers of new customers. ▪ Streamline the incentive amounts of some prescriptive technologies that have variable incentives.

Topic	Recommendation
	<ul style="list-style-type: none"> Review incentives and offering benefits and provide a margin of difference with the Direct Install fixed criteria to allow participants to receive as close as possible to the full quoted incentive amount.
Data Sets	<ul style="list-style-type: none"> Ensure key contact information (specifically contact name, email address and telephone number) are captured for each project by making these data fields mandatory on the application form and that Energy Advisors understand the significance of accurate information capturing as they are responsible for validating this information. Develop a data structure that captures the defined information and provide a clear definition of the data fields. Review how data is captured for the LEG Direct Install offer and revise it to avoid overstating incentives due to data duplication.
Offering Implementation	<ul style="list-style-type: none"> Provide fixed annual budget and information about free-ridership before offerings are launched. This will ensure cost effective technologies are being promoted from the start of the offering. When designing and delivering offerings, consider allowing longer timelines for project completion to align better with the duration and timing of participants' project life cycles and /or budget planning cycles, and to accommodate projects that carry over from year to year. Ensure consistency and continuity of the offering yearly to increase the efficiency and effectiveness of offering delivery. Offer a bonus incentive to customers to act within a certain timeframe. This will motivate participants to complete projects within offering timeline. Provide customer contact information in customer lists provided to contractors. This will increase participant recruitment efficiency. Provide an updated customer list mid-year, because contact information is outdated within a few months. When creating a customer list for Direct Install delivery agents coordinate with the internal sales team to ensure there is no duplication between customers being pursued by sales team and Direct Install delivery agents. Pre-screen customers and prioritize owner-occupied facilities. These facilities are more likely to participate. Streamline the turnaround response process for participant eligibility approval and develop a service level agreement (SLA) between internal departments to expedite the eligibility approval response turnaround time. This may include description of the internal EGI participant eligibility approval process that indicates the steps as well as responsibilities and turnaround time for each step. Allow tracking and reporting team to edit and adjust in the CRM once clarification is provided from the sales team. This will reduce effort and time to make edits. Optimize and streamline the application and incentive approval process. This includes streamlining participant signing requirements and limiting the number of touch points with customers. This will improve the customer experience. Work with participant contractors to collect information while the project implementation is in progress. This will minimize the effort to collect data when the project is completed.
Incentive Processing	<ul style="list-style-type: none"> Review the incentive processing and payment steps to identify areas to increase efficiency and turnaround time and implement quality control checks to ensure correct customer contact information is captured.

Topic	Recommendation
	<ul style="list-style-type: none"> ▪ The accounts payable department should include a description and project information with the mailed cheques to avoid participant confusion on why they are being sent. ▪ Implement a more efficient payment process similar to the one seen prior to 2019 that allowed project invoices to be processed individually.
Marketing	<ul style="list-style-type: none"> ▪ Develop more EGI branded communications and marketing to provide consistent and regular communications to customers on the offers. ▪ Ensure contractors have more EGI branded material in order to build awareness of the offerings as a product of EGI and verify the legitimacy of the offering. ▪ Develop more customer case studies, example of success stories, and novel and targeted communication of the offering’s benefits. ▪ Synchronizing the frequency of marketing campaigns with the contractor’s key sales period and involve them in the early marketing and design stages when offering changes are contemplated. ▪ Additional and increased frequency of marketing efforts will assist with achieving increased participation. ▪ Conduct research studies to define the influence and impact of different marketing strategies on program results to identify the most effective approach.
Communication, Engagement and Training	<ul style="list-style-type: none"> ▪ Optimize the number of internal meeting attendees, and allocated time for information sharing during regular internal update meetings. ▪ Provide more communication, training and support to vendors, and continue to alleviate the delivery vendors’ application challenges by streamlining the process for all offerings but was especially highlighted for Direct Install offerings ▪ Consider developing a formal trade ally network. ▪ Consider creating a joint online portal, where contractors can submit applications to internal Energy Advisors. ▪ Review and address turnover of Energy Advisor staff and develop a strategy to maintain customer and Energy Advisor relationship. ▪ Develop a process to manage customer interaction between EGI Energy Advisors and contractors. This will continue to improve the customer experience. ▪ Consider conducting customer surveys by an independent third party to increase the likelihood of a more accurate representation of customer satisfaction.
Process Evaluation	<ul style="list-style-type: none"> ▪ Conduct process evaluation as soon as possible after project completion to minimize the amount of changes in contact and schedule them to occur during non-vacation periods. ▪ Consider including an incentive amount for participants and non-participants as motivation for survey completion. ▪ Provide clear definition in data sets to enable easy identification of customers to be included in the process evaluation. ▪ Provide contact information, especially email addresses, for all participants and non-participants.

1.5 Participant Experience and Satisfaction

A survey of participants gained an understanding of their experience and gauged their satisfaction with the offerings. Questions examined how participants became aware of the offerings and their decision to participate in the program. Eighty per cent of the participants became aware of their respective offerings from the following source:

- Enbridge Advisors
- Trade allies or contractors

The offering features that played the most significant role in participants’ decisions to participate in their respective offerings were:

- Program incentive.
- Previous experience with an energy saving offering.
- Information or recommendation provided to by a LEG/LUG Energy Advisor.

The survey also focused on learning about participant experience and satisfaction with different offering components, including accessing online resources, working with Energy Advisors, the application process, installation and contractors, and the incentive processing. The key insights regarding the participants offering experience and satisfaction are summarized in Table 1-3.

Participants did not provide many suggestions for improvement or feedback. The few who provided feedback mentioned increased incentives, continued communication with Energy Advisors, and quicker incentive turnaround time.

Table 1-3: Summary of Participant’s Experience – Key Insights

Topic	Satisfaction	Insights
Overall Offering	92% of participants were either satisfied or extremely satisfied with the offerings over all.	<ul style="list-style-type: none"> ▪ The main reasons for participant’s high satisfaction rate were ease of participation, value of the incentive, and assistance from an Enbridge Advisor.
Offering Information	63% of participants rated accessing online information as easy or extremely easy.	<ul style="list-style-type: none"> ▪ Those participants who were satisfied cited LEG/LUG Energy Advisor and clear website navigation as the main reasons for their rating. ▪ Information accessed online the most frequently were, offering eligibility criteria, offering application, offering contacts and success stories.
Energy Advisor	97% of the participants were satisfied or extremely satisfied with LEG/LUG Energy Advisor interactions.	<ul style="list-style-type: none"> ▪ The main reasons for the high satisfaction were LEG/LUG advisor’s helpfulness, responsiveness, and knowledge.
Application	68% of participants rated offering application submission process as easy or extremely easy.	<ul style="list-style-type: none"> ▪ The main reasons for the ease of the application process according to program contractors were the simplicity of the application. It was straight forward and matched the complexity of the project, and

Topic	Satisfaction	Insights
		contractors assisted with filling in applications.
Installation	89% of participants reported that the installation process did not create any disruptions to their business.	<ul style="list-style-type: none"> ▪ Only five participants (9%) indicated disruptions as the installation took longer than expected or they needed to shut down a section of their business for the day.
Contractors	84% of participants were satisfied or extremely satisfied with the quality of the contractors' work. 90% of participants reported they were satisfied or extremely satisfied with the completed upgrades.	<ul style="list-style-type: none"> ▪ The main reasons for these ratings included the energy savings they incurred, the energy efficiency gained, and the overall quality of their product or work.
Incentive Process	80% of the participants were satisfied or extremely satisfied with the incentive paperwork turnaround time. 73% of the participants were satisfied or extremely satisfied with incentive payment processing turnaround time.	

2 Goals, Objectives and Scope

Historically, the commercial Custom and Prescriptive offerings have provided Enbridge and Union Gas' commercial and industrial customers with a wide variety of Demand Side Management (DSM) options. In 2019, Legacy Enbridge Gas (LEG) and Legacy Union Gas (LUG) merged into Enbridge Gas Inc. (EGI), a gas distribution company serving the majority of the province of Ontario. As regulated utilities, LEG and LUG operate DSM offerings for their residential, low-income, and commercial/industrial customers within the framework approved by the Ontario Energy Board (OEB).

The OEB approved a DSM Framework and the DSM Plans for LEG and LUG, which took effect in 2015. The offerings included in the DSM Plans were expected to continue to the end of 2020. The terms of the merger in 2019 left the newly formed company to continue delivering two separate DSM plans until the next framework is approved. EGI collaborated with the OEB to establish a timeframe for developing the updated framework, with proceedings scheduled to commence in 2020, followed by the framework's rollout in 2022.

In its report on the mid-term, the OEB directed the legacy utilities to conduct process evaluations. In the evaluation year, 2019, the new utility was developing coordinated delivery methods while still delivering on individual DSM plans. For this reason, the offerings and processes of the legacy utilities are considered separately.

2.1 Goals and Objectives

The purpose of process evaluations is to document offering processes, identify operational and quality assurance issues, and assess market barriers and market response. Process evaluations also provide valuable information to program managers by exposing reasons why a program or offering may or may not meet specific goals while outlining strategies for enhancing a program's organization, delivery effectiveness, and outcomes. The overall objectives of the process evaluation include:

- Assisting program and offering designers and managers to continuously improve programs and offerings.
- Providing pertinent input for the development of next-generation programs and offerings based on the performance assessment of previous programs and offerings.

2.2 Scope of Work

The conducted process evaluation assessed commercial offerings administered by LUG and LEG in the 2019 program year (PY). Table 2-1 summarizes the specific offerings included in the evaluation. The three offerings were delivered separately by LEG and LUG within their rate zones.

Table 2-1: Offerings Included in Process Evaluation

Offerings	Descriptions
Prescriptive	The offering provided fixed financial incentives for the installation of eligible high-efficiency technologies. Depending on the technology, incentives were provided to customers, service providers, and/or distributors/dealers. Energy savings estimations were based on the OEB’s Technical Resource Manual (TRM).
Direct install	The offering provided a turnkey solution, in the form of the installation of energy efficient technologies, to customers who were less likely to participate in traditional offerings. The offering also provided increased incentive levels for select technologies.
Custom	The custom commercial and industrial offerings addressed energy savings opportunities related to unique building specifications, design concepts, processes and/or new technologies that were outside the scope of prescriptive measures. The offering provided technical assistance and financial incentives to encourage customers to implement energy efficient technologies. LEG provided consulting services to customers and third-party service providers to assess buildings’ energy consumption and provide recommendations for gas-saving measures.

The scope of work included the following tasks to conduct the process evaluation of these offerings:

- Identify groups to be engaged during process evaluations, such as participants, contractors, and offering delivery staff. The participant identification process need to consider EGI customers’ diversity across sectors, provincial regions, and installed measure types.
- Develop and field process evaluation surveys, interview guides, and engagement processes for each of the identified groups.
- Analyze data and develop a report inclusive of actionable recommendations for improvements to the process.
- Prepare a presentation to highlight the evaluation findings for presentation to the program design, delivery, and strategy teams.

A summary of the evaluation methodologies is presented in Section 3, with observations, perspectives, and results of the process evaluation presented and discussed in Sections 4 to 9, and key findings and recommendations in Section 10.

3 Methodology

The process evaluation included the following main task areas:

- Review of offering material
- Review of offering data
- Sampling, interviews and surveys

This section describes the methodologies and approaches applied to execute the tasks.

3.1 Review of Offering Material

Nexant reviewed program documentation, including program fact sheets, websites, applications, process maps, annual reports, and marketing materials from both LUG and LEG, as applicable. Prior to drafting the in-depth interviews, an initial review of the collected offering documentation was conducted to fully understand the offering design, logic, and delivery, and any changes to the offerings. Subsequent to completing the in-depth interviews, the offering documentation was reviewed again to revisit and re-evaluate findings from the materials review in the context of interview and survey data findings. Ultimately, this allowed for the contextualization and triangulation of findings from all data sources. Applications, program fact sheets, process maps, and annual reports were examined in order to assess the approach and completeness of program design, logic, and documentation. Marketing materials, primarily consisting of program fact sheets, were evaluated for completeness, approach, and overall cohesion. Lastly, program websites were assessed in terms of their design, usability, and messaging.

3.2 Review of Offering Data

Enbridge provided data pertaining to the LEG and LUG offerings, which included:

- **Participants:** Participant data sets for LEG and LUG containing those who participated in the 2019 program year. The data included in the participant data sets are discussed in Section 5.
- **Program staff:** Names and contact information of the main LEG and LUG program design and delivery managers for each offering.
- **Sales team:** Names and contact information of the LEG and LUG sales team supervisors.

3.3 Sampling, Interviews, and Surveys

The process evaluation assessed the offerings' design and delivery. An offering process assessment was conducted through in-depth interviews (IDIs) and focused surveys with

relevant offering actors, including LEG and LUG offering managers and sales staff, Direct Install contractors, participant contractors, and offering participants. For each respondent type, a customized interview guide or survey instrument was developed to ensure that responses addressed specific topics and provided the ability to draw meaningful conclusions.

Table 3-1 indicates the survey methodology, the total population invited to participate in the interviews or surveys, and the total number of completed interviews and surveys. The following subsections provide context regarding each surveyed group.

Table 3-1: Process Evaluation Primary Data Sources

Respondent Type	Methodology	Completed	Population
Legacy Enbridge Gas			
Offering managers and sales staff	Phone in-depth interviews	3	3
Contractors - direct install offering	Phone in-depth interviews	2	2
Participant contractors	Phone survey	2	272
Participants	Web survey	25*	277**
Legacy Union Gas			
Offering managers and sales staff	Phone in-depth interviews	3	3
Contractors - direct install offering	Phone in-depth interviews	2	2
Participant contractors	Phone survey	1	102
Participants	Web survey	31*	349**

*At 80% confidence level, the participant sample (n=25) for LEG has a 13% precision and the LUG participant sample (n=31) has a precision of 11% when only the contacted population is considered.

**Total participant population for LEG is 1,075 and for LUG is 750, but contact information was available for 277 LEG participants and 349 LUG participants.

3.3.1 Program Managers and Sales Team Interviews

IDIs were completed with the program managers and sales team supervisors. The EGI team identified the appropriate staff to interview regarding the various offerings that were in the evaluation scope. Interview topics addressed the following:

- Offering operation, goals, and resources
- Design and delivery, including tacking and measurement, and incentives
- Internal and external engagement
- Marketing and outreach
- Customer experience and satisfaction
- Strengths and weaknesses, and suggestions for improvement

3.3.2 LEG/LUG Contractor In-Depth Interviews

For these interviews, two companies that were retained by LUG to assist with delivery of the Direct Install (DI) offerings were contacted by EGI to request their participation in an IDI. Both companies responded to the request and completed the IDIs. Interview topics addressed:

- Design and delivery
- Engagement with LEG/LUG and other third parties
- Customer engagement
- Customer experience and satisfaction
- Barriers to participation
- Suggestions for improvement

3.3.3 Participant Contractor Interview

Participant contractors are contractors who worked directly with participants and were not retained by LEG/LUG to assist in offering implementation. Since this is the first process evaluation of the commercial offerings, EGI wanted to obtain input from only a few participant contractors to gain a high level perspective of the participant contractors' involvement with, and knowledge of, the offerings. This high level perspective will inform the relevance and usefulness of interviewing or surveying participant contractors in the future. Enbridge reviewed the participants' contractors list to identify three contractors that supported LEG participants, and three contractors that supported LUG participants. The six contractors were selected based on the number of projects completed and the contractors' geographic distribution. The intent of the selection was to include participant contractors that have completed a couple of projects with participants and are distributed across the province.

For the phone interviews, the six companies were contacted by Enbridge to request their participation in the interview. The evaluation team followed up to recruit the contractors and schedule the phone interview. Two LEG participant contractors and one LUG participant contractor participated in the phone interviews. The other three participant contractors did not participate, due to retirement of key staff, non-response, and declining to participate. Interview topics addressed:

- Participants' contractor experience during participation in the offer
- Engagement with LEG/LUG
- Application and incentive processing
- Incentives
- Participant satisfaction
- Suggestions for improvement

3.3.4 Participant Survey

Enbridge contacted the 626 participants with email contact information to request their participation in a web-survey. The survey was in the field for eight weeks, from November 11, 2020 to January 5, 2021. Reminder emails were sent out one week after the survey was launched and again one week before the survey was closed, whilst response rates were actively monitored. After the survey was fielded for four weeks, the Enbridge Sales Team followed up with participants who had several projects to promote the survey's completion. A total of 56 participants completed the survey, which was comprised of 25 LEG participants and 31 LUG participants. Survey topics addressed:

- Overall customer experience and satisfaction
- Application process
- Installation process and contractor
- Incentive processing
- Suggestions for future improvements

To achieve higher participation rates the following items are recommended for future process evaluations:

- Due to frequent staff turnover at customer facilities, it is recommended to conduct process evaluation as soon as possible after project completion to minimize the amount of changes in contacts. The optimal strategy is to include survey completion as part of the project close out. This means participant surveys are conducted at the same time when the offering is being delivered, and all the survey data are compiled and analyzed at the end of the program year.
- Schedule process evaluations to occur during non-vacation periods. Avoid vacation periods that coincides with school holidays, such as November to January, March, and July to August. Participants and customers are more likely to be unavailable during these periods.
- Consider including an incentive amount for participants and non-participants as motivation for survey completion.
- Provide clear definition in data sets, to enable easy identification of customers to be included in the process evaluation, and include contact information, especially email addresses, for all participants and non-participants. The lack of contact information reduces the number participants to be included in the process evaluation.

3.4 Observations, Results and Recommendations

The process evaluation focus on the 2019 program year, which was a transition year where the newly formed Enbridge Gas Inc. (EGI) incorporated the teams and offers from Legacy Enbridge (LEG) and Legacy Union Gas (LUG). Changes occurred during 2019 and 2020 to align the teams, processes and offers, for example new Customer Relationship Management (CRM) software for submitting projects, and newly adopted tracking and reporting tools. This means some of the recommendations for improvement of processes as they were in 2019 might have been addressed or are being addressed. Future process evaluations will be able to assess the effectiveness of these changes.

The observations, perspectives and results of the reviews, interviews and surveys are discussed in the remainder of the report, as follows:

- Review of offering material
- Review of data
- Program and sales staff perspectives
- Direct Install contractors' perspectives
- Participant contractors' perspective
- Participants' perspectives

4 Review of Offering Material

Section 3.1 describes the reviewed program material and the review methodology. The remainder of this section discusses the observations and recommendations based on a review of the program material.

4.1 Observations

4.1.1 Offer Plans and Applications

Applications are required for LEG programs and the application material was found to be thorough, straightforward, and included expected data request fields. LUG Energy Advisors complete applications on behalf of customers who want to participate in the Prescriptive offering. Customers are required to sign a “Terms and Conditions” sheet to participate in the LUG Direct Install offering. To participate in LUG’s Custom offering, participants or contractors need to complete calculation worksheets and a “Project Information Sheet”.

Internal program reference material from both legacy utilities was examined. For LEG, this material was a summary of offer plans, and for LUG, it was in the form of individual program summary documents. Each of these sets of documents also contained process maps. The individual program summary sheets are concise, comprehensive, and serve as a useful reference for staff members while including the most up-to-date information on program design and related responsibilities.

The process maps for both LEG and LUG were sufficient to provide an overview and information to deliver the offering, though they may lack the necessary detail to evaluate any underlying problematic process elements. LUG’s process maps were offer-specific, while LEG’s were limited to each broad offer category (prescriptive, direct install, and custom). In addition, LEG’s summary offer plans contain logic models that can be a useful tool for summarizing and tracking program requirements and outputs.

4.1.2 Website

While both LEG and LUG have active websites to promote programs and offerings, the designs differ. LEG’s commercial and industrial landing page does not provide a straightforward path to navigate to efficiency offers. Nonetheless, once a user reaches this page, the presentation is dynamic, and navigation is convenient. Users can scroll down to “Commercial Sectors,” click on the appropriate sector and be presented with offers suited to that specified sector. Users can also be redirected to a page where they can view available offers by selecting either a sector or an available measure. Additionally, users have access to a variety of resources, including case studies, energy calculators, a contact link for Energy Advisors, applications, and technical information videos.

The LUG site uses a “site map” (hierarchical structuring of the website) design to facilitate user navigation, where available pages are listed. However, when completing an application, a user may become disoriented while navigating through the website’s pages, as the individual offer

pages are not nested below each offer type by default. Once the user has navigated to the appropriate pages, the specifics of the offer are transparent but are presented in a manner that invites the user to scroll down to view incentive levels and measure requirements. LUG's website offers a useful service provider directory, which is not provided on LEG's website.

4.1.3 Marketing Material

LEG had a larger number of program marketing material compared to LUG and LEG material offered modern graphic design, concise communication about offer details, and clear contact information. In general, LUG's marketing content was technology-focused and included technology specifications and the issues it can address, rather than presenting offer details.

4.2 Recommendations

4.2.1 Offer Plans and Applications

The following items are recommended to assist in the continuous improvement of offer plans and applications:

- Process maps. Process maps document each stakeholder's involvement in the program and highlight any obstacles in the program's operations. Ensure that each specific offer has a process map that is sufficiently detailed, for example it is offer-specific, does not skip or combine steps for any stakeholder and carefully documents instances where there are multiple action options arising from particular steps.
- Logic models. Each program offer should have its own logic model which provides rationale for each step in the process map. Importantly, this approach needs to consider prioritizing the customer experience with the offer. The logic model should address any obstacles and/or motivation at each step of the process map.
- Summary sheets. Individual offer summary sheets are valuable resources for monitoring essential program elements (and changes), staff roles, incentive levels, and process maps. Each offer should have an up-to-date summary sheet.
- Applications and data tracking. Program applications are useful for tracking and summarizing a customer's involvement in the program. A significant portion of documenting customer involvement is ensuring customers complete applications followed by uploading that information into the program database.

4.2.2 Website

The following is a recommendation to improve upon LEG and LUG program websites:

- Website usability and presentation. Program websites are often the first way a customer interacts with an efficiency program. The website design should consider prioritizing the customer experience. This includes making resources readily available, presenting important information at the top of the page (to limit scrolling), assuring ease of navigation, modernizing the website's template. Additionally, program marketing collateral should ensure that the branding and design accurately reflect these elements as well.

4.2.3 Marketing Material

The following is a recommendation to improve upon LEG and LUG marketing material:

- All marketing materials should distinctly reference program incentives and benefits up front. The material should also provide clear guidance for immediate action, such as contact information for assistance and information about additional resources. LEG's marketing materials offer good examples.

5 Review of Data

Section 3.2 describes the reviewed offerings data and the review methodology. The review of offering data covers the first year of the Enbridge/Union Gas merger where different data tracking systems and processes were beginning to align internally, but the delivery of offerings were still being delivered as part of two separate DSM plans. The review of the two separate tracking systems needs to be viewed within this context, and as integration continues the processes will change. The remainder of this section discusses the observations and recommendations based on a review of the data.

5.1 Observations

The main data fields provided in the data set are summarized in Table 5-1.

Table 5-1: Relevant Data Included in LEG and LUG Participant Data Set

LEG	LUG
Project number	Project number
Offer segment (Custom / Prescriptive / Direct Install)	Offer segment
Program offering (Commercial / Industrial)	Offer classification
Size of sub-sector (Large/Small)	
Customer sector	Customer sector and SIC code description
Customer contact information: customer name, address	Customer contact information: customer name, address
Measure group and name	Measure group and name, and equipment type and technology
Installation and commissioning dates	Installation and commissioning dates
Natural gas consumption and savings	Natural gas consumption and savings
Incentive per project	Incentive per project
Sales staff contact	Sales staff contact
Project contact information: name, phone number, email address	Customer decision maker contact: name, phone number, email address Customer technical contact: name, phone number, email address
Efficiency partner company contact info: name, address, phone number, and email address	Service provider contact info: company name, contact name, phone number, and email address

The review and use of the 2019 LEG and LUG participant data sets informed the following observations:

- The data sets provided for all programs lacked contact information, specifically contact name and email address, for a significant number of projects. The LEG and LUG data sets did not contain email contact information for 74% and 53% of the projects, respectively.

- The validation of contact information for both LEG and LUG data sets rests solely with the Energy Advisors (EAs), since they are the LEG/LUG representative in contact with the participant. This indicates the accuracy of the information is dependent on EAs' information capturing capability.
- For the LEG Direct Install offer, 41 projects could not be matched and have no primary contacts or incentive. These specific data fields were unpopulated.
- When comparing the LEG and LUG data sets, there are differences in data fields to collect information. For example, LEG captures the facility's size (large versus small), while LUG does not, and different sector classification is used.
- Business Intelligence (BI) did not provide a "Do Not Contact" data field at the account level, and the field was not included in the LEG data set.
- For the LUG data set, there were no accounts designated as opt-out/do not contact in the Banner or Guardian systems.¹

5.2 Recommendations

The following items are recommended to assist in the improvement of the data sets and to consider when combining the LEG and LUG data sets:

- Ensure contact information, specifically contact name, email address and telephone number, are captured for each project. A suggestion is to make these data fields' mandatory data entry fields as the initial shared dataset lacked a significant amount of contact details.
- Since the validation of contact information for both LEG and LUG data sets rests solely on Energy Advisors, it is crucial they understand the significance of accurate information capturing.
- Review the structure of the data and define the information to be captured. Develop a data structure that captures the defined information and provide a clear definition of the data fields. This may require coordination and agreement with other internal teams to have a consistent definition of classifications, for example, for sectors and sub-sectors. The data structure also needs to address customers who do not want to be contacted again or want to opt-out of communication. This may also require coordination and agreement with other internal teams to ensure this data is captured and reported.

¹ Banner: LUG's Customer Information System, which was migrated to LEG's SAP CIS system. The systems contains all LUG customer data and billing data.

Guardian: LUG's system to manage DSM leads and projects, and provide information to generate cheques via SAP. The system tracks gas/electric/water savings and incentives.

6 Program and Sales Staff Perspectives

The following subsections outline the process evaluation results of the IDIs conducted with key program managers and sales team managers (three from LEG and three from LUG). These IDI's were conducted to achieve a comprehensive grasp of the offering's goals, operations, implementation, and the encountered challenges during the offerings' delivery. Feedback from these interviews is summarized below, centered on main themes:

- Goals, implementation and resources
- Internal team engagement and team roles
- Tracking and measurement
- Engaging contractors or trade allies
- Outreach and marketing
- Incentives
- Customer experience and satisfaction

6.1 Goals, Implementation and Resources

The feedback on goals, implementation, and resources varied among the offerings and utilities. The main goal for both LEG and LUG was to achieve energy-saving and cost-effective offerings. Such was the objective for both LEG and LUG Direct Install and Custom offerings. The LEG Prescriptive offering did not specify a key goal, while the LUG Prescriptive offering had gas-savings and cost-effectiveness targets. Additional goals for both utilities included:

- Reducing free ridership. Program net verified savings are estimated by adjusting (discounting or increasing) the gross verified savings through the application of a set of adjustment factors, including free-ridership rates, spillover effects, and rebound effects. Free-ridership is the program savings factor attributable to participants who would have implemented a program measure in the absence of the program. Though they may not be directly attributable to the evaluated program, savings occur as a result of free-ridership, and thus these effects reduce the direct impact of the program or offering.
- Integration goals for LEG and LUG commercial teams. In 2019 the goals included cross-training and knowledge transfer.

Reducing free ridership was a shared objective among the utilities, whereby both utilities applied their own distinct methodologies. LEG produced pre-screening documents and internal education sessions. The LEG delivery team also reviewed technologies to identify those that are associated with having a high free ridership rate. This led to an update of the 2019 application form to reflect the feedback from reviews of technologies. LUG's methodology was two-fold; the

customers were reviewed to ensure the appropriate ones were targeted, and there was an added focus on attracting new customers who were not exposed to the offerings before. It is believed that new customers may be less familiar with energy efficiency opportunities, which increases the chance that the customer will not be a free-rider. Enbridge continues to address free-rider mitigation strategies across the integrated team and share best practices from each of the legacy utilities.

Both utilities indicated no challenges in measuring their goals. However, the utilities reported challenges with achieving the goals. An overall challenge experienced in achieving goals is the continued competition with electricity programs. Higher electricity cost makes these projects more attractive for customers from a cost-benefit perspective. The main challenges and barriers were associated with the following items below and are described in further detail in this section:

- Budget and reporting of the previous year results
- Staffing
- Offering design and delivery
- Duration and timing of offerings

All of the following insights regarding goals, implementation and resources in this section are generally applicable to the commercial offerings unless the specific offering is indicated.

Legacy Enbridge Gas

For LEG, barriers mostly focused on budget and staffing. A challenge for the staff is the different timelines for launching of offerings and the reporting of evaluation results from the previous year. Programs are usually launched prior to when evaluation results are scheduled to be reported. This means the program delivery team worked with an assumed budget and promoted technologies with assumed low free ridership until evaluation results are reported. The evaluation results inform budgets and defining technologies with low free ridership.

A more general limitation concerning limited budget was the contracting of external staff. Staff recommend reviewing the cost-effectiveness of contracting external staff, including the effort required to fill the vacancies when the contracts ended.

LEG expressed a challenge with achieving the Direct Install offer target due to lengthy sales cycles, especially for offerings such as the Demand Control Kitchen Ventilation (DCKV) offering.

Legacy Union Gas

LUG's challenges and barriers were multifaceted and attributed to budgets, staffing, offering design, and the offering. Limited budgets required a dedicated focus on key accounts, which are included in a limited number of sub-sectors and markets. This limited the opportunity to pursue additional customers and accounts in other sub-sectors and markets. Limiting the ability to penetrate other sectors and markets amplified the difficulty of achieving targets, which has been increasing on an annual basis as the offering targets are compounded based on results achieved from previous years. Continuous modifications in offering design (such as eligibility, measures included, budget and incentives) presented additional challenges in achieving targets.

Since the merger in 2019, LUG staff mentioned being short-staffed as a result of the changing roles. Future evaluations will be able to assess the allocation of adequate staffing resources.

LUG observed that certain Prescriptive offering technologies experienced low market penetration as they were not well known and thus not marketed or promoted well by the vendors. This was particularly observed for complex measures requiring additional engineering assistance. The variety of measures included in the Direct Install offering was perceived by the program and sales staff to be minimal.

LUG experienced challenges with the offering delivery duration and timing, which does not always align with projects' life cycles and /or customer budget planning cycles. For several customers, the planning cycles for budgets and projects extend beyond an annual calendar period. These opportunities are often not captured due to the offering's timing and duration, which is based on annual goals.

Recommendations

The following items were provided by LEG and LUG staff to address some of the challenges and barriers that were identified:

- Use internal sales staff to deliver offerings, especially for custom projects, which will make the offerings more cost-effective.
- Review and address the internal sales team resource constraints, experienced by LEG.
- Provide more communication and support to vendors, especially for the Direct Install offering, and continue to alleviate the delivery vendors' application challenges by streamlining the process. The program and sales staff observed that the streamlining of the application process was addressed after 2019. Future evaluations will be able to confirm the effectiveness of this change.
- Offer a bonus incentive to customers that act within a certain timeframe. This will incentivize participants to complete the projects within a shorter period.
- When designing and delivering the program, consider allowing longer timelines for project completion, as planning cycles for budgets and projects extend beyond an annual calendar period. This is important for time bonus offers and incentives. Customers value the certainty of knowing what the offer is and that it will still be there when making decisions in their planning. Some projects are complex and have planning cycles that span multiple years.
- Add new and emerging technologies to the offers, to expand the scope of the offerings and provide a wider selection of solutions for customers and increase participation.
- Provide clear guidance on how to screen for free-riders, including reviewing and addressing the challenge in maintaining customer relations whilst screening free-riders, to assist in reducing free-ridership.

- Provide clear definition and clarification of how savings are evaluated, especially regarding free-ridership. One aspect to address is offerings that have been in the market for a while. Customers factor in available incentives into their annual budgets. This means the offer influenced the decision of the customer to participate, but from the evaluator perspective this might be regarded as a free rider.
- Work with manufacturers to help augment efficiencies of technologies upstream, to provide a wider selection of cost-effective efficient solutions for customers and increase participation
- Utilize the Guardian tracking system to keep records updated to facilitate handovers due to changing roles.

6.2 Internal Team Engagement and Team Roles

Legacy Enbridge Gas

The LEG program established an annual program review process. During the last quarter of each year, the program team reviewed the various offering components (marketing, incentive levels, and outreach) to assess their respective effectiveness and informed program modifications prior to reintroducing the offers in January. At the beginning of each year, formal launch meetings occurred, which included the internal sales team. The offering's specifications were communicated, including the requirements, eligibility, and other relevant aspects of the implementation. The delivery team held internal monthly team meetings. Additional frequent meetings were organized to address ongoing issues and discussions. Internal communications were dynamic, and team members were contacted on an as-needed basis. The regular communication between the internal sales team and the Prescriptive and Direct Install teams was supported by an internal SharePoint site, facilitating data and content sharing.

The LEG sales staff (or Energy Advisors) worked closely with customers throughout the offer's lifecycle. The sales team was involved in engaging and recruiting customers and helping them throughout the offer cycle. The sales team followed a holistic approach in delivering the offers, as they understood the customers' needs and offered them relevant clarifications. The sales team was comprised of representatives that worked directly with business partners to reach targeted sectors and discussed available customer opportunities. The sales team's day-to-day tasks included understanding why customers were not pursuing identified opportunities and working through the opportunities with business partners to recruit customers.

For Prescriptive applications, the LEG sales team worked with the business partners to complete applications and uploaded them using the internal tracking system. For Direct Install applications, delivery vendors processed the applications with the customers and sent them directly to the project team.

The LEG program staff worked closely with the LEG sales team. The sales team often reached out to the program staff to obtain insights about program specifics and technology development. This dynamic was important when customers wanted to explore new technologies that are not in the typical DSM offer range. Another example of the teams' close interaction occurred when the Prescriptive offer team worked with the sales team to increase specific technologies' uptake.

This included developing sales support, such as orchestrating a webinar with business partners to promote the offer and technologies to a target sector. An objective of the teams working closely together was for the sales team to provide market feedback to the program team before launching the offers each year. Given the close collaboration between the sales team and the customers, the team was able to provide valuable insight into the offer's continuous improvement, especially pertaining to national accounts and large customers. The program staff also attended some customer meetings and on-site visits with the sales team to better understand the customers.

The LEG evaluation team was involved with Prescriptive and Direct Install offers. For the Prescriptive offer, the team checked incentives, ensured certain sectors were reached and ensured compliance with TRM estimates. For the Direct Install offer, the team requested that the program team ensure the delivery vendor performed the appropriate quality checks after installation, as they were compensated prior to the installation.

Legacy Union Gas

The LUG project review team held internal bi-weekly team meetings and as well as regular meetings to address ongoing issues, discussions, and updates. A team member was routinely sent to attend other teams' meetings to exchange updates and feedback. The LUG program staff and LUG sales team stayed in close communication with each other.

For internal communication, the LUG sales team communicated via regular email correspondence, weekly phone calls and joint field sales visits with energy supervisors across the province.² During quarterly meetings, the program team was invited to share updates and feedback from energy advisors on challenges and insights. Besides the quarterly meetings, the sales team frequently reached out to program staff for general inquiries and engaged in discussions when they received information to aid recruitment. For Custom offers, the energy advisors served as the primary contact for customers and trade allies for project-specific information.

The LUG tracking and reporting team supported program design through back-end processing and set up the reporting system to report results. The LUG evaluation team was involved with Prescriptive and Direct Install offers. For the Direct Install offer, they determined if the appropriate customers were targeted and worked towards reducing free-ridership. For the Prescriptive offer, they were closely involved in the utilization of the Technical Reference Manual (TRM). This included an understanding of any changes to the TRM and any measures that will be assessed as part of the Ontario Energy Board (OEB) evaluation to ensure an understanding of the parameters prior to designing a program or offer.

The marketing team supported the offer's promotion by aiding in the customization of the communication based on segment or business type.

² With the advent of COVID-19 in 2020, video conference calls were adopted and viewed as an improvement to communication, especially in terms of efficiency and effectiveness

Recommendations

Both LEG and LUG program and sales staff expressed high satisfaction with the communication and engagement amongst internal teams and provided the following recommendations for additional improvements:

- Optimize meetings based on the number of attendees and allocate adequate time for information sharing. Internal meetings with numerous participants can limit the available time for information sharing.
- Provide regular updates regarding internal communication.

6.3 Tracking and Measurement

LEG program staff perceived the tracking system as easy to operate and diligent. They went on to say that the system, runs independently, and is supported by a well-structured internal process. The sales team used the system to input project details and submit applications, while the tracking and reporting team managed the process. The tracking and reporting team reviewed the submitted applications to determine compliance with the offering's rules. The team continuously reviewed the tracking system and analyzed the major reasons for delayed applications. The tracking and reporting team also provided feedback and project status information to the sales team to assist in addressing delayed applications.

LUG used the Guardian system³ for tracking. Prescriptive applications were forwarded to the tracking and reporting team, who verified the completeness of the applications, including the presence of all required documents. In the case of errors or missing documentation, the application was sent back to the advisor for correction or resubmission as needed. Custom applications were forwarded to the quality assurance and quality control (QA/QC) team, who reviewed calculations to ensure they were satisfactory and met the offering rules and internal standards. The applications were then sent to the tracking and reporting team for final submission or payment.

When using the tracking system, challenges were identified along with their respective recommendations, which include:

- LEG program staff was challenged when creating a customer list to provide to delivery agents for the Direct Install offer. The program staff had to ensure they were not providing the same contacts that the LEG internal sales team is working with. To address this challenge, the LEG program staff recommended the following:
 - More resources allocated to the tracking and reporting team to help with the Direct Install offer.

³ Guardian: LUG's system to manage DSM leads and projects, and provide information to generate cheques via SAP. The system tracks gas/electric/water savings and incentives.

- When creating customer lists for Direct Install delivery agents, review these lists, and coordinate with the internal sales team to ensure there is no duplication with the internal sales team customer list.
- When project edits and updates were required to be made in the CRM it often resulted in added effort and time. To address this challenge, the following is recommended:
 - Allow the tracking and reporting team to edit and adjust the CRM when feedback is provided by the sales team, rather than waiting for the sales team to execute these changes.

6.4 Engaging Contractors or Trade Allies

Both LEG and LUG retained contractors (also referred to as business partners, service providers, or trade allies) for the Direct Install offers. LEG and LUG staff's perception is that participants had a high level of satisfaction with Direct Install contractors as staff were asked to rate customer's satisfaction with their contractors.

Challenges raised by program and sales staff when engaging with contractors included:

- When working with a contractor, the program team believes that their influence on customers is weakened as they have no direct interaction with customers, and sometimes customers are not aware of LEG/LUG.
- Contractors are specialized in a specific technology, and they may not have a holistic understanding of natural gas usage and the offerings. This requires additional effort from the sales team who needs to educate the contractors.

Neither LEG nor LUG had a formal trade ally network. A formal trade ally network is a roster of contractors or vendors that is maintained by a utility (or energy efficiency agency). The contractors on the roster are vetted by utility, and the trade allies work as trusted partners with the utility to identify, sell and implement energy efficiency upgrades in support of achieving program and offering goals. Some LEG/LUG staff believes that having a formal trade ally network would be valuable to deliver results and recruit additional businesses/customers. The teams also believe that having a formal trade ally network will attract small to medium-sized businesses and offer a level of consistency in the quality and efficiency of services provided by contractors. Suggestions by the program and sales team to consider when developing a formal trade ally network include having a defined registration and performance criteria and promoting the value of the trade ally network (for example, training and education, streamlined tools and application forms, etc.), which will add value to contractors' business.

The following are recommendations by LEG and LUG program staff to improve contractors' engagement:

- Create a joint online portal where contractors can submit applications to internal energy advisors.

- Provide performance-based compensation to contractors to provide additional motivation to increase participation.
- Provide an increased budget that would allow for sufficient education and training of contractors to aid them in promoting and delivering the offerings.
- Provide more engagement with, and assistance for, contractors (especially in midstream type offers) to improve supply chain processes for targeted customers.

6.5 Outreach and Marketing

Legacy Enbridge Gas

During the design of LEG Prescriptive and Direct Install offerings, there was no separate marketing department. Marketing was an imbedded role of the program design team.

The LEG Prescriptive offering was released into the market by the internal sales team and promoted through commercial and industrial contractors (or business partners). The offering was also promoted through associations for targeted sectors. According to the program and sales staff, reaching out to contractors was an effective approach due to the contractors' close working relationship with customers and leveraging contractors' involvement with different associations to promote the offering. The Direct install offering followed a similar approach as the Prescriptive offering. The difference was that Direct Install vendors were selected through a procurement process involving a request for proposal (RFP) process. For the Direct Install offering, the contractors (or delivery agents) were the main channel of outreach and marketing to customers. The contractors used LEG branding material and communicated directly with customers on a one-on-one basis.

The LEG sales team's recruitment and marketing approach for all the offerings was diversified and depended on the targeted sector and the customer's natural gas usage. For larger accounts, one-on-one relations were developed with dedicated LEG account managers. For smaller accounts, mass marketing approaches were used, including direct email, social media, and newsletters. Additional marketing to customers included quarterly newsletters, and promotional material such as bill inserts. Additionally, the offering's website is user-friendly and easy for customers to access. The program and sales staff perceived the effectiveness of some of the marketing strategies as follows:

- Social media campaigns are effective at driving traffic to offer website.
- Direct mail was used for the Direct Install offering to target customers, and was found to be effective.
- For the Prescriptive offering, working with trade allies is more effective than a mass-market approach, as they are knowledgeable of the offerings. It was challenging to ensure the right customers are targeted through a mass market approach.

LEG program and sales staff indicated it was challenging to manage the outcome and effectiveness of marketing strategies, given that information was not available to understand the direct influence of different marketing strategies on program results. The program staff observed

a temporary uptake in certain measures and technologies that can be linked to a targeted campaign, such as an incentive increase campaign.

A challenge experienced with the Direct Install offering is that some customers would question the legitimacy of the offer, as it was not presented directly by Enbridge, but by a contractor (or vendor).

Legacy Union Gas

LUG marketing approaches are built on previous success stories and the relationships with specific types of business, associations, contractors (or business partners), stakeholders that assisted in influencing customer decision.

The LUG Prescriptive offerings were released into the market by the LUG internal sales team. Communication outlining offerings for the year was issued to contractors (or business partners) through sales materials and brochures, which also guided contractors and participants to the website where they could find additional information. Broader communication included promotional material, such as bill inserts.

The LUG Direct Install offerings employed targeted communication only to identified accounts. This targeted communication was comprised of direct mail communication through contractors (or vendors) who were in charge of conducting the offering's outreach and recruitment.

In general, LUG staff considered the most effective marketing approaches to be direct forms of marketing, such as targeted email and mail campaigns, advertising and digital campaigns. According to the program staff general online marketing was less effective due to the diversity of the commercial sector. A single marketing message does not apply to all customer groups within the commercial sector.

Recommendations

The program and sales staff provided the following recommendations to consider for enhancing customer outreach and marketing:

- Improve communication of the benefits of offerings' technology to decision-makers by making the communication more specific and meaningful for targeted sectors.
- Develop more communications and marketing material.
- Provide consistent and regular communications to customers for Prescriptive and Direct Install offerings, and ensure the Enbridge brand is associated with the offering.
- Develop more customer case studies and examples of success stories detailing the equipment, financial benefit, and satisfaction with the projects.

6.6 Incentives

The Prescriptive and Custom offers provide incentives to eligible businesses that meet the offer criteria. The Direct Install offer provides up to 90% of the cost of the equipment and installation. There were three incentive levels for the LEG Prescriptive offer (per unit incentives for

customers, contractors, and distributors). The Prescriptive incentives were designed to be within 20%-40% of the measure's incremental cost. In contrast, the Direct Install offers were designed to attract targeted customers with limited knowledge of the CDM offers and aimed at covering up to 90% of the total project cost.

Overall, both LEG and LUG program and sales staff perceived the incentives and incentive structures to have worked well and provided the following observations and recommendations for additional improvement:

- Incentives for mid-size projects were crucial, as they tend to be a significant part of the total project cost. For larger projects, customers explained that the technical support was more valuable, and incentives were second most important since the incentive did not constitute a significant portion of the project cost. An example of this observation is that according to the LEG/LUG staff, larger customers indicated that energy audits were more important than incentives.
- It is perceived that the distributor incentive did not work well, as it was too far down the supply chain, and hard to determine the distributors' influence. This is potentially being addressed by the implementation of a new midstream program.
- Provision of higher incentive levels would allow for engaging broader and deeper tiers of customers who have not participated yet due to lack of time, budget, and/or knowledge.
- Streamline the incentive amounts of some prescriptive technologies with variable incentives, for example, defining a minimum or consistent amount.

LEG program and sales staff identified a few challenges with incentive processing:

- Delay in payment processing was experienced, mainly due to incorrect customer addresses or important information was missing.
- Incentive cheques were mailed from Texas with limited information regarding the application or project, which creates confusion for the customers. Including a description and project information with the mailed cheques will help customers understand why they are receiving the cheques.

6.7 Customer Experience and Satisfaction

Both LEG and LUG program and sales staff perceived the participants' experience and satisfaction of participants to be very satisfied regarding the offerings themselves, interaction with the LEG/LUG sales team, contractors, and the installed technology. The sales and programs staff attribute the high level of satisfaction to the following:

- Programs were easy to participate in for Prescriptive and Direct Install offerings, as contractors managed most of the application process.

- With the Custom offering, Energy Advisors facilitated the customer experience and journey by aiding them with the calculation, compilation, and submission of the project for the incentive, keeping them engaged, and minimizing the level of effort to participate.
- Appropriate incentive levels, especially high incentive coverage for the Direct Install offer.

The program and sales staff identified the following challenges and barriers as reasons why some customers may not participate in the offerings:

- Some customers did not understand their energy consumption and thought they could not improve their energy expenditure.
- Customers were not aware of the offers. Especially smaller customer accounts because offerings are evaluated based on the volume of gas-saving, which directs the program team to focus more on larger accounts.
- Smaller accounts have a more pressing need for technical and financial assistance, due to limited human and financial resources. Larger customers tend to have their own energy managers, which is not the case for smaller customers.
- The offer's return on investment (ROI) was not in line with the customer's core objective, as the offer did not result in a pay-back period that was short enough for the participant.
- Some customers experienced a frequent change in the Energy Advisors they worked with, resulting in the customer need to develop a new relationship with a new Energy Advisor.
- Incentive processing and payment turnaround can be too long. Most offerings' processing time was six to eight weeks, and an additional month or more before the customer received a rebate or incentive payment.

The following recommendations were provided by the program and sales staff to enhance customer experience and satisfaction:

- Streamline participant signing requirements and limit the number of touch points with customers for the LEG Direct Install offering. For example, limit the instances a LEG/LUG representative goes back to the customer to verify their information.
- In the LEG rate territory, add more support on larger accounts since these accounts did not receive sufficient attention in the past due to a lack of account-dedicated resources. In the LUG rate territory, it is recommended to reach out to the population of smaller commercial customers (less than 50,000 m³) since these customers were not previously targeted.
- Although internal teams conducted customer surveys, it is recommended to consider conducting these surveys by an independent third party to increase the likelihood of a more accurate customer satisfaction representation.

6.8 Summary of Strengths, Challenges/Barriers and Recommendations

Table 6-1 summarizes the aspects of the offering delivery that have worked well, according to the program and sales staff. While, the challenges or barriers, and recommendations are summarized in Table 6-2.

Table 6-1: Program and Sales Staff Perspective - Offering Delivery Strengths

Topic		Offering Delivery Strengths
Internal team engagement and communication	Close collaboration and frequent communication amongst the program staff	<ul style="list-style-type: none"> ▪ Regular meetings and open lines of communications was established for LEG and LUG program staff which provided an environment for teams to address ongoing issues, discussions and updates with all parties that need to be involved. ▪ Program and sales staff frequent communication and close collaboration provides valuable insights into the continuous improvement of offers and help to address participant needs and questions.
Application and data tracking system	Well established process and tracking system that is easy to operate	<ul style="list-style-type: none"> ▪ LEG program staff felt that the tracking system was easy to use as it runs independently and is supported by a well-established internal process. ▪ LUG program staff had an established Guardian system for application tracking, accompanied by an established internal review process.
Engaging contractors	Contractors managing application process	<ul style="list-style-type: none"> ▪ The LEG and LUG programs staff attributed the high level of satisfaction with the Prescriptive and Direct Install offering as the ease of participation, because contractors managed most of the application process.
Energy Advisors	Energy Advisors facilitate customers with the Custom offering	<ul style="list-style-type: none"> ▪ Program and sales staff perceived the Energy Advisors as a key element that drives the success of the Custom offerings. Energy Advisor worked to keep participants engaged by minimizing the effort to participate.
Marketing	Successful direct marketing strategies	<ul style="list-style-type: none"> ▪ Direct marketing strategies that were named as being successful, are: <ul style="list-style-type: none"> ▪ Social media campaigns, which were effective at driving traffic to offer website. ▪ Direct mail to targeted customers who were on the Direct Install offer customer list. ▪ Direct marketing done by trade allies were very effective for Prescriptive offer.
Incentives	An incentive structure providing incentive for mid-size projects and technical support for larger projects	<ul style="list-style-type: none"> ▪ Incentives for mid-size projects were very important as it tends to be a significant part of the total project cost. ▪ For larger projects, the technical support was more valuable and incentives were second most important, since the incentive did not constitute a significant portion of the project cost.

Table 6-2: Program and Sales Staff Perspective - Challenges/Barriers and Recommendations

Topic	Challenge / Barrier	Recommendation
Goals, Implementation and Resources		
Free-ridership	<ul style="list-style-type: none"> ▪ Reducing free ridership was a shared objective among the utilities, whereby both utilities applied their own distinct methodologies. 	<ul style="list-style-type: none"> ▪ Continue to address free-rider mitigation strategies across the integrated team and share best practices from each of the legacy utilities. ▪ Provide clear definition and clarification of how savings are evaluated, especially regarding free-ridership. ▪ Provide clear guidance on how to screen for free-riders.
Budget and Resources	<ul style="list-style-type: none"> ▪ Offerings and technologies are promoted with assumed budgets and free-ridership during the first part of the year until previous year’s results are reported. This was a challenge as the savings were critically discounted, which lead to a less cost-effective offering. ▪ Contracting external staff to deliver offerings is less cost-effective compared to using internal staff. ▪ A significant effort is required to fill vacancies when contracted employees’ contracts end. ▪ Limited budgets limit the opportunity to pursue additional customers and accounts besides key accounts. ▪ Goals increase on an annual basis while budgets do not. 	<ul style="list-style-type: none"> ▪ Provide fixed annual budget and information about free-ridership early in year before offerings are launched. ▪ Use internal sales staff to deliver offerings, especially for custom projects, which will make the offerings more cost-effective. ▪ Review and address the internal sales team resource constraints. ▪ In the historic LEG rate territory add more support on larger accounts, since these accounts did not receive sufficient attention in the past due to lack of account-dedicated resources. In the historically LUG rate territory reaching out to the population of smaller commercial customers (less than 50,000 m³) is recommended, since these customers were not targeted before. ▪ Review and address resource constraints with the tracking and reporting team to help with the Direct Install offer. The perception is that the team does not have sufficient staff.
Data	<ul style="list-style-type: none"> ▪ Developing a customer list to provide to delivery agents for the Direct Install offer, may conflict with internal sales team customer lists. 	<ul style="list-style-type: none"> ▪ When creating a customer list for Direct Install delivery agents, segment these lists and coordinate with the internal sales team to ensure there is no duplication with the internal sales team customer list.
Offering Design	<ul style="list-style-type: none"> ▪ Continuous modifications in offering design presented additional challenges in achieving targets. ▪ The variety of measures include in the Direct Install offering was minimal. 	<ul style="list-style-type: none"> ▪ When design changes are contemplated, promote collaboration between internal program and sales teams to define and plan implementation strategies. ▪ Add new and emerging technologies to the offers, to expand the scope of the offerings and provide a wider selection of solutions for customers and increase participation.

SECTION 6

PROGRAM AND SALES STAFF PERSPECTIVES

Topic	Challenge / Barrier	Recommendation
Offering Implementation	<ul style="list-style-type: none"> The offering delivery duration and timing, does not always align with projects' life cycles and /or customer budget planning cycles, resulting in customers not participating in offerings. 	<ul style="list-style-type: none"> Work with manufacturers to help augment efficiencies of technologies upstream, to provide a wider selection of cost-effective efficient solutions for customers and increase participation When designing and delivering the program, consider allowing longer timelines for project completion, as planning cycles for budgets and projects extend beyond an annual calendar period. Offer a bonus incentive to customers that act within a certain timeframe. This will incentivize participants to complete the projects within a shorter period. Utilize the Guardian tracking system to keep records updated to facilitate handovers due to changing roles.
Application Process	<ul style="list-style-type: none"> Edits and updates in the CRM required LUG staff to make changes, which often results in extra effort and time. 	<ul style="list-style-type: none"> Allow tracking and reporting team to edit and adjust in the CRM when clarification is provided from the sales team, and not wait on the sales team to execute these changes.
Internal Team Engagement and Team Roles		
Communication	<ul style="list-style-type: none"> Internal meetings with numerous participants can limit the available time for information sharing. 	<ul style="list-style-type: none"> Optimize meetings based on the number of attendees and allocate adequate time for information sharing. Provide regular updates regarding internal communication.
Engaging Contractors or Trade Allies		
Engagement, Communication and Training	<ul style="list-style-type: none"> The program team's influence on customers is diluted when working with contractors. Team has no direct interaction with customers, and sometimes customers are not aware the utility's role when working through a contractor. Contractors may not have a holistic understanding of overall natural gas use and offered programs. Prescriptive offering technologies were not well known and thus not marketed or promoted well by the vendors. 	<ul style="list-style-type: none"> Provide more communication, training and support to vendors, especially for the Direct Install offering, and continue to alleviate the delivery vendors' application challenges by streamlining the process. The staff observed that the streamlining of the application process was addressed after 2019. Consider creating a joint online portal, where contractors can submit applications to internal Energy Advisors. Provide performance-based compensation to contractors to provide more motivation to increase participation. An increased budget that would allow for sufficient education and training of contractors to aid them in promoting and delivering the offers and resulting in increased participation. More engagement with, and assistance for, contractors (especially in distributor type offers) to improve supply chain process for targeted customers.

SECTION 6

PROGRAM AND SALES STAFF PERSPECTIVES

Topic	Challenge / Barrier	Recommendation
Outreach and Marketing		
Communication, Content and Branding	<ul style="list-style-type: none"> ▪ Customers were not aware of the offers. Especially smaller customer accounts are not aware of the offerings, because they are not targeted. ▪ Diversity in the commercial sector presents a challenge for online general marketing, because a single defined marketing message does not apply to all customer groups within the commercial sector. ▪ Customers would question the legitimacy of the offer when it is not presented directly by LEG/LUG, but by a contractor (or vendor). 	<ul style="list-style-type: none"> ▪ Consider developing a formal trade ally network. ▪ Develop more communications and marketing. ▪ Ensure contractors have EGI branded material and can direct the customer to an EGI representative to verify the legitimacy of the offering. ▪ Provide more consistent and regular communications to customers for Prescriptive and Direct Install offers, to ensure the EGI name and brand are associated with the offers. ▪ Develop more customer case studies and examples of success stories detailing the equipment, financial benefit and their satisfaction with the projects. ▪ Improve communicating the benefits of offer technology to decision-makers by making the communication more novel and meaningful.
Research	<ul style="list-style-type: none"> ▪ It was a challenge to manage the outcome and effectiveness of marketing strategies, since no information was available to understand the direct influence of different marketing strategies on program results. 	<ul style="list-style-type: none"> ▪ Conduct research studies to define the influence and impact of different marketing strategies on program results, which will guide the selection of the most effective strategies.
Incentives		
Incentive Structure	<ul style="list-style-type: none"> ▪ It is perceived that the distributor incentive did not work well as it was too far down the supply chain, and hard to determine what influence the distributors have. ▪ The offer return on investment (ROI) was not in line with the customer's core objective. ▪ Improvements can be made to the incentive structure to increase participation. 	<ul style="list-style-type: none"> ▪ The issues with the distributor incentives is potentially being addressed by the implementation of a new midstream program. ▪ Provision of higher incentive levels would allow for engaging broader and deeper tiers of customers who have not participated yet due to lack of time, budget and/or knowledge. ▪ Streamline the incentive amounts of some prescriptive technologies that have variable incentives, for example define a minimum or consistent amount.
Incentive Processing	<ul style="list-style-type: none"> ▪ Incentive processing and payment turnaround can be too long. ▪ Delay in payment processing, mainly due to incorrect customer addresses or important information was missing. 	<ul style="list-style-type: none"> ▪ Review the incentive processing and payment steps to identify areas to increase efficiency and turnaround time. ▪ Implement quality control and checks to ensure correct customer contact information is captured. ▪ Including a description and project information with the mailed cheques will help customers understand why they are receiving the cheques

SECTION 6

PROGRAM AND SALES STAFF PERSPECTIVES

Topic	Challenge / Barrier	Recommendation
	<ul style="list-style-type: none"> ▪ Incentive cheques included limited information regarding the application or project, which created confusion with customers. 	
Customer Experience and Satisfaction		
Support and Engagement	<ul style="list-style-type: none"> ▪ Smaller accounts have a more pressing need for technical and financial assistance, due to limited human and financial resources. ▪ Some customers experienced a frequent change in the Energy Advisors they worked with, requiring the customer to develop a new relationship with a new Energy Advisor. ▪ Improvements can be made to the customer experience. 	<ul style="list-style-type: none"> ▪ Consider including in offerings a cost-effective strategy to provide technical support for smaller accounts. ▪ Review and address turnover of Energy Advisor staff and develop a strategy to maintain customer and Energy Advisor relationship. ▪ Streamline participant signing requirements and limiting the number of touch points with customers, for example, limit the times a LEG/LUG representative has to go back to the customer to verify their information. ▪ Although customer surveys were conducted by internal teams, it was recommended to consider conducting these surveys by an independent third party to increase the likelihood of a more accurate representation of customer satisfaction.

7 Direct Install Contractors Perspectives

LUG and LEG retained contractors to deliver the Direct Install offerings. To gain contractors' perspective with the Direct Install offerings, EGI identified two contractors to be interviewed. Both Direct Install contractors had delivered the offering since 2016. The contractors also had extensive experience with other LEG/LUG commercial offerings.

The contractors' awareness of the 2019 offerings stems from past familiarity with the Direct Install offerings. The contractors were initially introduced to the offerings as follows:

- A manufacturer referred the contractor to the offering.
- The contractor is kept up to date with offerings through various channels, and became aware of the Direct Install offering delivery opportunity when the request for proposal (RFP) was issued.

The Direct Install contractor interviews focused on the contractors' experience with the offerings and their role in delivering the offerings. The topics included:

- Application and incentive processing
- Outreach and marketing
- Offer design
- Customer engagement and satisfaction
- Interaction with LEG and LUG

These topics are discussed in the remainder of this section.

7.1 Application and Incentive Processing

When asked about their experience with the application and incentive processing, the contractors identified the following challenges and recommendations:

- LEG and LUG had different information requirements for application and incentive approval:
 - LEG required a significant amount of paperwork, which included extensive technical and participant information, and multiple participant signatures at different stages of the application process and during project completion. This required a considerable effort from the contractor to complete the paperwork for incentive payment processing. In 2019, LEG also required pre-existing and post-installation photos of the equipment and required the completion of a technical questionnaire. According to

the contractors, these requirements were removed in 2020, which resulted in a more efficient process.

- LUG had a more efficient process compared to LEG, as they required less information and had optimal applicant signature requirements. The quotation, which is signed when the customer agrees to participate, includes all the required legal, financial, and participant information. The invoice was the only document required following the project's completion for incentive payment processing.

The contractors recommend EGI optimizing and streamlining the application and incentive approval process. This includes having the customer sign-off, and approval of the project at the "confirmation of participation" stage, instead of requiring multiple participant touchpoints and extensive documentation. This process is similar to the process LUG had in place in 2019.

- LEG required batch invoicing, which included invoices for multiple projects from different participants in one batch submission. The contractors experienced significant delays with incentive payments, as the payment is dependent on having all invoices within the batch to be approved. If there was an error with any, the payment of all invoices in the batch is delayed until the issue is resolved. The contractors also found updating the invoicing spreadsheet confusing and time-consuming.

Prior to 2019, project invoices were submitted and processed individually. This incentive payment process was more efficient. The contractors recommended a similar process to allow project invoices to be processed individually. An option is to simplify the Direct Install invoicing spreadsheet to make it more user-friendly, which would allow issues to be resolved for one invoice without delaying the processing of other invoices.

- Incentives for the Direct Install offering measures were determined using fixed criteria. For example, the incentive for air curtains was based on specific door size. The features of customers' facilities often did not match the fixed criteria, where door sizes differed from the offering's specified door sizes. In these cases, the participant did not receive the maximum quoted incentive when they enrolled in the offering. The contractors recommend providing a margin of difference with the fixed criteria to allow participants to receive the full quoted incentive amount or as close to the amount as possible.

Contractors believed that the offering's incentive are sufficient and an important selling feature in securing customer participation.

7.2 Outreach and Marketing

Both contractors identified their sales team as the key driving force in reaching out to customers. Most sales team members have been involved in delivering the offering for many years. According to the contractors, having properly trained sales staff played a vital role in successfully recruiting participants.

Both LUG and LEG provided contractors with a customer list based on their delivery territory. The list mainly contained the company name and an account number but did not contain contact

information. The company names on the lists were used during research to find customer contacts and contact information. Customers on the list were mainly contacted using a mass marketing telephone campaign. To improve the effectiveness of the provided customer lists, the contractors recommended:

- Providing an updated customer list mid-year. Contractors observed the customer lists became outdated within a few months. An updated contact list will provide new customers to target for recruiting.
- Providing contact information. Contact information will reduce the contractor's effort to identify the correct customer contact person. Ideally, include information of decision makers or energy managers.

The contractors believe recruiting customers can be achieved by understanding their immediate needs and educating them on the offering's financial benefits. The following strategies were used by the contractors during the recruitment process:

- Showcasing the offered technology using videos or demonstrating the product's functionality at the contractor's facility or at participant's site nearby.
- Scripted emails outlining the offering's details and providing quotes that clearly highlight the financial benefit of the offered technology, for example the return on investment (ROI).
- On-site, real-time quotations using an automated quoting process.
- Face to face interaction and continuous follow-up.

The contractors had a challenge with recruiting customers due to the offering cut-off dates. The cut-off dates forced the contractors to only have 2-3 months of recruitment, as the remainder of the time is required for project implementation and approval to claim the incentive. The contractors observed that consistency and continuity of the offering over the years increases the efficiency and effectiveness of recruiting due to customer's familiarity with the offering and the ability to work with customers to plan for participation in the future.

Marketing material for both utilities was readily available, accessible, and included electronic and printed material. The contractors indicated they provided input as EGI developed the offering marketing material and marketing strategies. According to the contractors, it was an efficient collaboration that resulted in successful marketing campaigns. The contractors recommended continued collaboration with the EGI marketing team. The contractors expressed an interest in having a role in the early marketing and design stages when modifications to the offering are contemplated. Engaging the contractors in the initial stages of the design or augmentation of an offering can benefit from the contractors' practical experience to inform eligibility and how to showcase the technology.

The contractors observed that the marketing campaigns have high success levels within the first few weeks of their release. To take advantage of these events, contractors recommended

synchronizing the frequency of these campaigns with the contractor's key sales period, which tends to be seasonal.

The contractors were very satisfied with the marketing material and marketing strategies. They believed it should remain focused on highlighting the benefits of the offering for the customer in terms of cost and energy savings and positive environmental impacts. The contractors recommended additional marketing and an increased frequency of marketing campaigns.

7.3 Offer Design

In reference to the measures included in the Direct Install offering, the contractors had the following observations and recommendations:

- The dock seal offering creates confusion in terms of eligibility and incentive amounts. For example, not all dock doors can accommodate the top part of the dock door seals, due to the door's size. The eligibility criteria need to be revised based on understanding the components of a dock seal and how it fit into specific dock door sizes. This revision will facilitate the process of qualifying a project where the dock door size differ from the fixed criteria door sizes. Reducing the time to confirm eligibility will ensure fewer customers decline participation due to long approval wait times. The contractors also recommended accommodating participants with non-standard door sizes to be eligible for the maximum incentive amount of 90% of the cost.
- In 2019, the offering included primarily smaller doors, such as loading dock doors, resulting in lower capital cost to the customer, as the project's cost would be significantly lower. In 2020 the offering will focus on larger doors.
- The contractors recommended including additional measures in the offering and to consider new and emerging technologies, for example, High Volume Low Speed (HVLS) fans. According to the contractors, including additional measures will increase the options customers have, resulting in greater participation and energy savings.

7.4 Customer Engagement and Satisfaction

The contractors perceived participants to be very satisfied with the Direct Install offering, and the main motivational factors that lead customers to participate include:

- Customers were familiar with the LUG and LEG brands and their good reputation.
- The contractors consider the incentive structure and amounts as the key strength of the Direct Install offering. Both contractors identified the participants' perception of the offer as "too good to be true."

The contractors identified the following challenges or barriers in reference to customer participation:

- The turnaround time to approve an application was sometimes three to four weeks. During this period, some customers lost interest.

- The measure implementation cost was sometimes a barrier to participation because the customer did not perceive the return on investment to be worth the effort.
- Customers often did not own the facility and were renting or leasing the space. In some cases, the building owner did want to invest in the leased space, or in others, the customer's relationship with the landlord was strained.
- Sometimes it was not physically possible to install the equipment in the facility.
- Some customers were unable to participate in the offering because they participated in other offerings in previous years. Although it was a completely different offering, they were disqualified.

7.5 Interaction with LEG and LUG

Both contractors had frequent communication with LEG and LUG. Their interaction with LEG and LUG Energy Advisors was stated to be beneficial. The Energy Advisors collaborated with the contractors to develop strategies and resolve issues regarding participation and closing projects at year-end. Collaboration with the marketing team was also valuable, as discussed in Section 7.2.

To further enhance the interaction with LEG and LUG, the contractors recommended:

- Develop a process, for example, using a Responsible, Accountable, Consulted, Informed (RACI) chart approach, to manage customer interaction between EGI Energy Advisors and contractors. This will define touchpoints and handoff to ensure the customer receives the most benefit of the offering and both parties work effectively and efficiently towards shared objectives.
- Streamline the turnaround response process for participant eligibility approval and develop a service level agreement (SLA) between internal departments to expedite the eligibility approval response turnaround time. Short turnaround times will improve customer satisfaction and increase offering participation.
- Clearly define the customers that contractors can recruit. Contractors believed a significant number of the pursued customers were ineligible for the Direct Install offering because they could potentially take opportunities away from a LEG or LUG Energy Advisor

7.6 Summary of Strengths, Challenges/Barriers and Recommendations

The Direct Install contractors viewed the following processes and aspects of the offering delivery to have worked well or to be strengths of the offering (Table 7-1). While, the challenges and barriers, and recommendations are summarized in Table 7-2.

Table 7-1: Direct Install Contractors Perspective - Offering Delivery Strengths

Topic		Offering Delivery Strengths
Energy Advisors	Support from Energy Advisors	<ul style="list-style-type: none"> Direct Install Contractors found it was beneficial to collaborate with Energy Advisors, especially the EAs assisted with the development of strategies, resolved issues regarding participation and closing projects at year-end.
Marketing	Marketing material accessibility and collaborative development of marketing strategies	<ul style="list-style-type: none"> Marketing material for both utilities was readily available, accessible, and included electronic and printed material. The contractors provided input as EGI developed the offering marketing material and marketing strategies. This collaboration resulted in successful marketing campaigns according to the Direct Install contractors.
	Customers familiarity with the LUG and LEG brands	<ul style="list-style-type: none"> Direct Install contractors reported that their customers were familiar with the LEG and LUG brand. Their customers linked the LEG and LUG brands to reputable establishments and this brand recognition drove motivation to participate in the offering.
Incentive	Incentives covering most of the project cost	<ul style="list-style-type: none"> LEG and LUG Direct Install Contractors regarded the offering's incentives, which provides up to 90% of the cost of the equipment and installation, as the key strength and selling feature of the Direct Install offering.

Table 7-2: Direct Install Contractors Perspective - Challenges/Barriers and Recommendations

Topic	Challenge / Barrier	Recommendation
Interaction with LEG and LUG		
Energy Advisors	<ul style="list-style-type: none"> Continuous improvement of engagement between contractors and Energy Advisors 	<ul style="list-style-type: none"> Develop a process, for example, using a Responsible, Accountable, Consulted, Informed (RACI) chart approach, to manage customer interaction between EGI Energy Advisors and contractors.
Energy Advisors	<ul style="list-style-type: none"> Customers were ineligible for the Direct Install offering because they would potentially take opportunities away from a LEG or LUG Energy Advisor. 	<ul style="list-style-type: none"> Clearly define the customers that Direct Install contractors can recruit.
Offer Design		
Measures	<ul style="list-style-type: none"> Continuous improvement of offer design 	<ul style="list-style-type: none"> Include additional measures in the offering and consider new and emerging technologies.
Incentive	<ul style="list-style-type: none"> Measure implementation cost was sometimes a barrier to participation. 	<ul style="list-style-type: none"> Review incentives and offering benefits, especially for low incentivized measures.
Incentive Structure	<ul style="list-style-type: none"> Incentives for the Direct Install offering measures were determined using fixed criteria. Often participants did not receive the maximum quoted incentive due to not exactly matching the fixed criteria. 	<ul style="list-style-type: none"> Provide a margin of difference with the fixed criteria to allow participants to receive the full quoted incentive amount or as close to the amount as possible.
Eligibility	<ul style="list-style-type: none"> Some customers were unable to participate in the offering because they participated in other offerings in previous years 	<ul style="list-style-type: none"> Review and clearly define customer eligibility when participating in different offerings.
Outreach and Marketing		
Customer Lists	<ul style="list-style-type: none"> Customer lists provided by LEG and LUG mainly contained company names but did not contain contact information. 	<ul style="list-style-type: none"> Provide contact information, which will increase participant recruitment efficiency.
Customer Lists	<ul style="list-style-type: none"> Customer lists became outdated within a few months. 	<ul style="list-style-type: none"> Provide an updated customer list mid-year.
Facility Ownership	<ul style="list-style-type: none"> Customers often did not own the facility and were renting or leasing the space. 	<ul style="list-style-type: none"> Pre-screen customers and prioritize owner-occupied facilities. This information can potentially be included as a data entry requirement.

SECTION 7

DIRECT INSTALL CONTRACTORS PERSPECTIVES

Topic	Challenge / Barrier	Recommendation
Offering Timelines	<ul style="list-style-type: none"> The contractors had a challenge with recruiting customers due to the offering cut-off dates. 	<ul style="list-style-type: none"> Review the offering timelines to accommodate projects that carry over from one year to the next. Ensure consistency and continuity of the offering over years to increase the efficiency and effectiveness of offering delivery.
Continuous Improvement	<ul style="list-style-type: none"> Continuous improvement of marketing. 	<ul style="list-style-type: none"> Synchronizing the frequency of marketing campaigns with the contractor’s key sales period, which tends to be seasonal. Additional marketing and an increased frequency of marketing campaigns. Include contractors in the early marketing and design stages when modifications to the offering are contemplated.
Application and Incentive Processing		
Overall Process	<ul style="list-style-type: none"> LEG and LUG had different information requirements for application and incentive approval. 	<ul style="list-style-type: none"> Optimize and streamline the application and incentive approval process. A good example is the process LUG had in place in 2019.
Overall Process	<ul style="list-style-type: none"> Long turnaround time to approve an application resulted in some customers losing interest to participate. 	<ul style="list-style-type: none"> Streamline the turnaround response process for participant eligibility approval and develop a service level agreement (SLA) between internal departments to expedite the eligibility approval response turnaround time.
Invoicing	<ul style="list-style-type: none"> Batch invoicing, causes significant delays with incentive payments, as the payment is dependent on having all invoices within the batch approved. 	<ul style="list-style-type: none"> Prior to 2019, project invoices were submitted and processed individually. This incentive payment process was more efficient. Implement a similar process to allow project invoices to be processed individually.

8 Participant Contractors Perspectives

It is common practice for customers participating in the Custom or Prescriptive offering; particularly small and medium customers, to retain a contractor who works directly with Enbridge on the project details and incentives. These contractors, hired by the customer, are referred to as Participant Contractors.

In-depth interviews (IDIs) were conducted with the participant contractors to understand their experience with the offering and their involvement with participants. This section discusses the observations from the IDIs.

8.1 Firmographics

Of the three participant contractors interviewed, two contractors worked with LUG customers, and one worked with LEG customers. The two LUG participant contractors provided a perspective of a long history of participating in gas programs and offerings. In contrast the LEG participant contractors was new to participating in the gas offerings with 2019 being the first year of participation. The two LUG participant contractors worked on relatively large projects and large facilities, such as hospitals, universities and schools, while the LEG participant contractor worked with customers, which can be considered as medium and small-sized. Two of the participant contractors worked with an EGI Energy Advisor, while the third participant contractor has no direct relationship with an EGI energy advisor or representative.

8.2 Participant Contractors Feedback and Observations

Working with an EGI Energy Advisor is seen as a significant benefit in providing support for participant contractors. The participant contractors who worked with an Energy Advisory was very satisfied with the engagement with the Energy Advisor and identified the following strengths:

- They worked collaboratively to identify customers to recruit for participation in the offering.
- The Energy Advisor continuously provided offering updates and modifications, such as changes in incentives. The contractor relied on this information to develop marketing material and business cases customer recruitment.
- Regular communication between the Energy Advisor and contractor, which included a one-hour meeting scheduled for every two months, ensured:
 - The contractor was informed about any changes with the offering.
 - The list of participants' projects was reviewed to address the projects' business cases, the accuracy of the estimated incentives, and expedite incentive processing and payment.

- The Energy Advisor managed a participant project tracking sheet, which was regularly reviewed and updated to ensure continuous follow up with the participants on all projects. This management strategy allowed for project completion within an optimized schedule.
- The Energy Advisor filled in applications, which reduced the level of effort required by the contractor, who only needed to provide technical data and engineering drawings.

The participant contractors were very satisfied with the following program elements:

- The application process. The contractor perceived the application process to be straightforward and required a level of effort that is aligned with the complexity levels of projects. Support provided by Energy Advisor with completing the applications significantly reduced the contractors' level of effort, compared to the period before electronic applications were implemented and when the contractor had to complete the applications.
- Incentive processing and payment. The processing and payment of incentives were considered to be relatively fast. According to the participant contractors, participants expressed a high level of satisfaction with the incentive processing and payment turnaround time.
- Incentive amount. According to the participant contractors, participants expressed a high level of satisfaction with the incentive amount, which contributed to making the project much more cost-effective and affordable.
- The Energy Advisor and the participant project tracking sheet. The benefits and advantages the Energy Advisor and tracking sheet provided are discussed in the preceding listed bullet points in this section.

According to the participant contractors, the Prescriptive offering is straightforward, and this simplicity is one of the offering's main strengths. In contrast, according to the participant contractors, the Custom offering required detailed information and a significant level of effort. For some larger projects, the level of effort required to provide the detailed technical information was onerous and significant in terms of labour cost. The level of effort could be reduced if the information is collected while the project implementation is in progress. If data is collected only after completion of the project, it requires the contractor to search for historical information, which is inefficient and labour intensive. The participant contractors observed a trend in the input complexity required for Custom offering applications, where it was simpler in the past but is progressively becoming more onerous. The contractors' main recommendation for improvement is to simplify the Custom offering, especially in terms of information requirements. Increased effort, which leads to higher labour costs, decreases the benefit of the incentive.

Participant contractors observed that some customers did not participate in the offering because the effort required to complete the application outweighed the benefit of the incentive amount. This is especially applicable to smaller projects. The participation labour cost can also be too high if an engineer is required due to high engineering rates.

The following additional recommendations were made by the participant contractors:

- Make participant contractors aware of EGI branded marketing material. One of the participant contractors was not aware of any EGI branded marketing material to be used when recruiting customers.
- Consider including new technologies in the offerings, which would assist in making the offering attractive for more customers.

All the participant contractors expressed a desire to continue participating in the gas offering.

8.3 Summary of Strengths and Challenges/Barriers

The participant contractors viewed the following processes and aspects of the offering delivery to have worked well or to be strengths of the offering (Table 8-1). While the single main challenge the contractors experience was an increased level of technical detail required, which became onerous and significant in terms of labour cost for larger projects. One strategy to reduce the level of effort could be if the information is collected while the project implementation is in progress.

Table 8-1: Participant Contractors Perspective - Offering Delivery Strengths

Topic		Offering Delivery Strengths
Energy Advisor	Dedicated Energy Advisor supporting the contractor	<ul style="list-style-type: none"> ▪ Energy Advisors were perceived as an invaluable benefit to participant recruiting contractors as they worked to assist contractors with recruitment, sharing offering updates, managed project tracking sheets and took on the task of filling in applications. Ultimately lessening the effort required to participate in the offering.
Application	Straightforward application process	<ul style="list-style-type: none"> ▪ The contractor perceived the application process to be straightforward and required a level of effort that is aligned with the complexity levels of projects.
Incentive process	Fast incentive processing and payment	<ul style="list-style-type: none"> ▪ The processing and payment of incentives turnaround time was considered to be relatively fast which contributed to the participants high level of satisfaction with the incentive process.
Incentive	Satisfactory incentive amount	<ul style="list-style-type: none"> ▪ According to the participant recruiting contractor, participants expressed a high level of satisfaction with the incentive amount as they felt it was satisfactory.

9 Participants Perspectives

The following subsections highlight the feedback received from the participant survey. The survey asked participants various questions to understand their experience and gauge their satisfaction with the offering. Questions examined how participants became aware of the offerings and their decision to participate in the program. The questions also focused on learning about their experience and satisfaction with different offering components, including accessing online resources, working with Energy Advisors, the application process, installation and contractors, and the incentive processing.

A firmographic profile was developed to describe the survey respondents and is discussed first (Section 9.1). The firmographic profile is followed by the results and observations of all responses, combined for all three offerings for each of the utilities (Section 9.2). The portfolio level analysis informs observations about the all respondents experience with LEG and LUG offerings.

Subsequent to the portfolio level discussion, the results and observations for each offering is discussed separately:

- Prescriptive offering (Section 9.3)
- Direct Install offering (Section 9.4)
- Custom offering (Section 9.5)

9.1 Firmographics

A total of 56 participants completed the survey, comprised of 25 LEG participants and 31 LUG participants. When split by offering, this total number presents a distribution of 25 Prescriptive offering participants, 14 Direct Install offering participants, and 17 Custom offering participants (Figure 9-1).

Figure 9-1: Total Number of Participants Broken by Offering

Offering Name	LEG	LUG	Total
Commercial Prescriptive/ Prescriptive	6	19	25
Commercial Direct Install/ Direct install	10	4	14
Commercial Custom/ Custom	9	8	17
Total	25	31	56

The profiles of the survey participants were analyzed to identify the following firmographics:

- Job titles and decision-makers
- Commercial sub-sector
- Number of employees
- Occupancy status

The profiles of the participants are summarized in the remainder of this section.

9.1.1 Job Titles and Decision Makers

The survey results depicted a variety of job titles. The most mentioned job titles were President, CEO, or owner (18%) or were job titles related to business management or administration (18%). Figure 9-2 illustrates the variety of job titles that were reported by participants.

The split of job titles by utility depicts that those who participated in the LEG offering did not include sustainability professionals or project managers compared to LUG participants that included 10% of sustainability professionals and 6% of project management. LEG participants contained more job titles relating to business administration or management (32%) than LUG participants (6%).

Those who participated in the LUG offering did not include Energy Managers or Quality Managers when compared to LEG participants that included 8% of Energy Managers and 4% of Quality Managers.¹ LUG participants contained more job titles of President, CEO or owner, and Facility Manager than LEG participants. Figure 9-3 demonstrates the reported job titles according to utility and the key dissimilarities found.

¹ This analysis was based on a total of 25 completed LEG participant survey responses and 31 completed LUG participant survey responses.

Figure 9-2: Participant Job Titles (n=56)

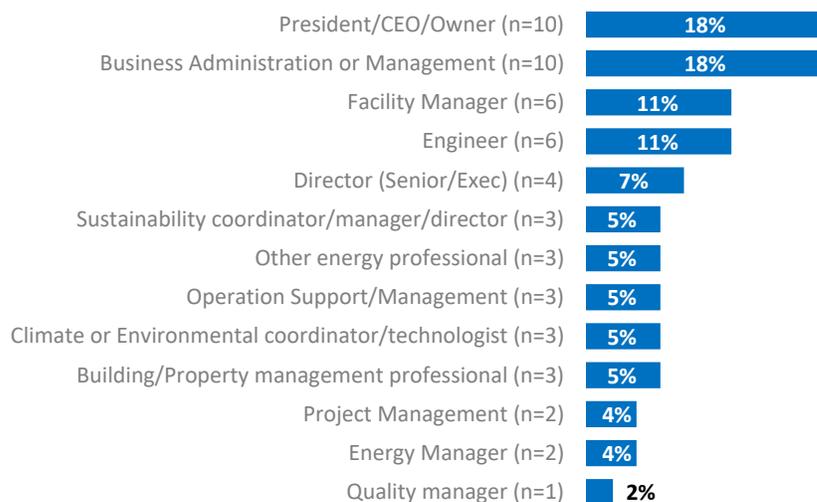
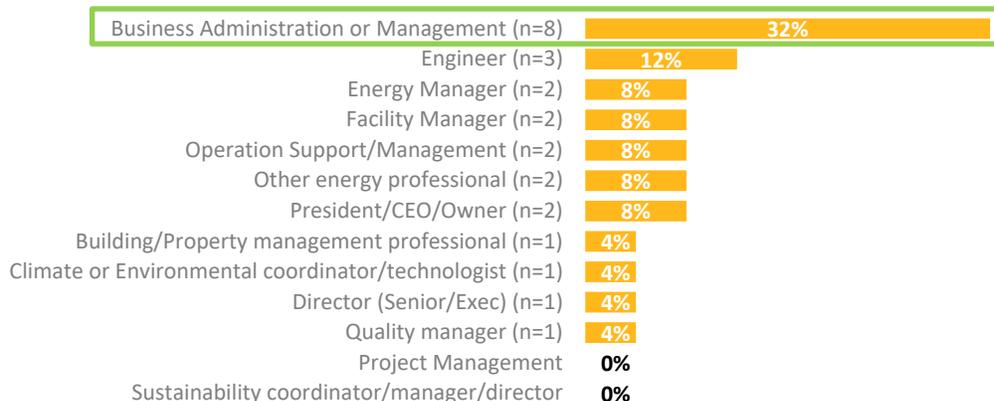
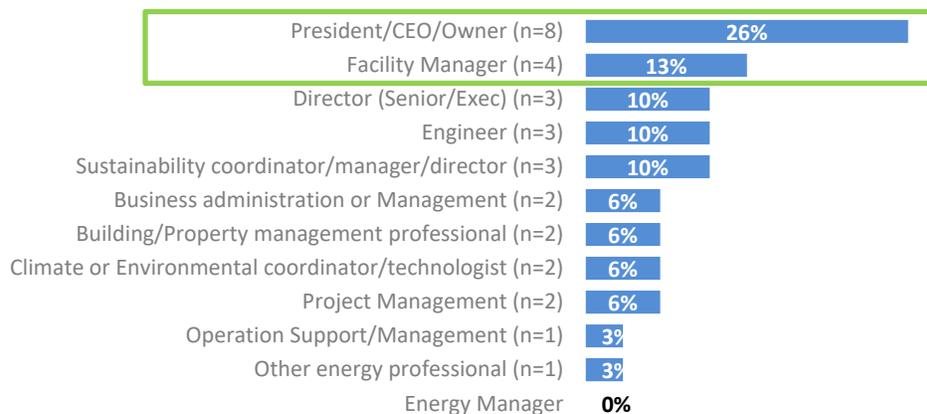


Figure 9-3: Job Titles Broken Down by Utility

LEG Participants Job Titles (n=25)



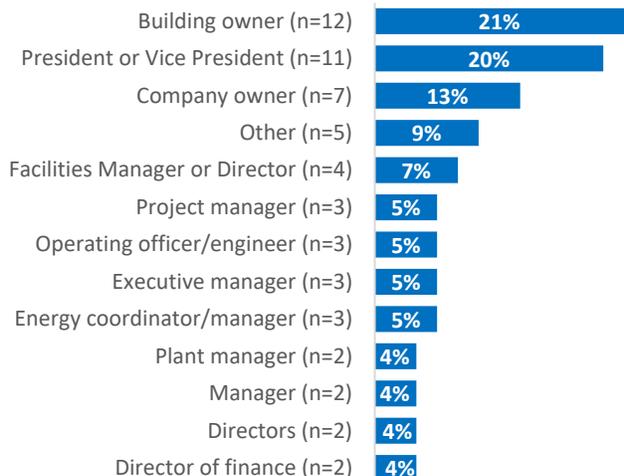
LUG Participants Job Titles (n=31)*



*Responses do not exactly equal to 100% due to rounding.

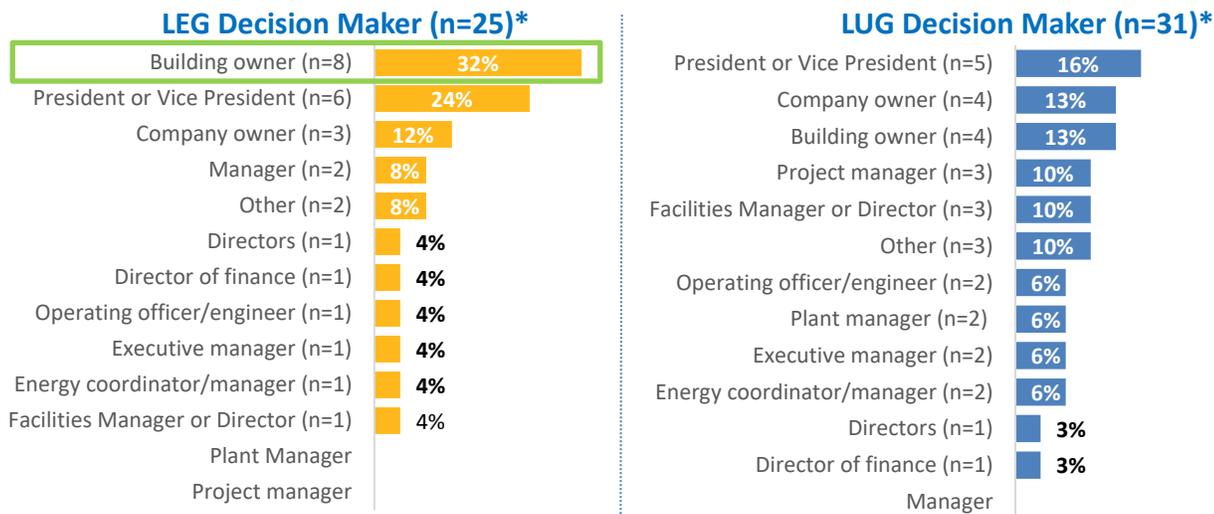
When participants were asked “who was the final decision-maker to approve the project and participation in the offering”, various job titles were stated. The top three most mentioned final decision-makers were the building owner (21%), President or Vice President (20%), or company owner (13%) (Figure 9-4). When responses are broken out by utility, most participants who reported the building owner as the final decision maker were LEG Participants (Figure 9-5).

Figure 9-4: Final Decision Maker (n=56)*



*Responses do not equal to 100% as some participants mentioned more than one decision maker.

Figure 9-5: Final Decision Maker by Utility



*Responses do not equal to 100% as some participants mentioned more than one decision maker.

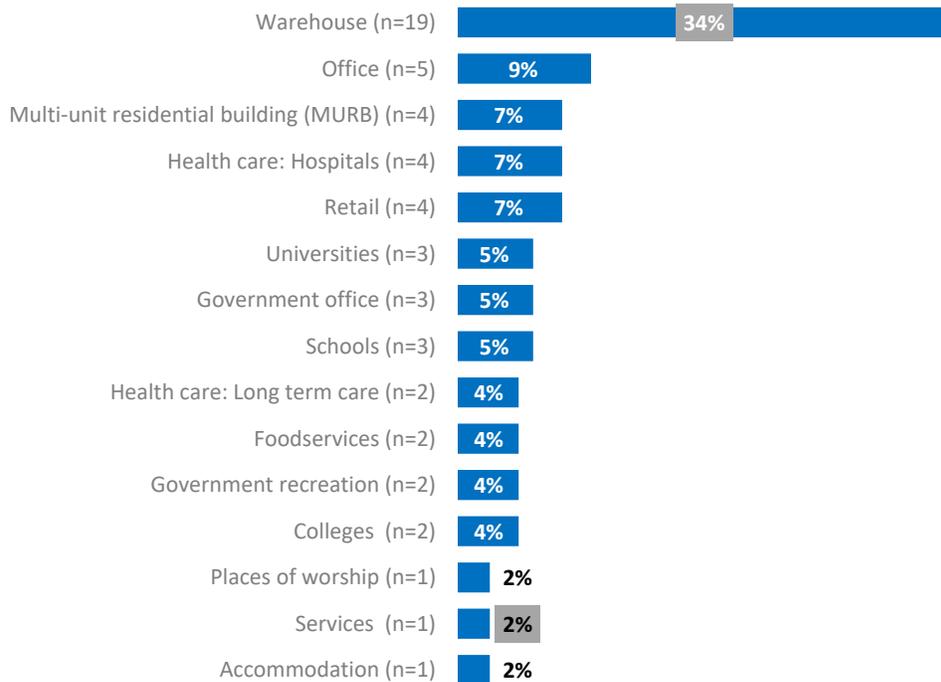
9.1.2 Commercial Sub-sector

Participants reported on the sub-sector of the facility where the offering upgrades were completed. Generally, the identified sub-sectors varied, with the warehouse as the most reported (34%) sub-sector (Figure 9-6).

The customer makeup is different for each legacy utility which is reflected in the breakdown of sub-sectors that responded to the survey.

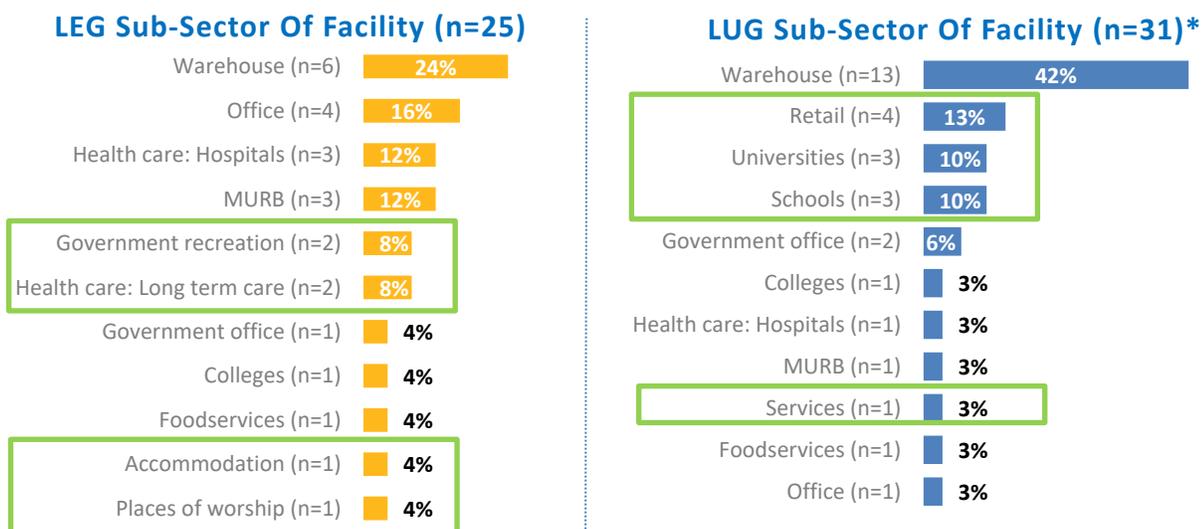
Places of worship, accommodation, long term health care, and government recreation sub-sectors were only reported by LEG participants. Whereas service, school, retail, and university subsectors were only reported by LUG participants. Additionally, LEG participants defined their sub-sectors' size, where 15 of the total of 25 LEG participants reported "large" and ten reported "small." Figure 9-7 illustrates the sub-sector data broken out by utility and the observed differences.

Figure 9-6: Sub-sector of Facility Where Upgrades Were Completed (n=56)*



*Responses do not exactly equal to 100% due to rounding.

Figure 9-7: Sub-sector of Facility Where Upgrades Were Completed by Utility



*Responses do not exactly equal to 100% due to rounding.

9.1.3 Number of Employees

Participants reported the estimated number of employees at their companies. Half of the participants stated their company had more than 200 employees. While 11% reported 51-100 employees and 20% reported 101-200 employees. The remaining 19% of participants had less than 50 employees. Figure 9-8 represents the estimated employee count reported by participants.

The split of employee count by utility depicts that LEG participants' companies in the range of 101-200 employees (28%) are greater in comparison to LUG participants (13%). In contrast, LUG participants' companies with more than 200 employees (58%) are greater in comparison to LEG participants (40%). Figure 9-9 illustrates the employee count by the utility.

Figure 9-8: Estimated Number of Employees (n=56)

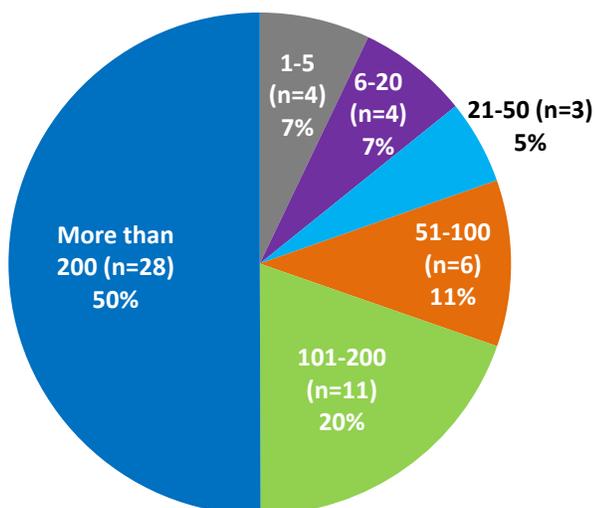
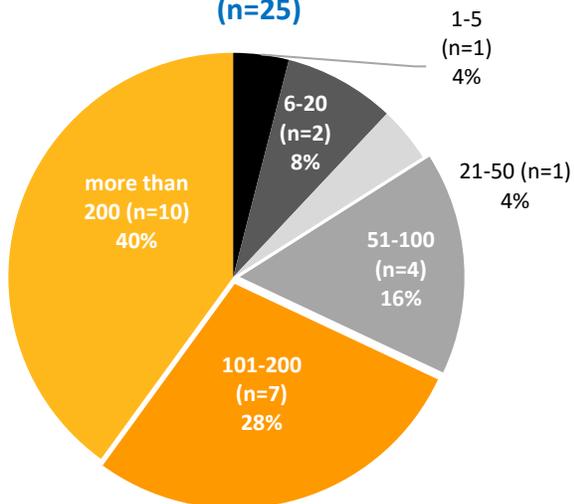
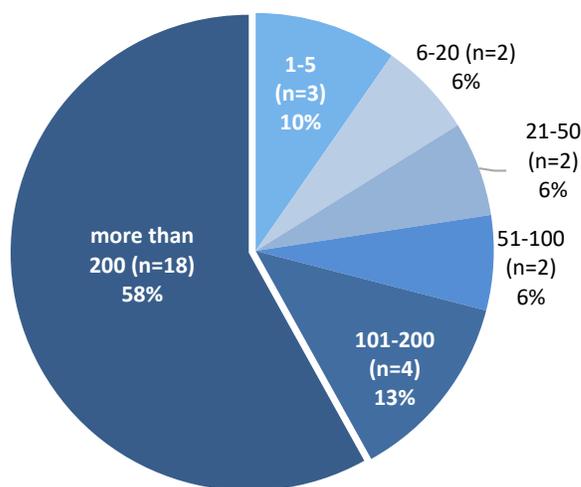


Figure 9-9: Estimated Number of Employees by Utility

LEG Estimated Number of Employees (n=25)



LUG Estimated Number of Employees (n=31)*



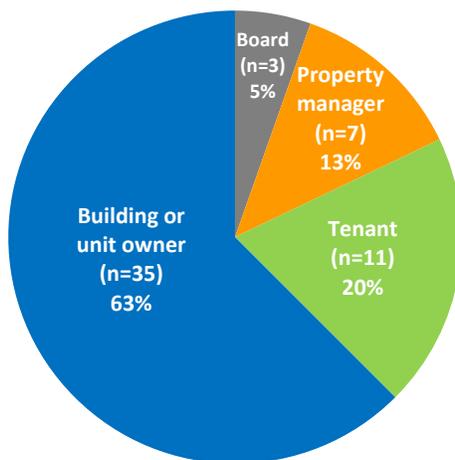
*Responses do not exactly equal to 100% due to rounding.

9.1.4 Occupancy Status

The survey asked participants to identify their occupancy status at the facilities where the offering upgrades were completed. The majority (63%) stated they were the building or unit owner, while 20% reported they were tenants, 13% were property managers, and 5% were board members (Figure 9-10).

The split of occupancy statuses by utility depicted a considerable variation in occupancy status between utilities. LEG participants' occupancy statuses that are either property managers (20%) and tenants (28%) are greater when compared to LUG participants. In contrast, the majority (71%) of LUG participants were identified as building or unit owners. Only LUG participants were identified as board members.

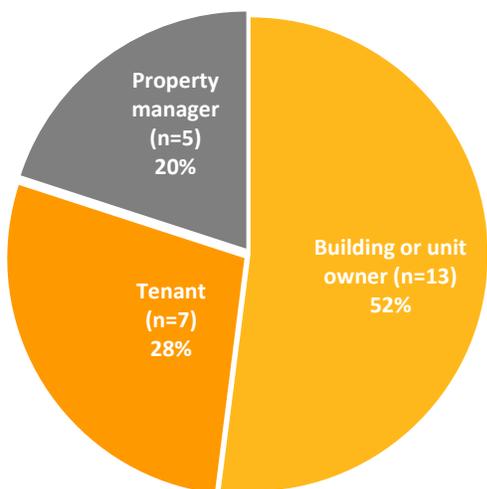
Figure 9-10: Occupancy Status in Offering Facility (n=56)*



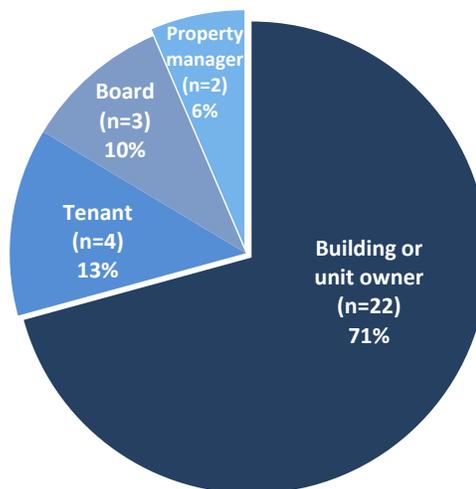
*Responses do not exactly equal to 100% due to rounding.

Figure 9-11: Occupancy Status in Offering Facility by Utility

LEG Occupancy Status in Offering Facility (n=25)



LUG Occupancy Status in Offering Facility (n=31)



9.2 Portfolio Level Responses and Observations

The following section discusses the aggregated key findings from all the completed participant survey responses. Portfolio level responses were also broken out by offering for analysis and as a result this if significant insights were found in comparing program response to the overall response numbers it is indicated in this section.

9.2.1 Overall Customer Experience and Satisfaction

Overall, participants became aware of their respective offerings from the following three source:

- Enbridge Advisors (54%)
- Trade allies or contractors (25%)
- Emails (16%)

Other methods participants became aware of program offerings include word of mouth (9%), advertisements (9%), online (4%) and other resources (7%).² When split by offering, LEG Commercial Custom participants and LUG Direct Install participants did not include emails as a source awareness of the offering.

Three (3) offering features contributed “extremely influential roles” or a “significant role” in participants’ decisions to participate in their respective offerings:

- Program incentive. The program incentive offering feature was the most rated as having an “extremely influential role” in participants’ decisions, with 56% rating it as “extremely influential” and 38% rating it as having a “significant role” in their decisions.
- Previous experience with an energy saving offering.
- Information or recommendation provided to by a LEG/LUG advisor.

Figure 9-12 illustrates the various offering features and their influence on respondents’ decisions to participate.

When responses were split based on offerings, some variations were realized. For LUG Prescriptive participants (67%), LEG Direct Install participants (50%) and LUG Prescriptive participants (42%), the “program incentive” was rated as influential to their decision to participate in the offering. In contrast, 25% of LEG Prescriptive participants rated “program incentive” was influential to their decision to participate in the offering. In addition only 20% of LEG Commercial Direct Install participants, 11% of LEG Commercial Custom participants and 13% of LUG Custom participants stated the “program incentive” played a “partial role” in their decision to participate in the offering.

² The percentages do not total 100% as the survey question allowed participants to select more than one option

LUG Custom participants were more likely to state that information or recommendations provided by a LEG/LUG advisor had a “partial role” (38%) in their decision to participate in the offering than the overall responses which saw only 21% of participants stating it had a “partial role”. LEG Direct Install participants rated their “previous experience with an energy saving offering” differently from the overall responses, as they were more likely to state it had a “partial role” (50%) in their decision making while of the overall responses only 18% gave this feature the same rating. Figure 9-13 illustrates the influence ratings provided for the top three most influential offering features on participants’ decisions for each offering.

Figure 9-12: Offering Features Influencing Decision to Participate in Offering (n=56)³

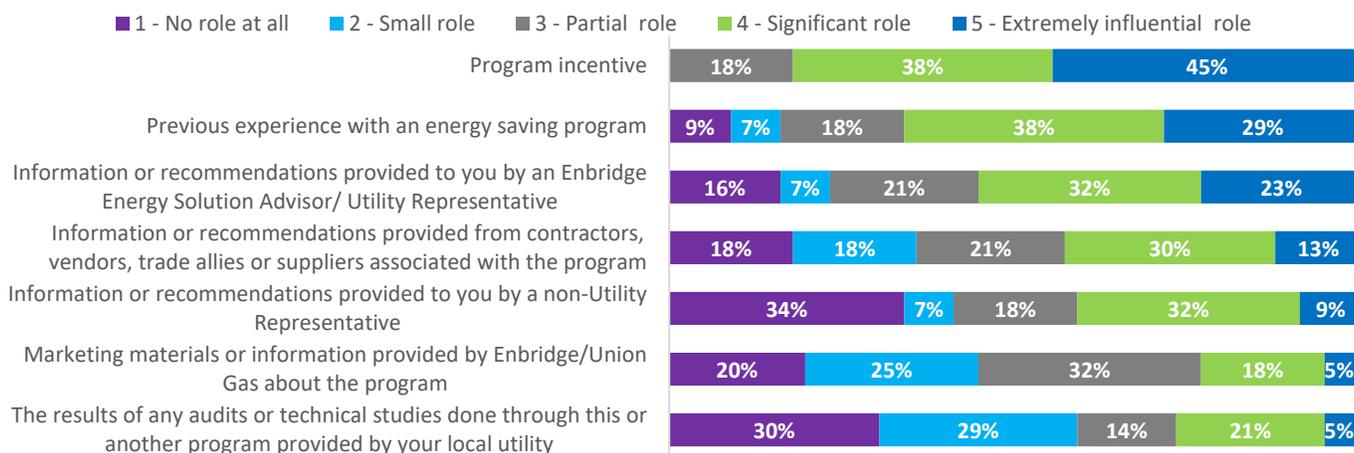
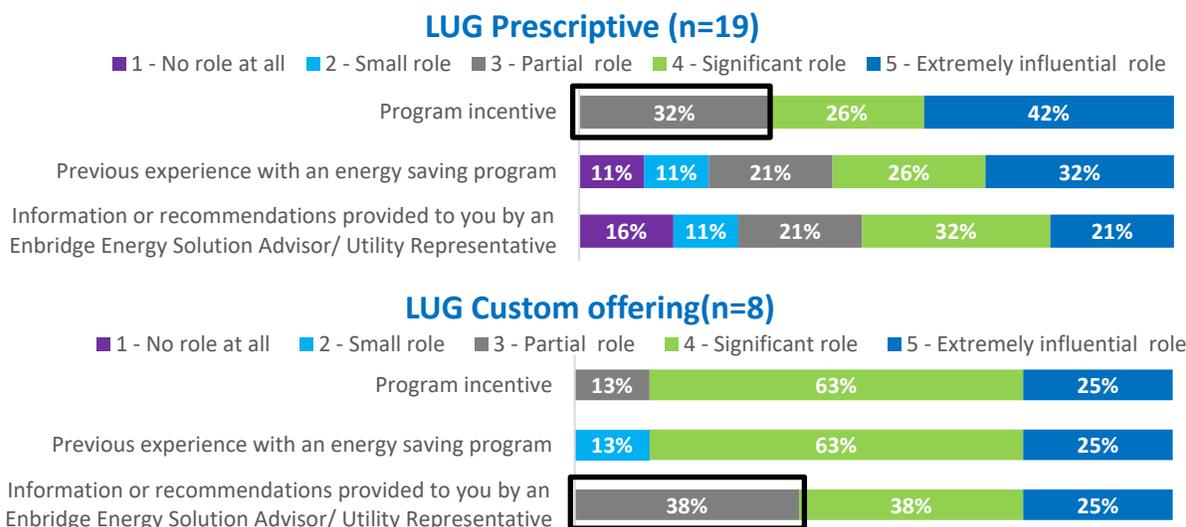
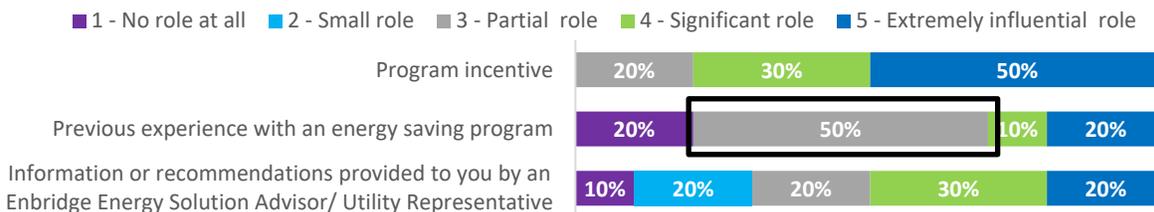


Figure 9-13: Different ratings of the Top Three Most Influential Offering Features Influencing Decision to Participate in Offering



³ Non-utility representatives are program delivery partners, which would include contractors hired by LEG/LUG to deliver programs.

LEG Direct Install (n=10)



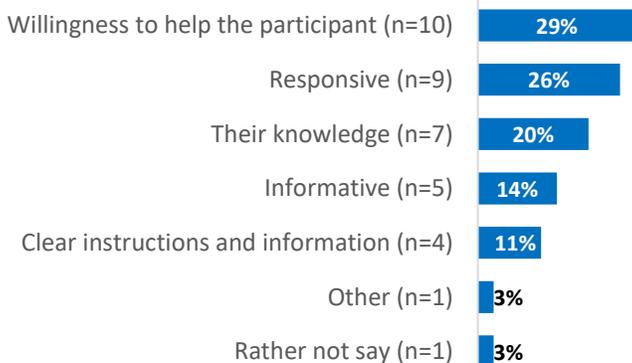
While participating in the offering, 63% of all respondents interacted or worked with a LEG/LUG advisor. When asked about their level of satisfaction, respondents stated they were either “extremely satisfied” (80%) or “satisfied” (17%), citing the LEG/LUG advisor’s helpfulness, responsiveness, and knowledge (Figure 9-14). This level of satisfaction was consistent across all offerings.

Figure 9-14: Participant Satisfaction with Energy Advisor (n=35)

Overall Satisfaction of Interaction with Energy Advisor



Reasons for Overall Satisfaction with Energy Advisor*

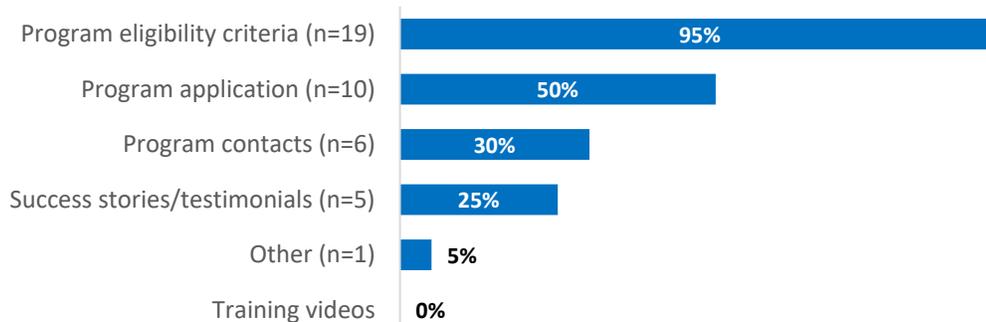


*Responses do not equal to 100% as some participants mentioned more than one reason.

While participating, 36% of respondents reported they accessed offering information online. The offering information accessed online by participants included offering eligibility criteria (95%), offering application (50%), offering contacts (30%) and success stories or testimonials (25%) (Figure 9-15). When participants were asked to rate their level of difficulty to access this online information, they reported it was “extremely easy” (21%) and “easy” (42%), citing the assistance from a LEG/LUG advisor and clear website navigation as the main reasons for their ratings

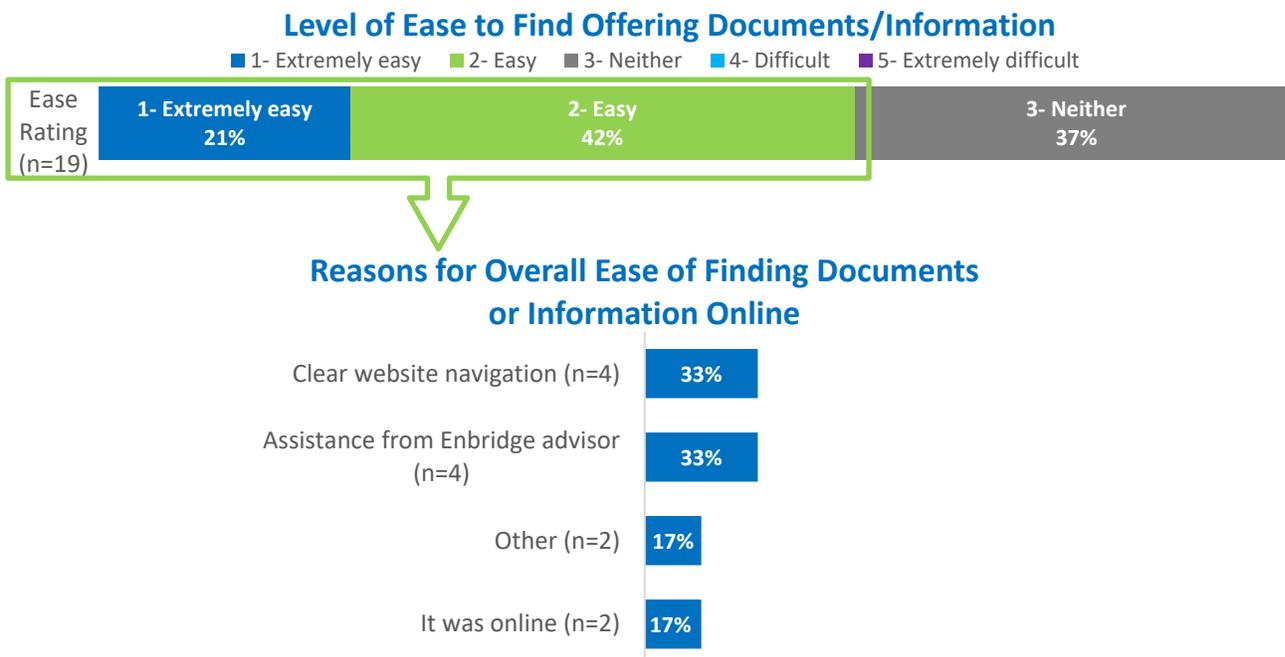
(Figure 9-16). The remaining 37% of participants that accessed online information found that it was neither easy nor difficult to find this online information. This level of satisfaction was consistent across all offerings.

Figure 9-15: Documents or Information Accessed Online (n=20)*



*Responses do not equal to 100% as some participants selected more than one document or piece of information.

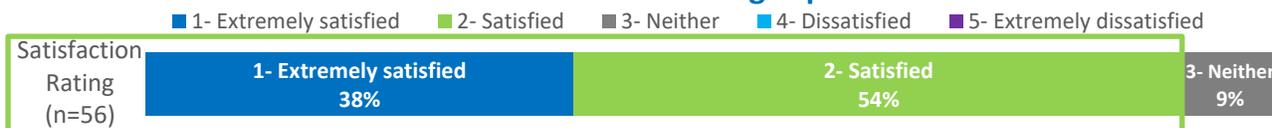
Figure 9-16: Ease in Finding Offering Documents or Information Online



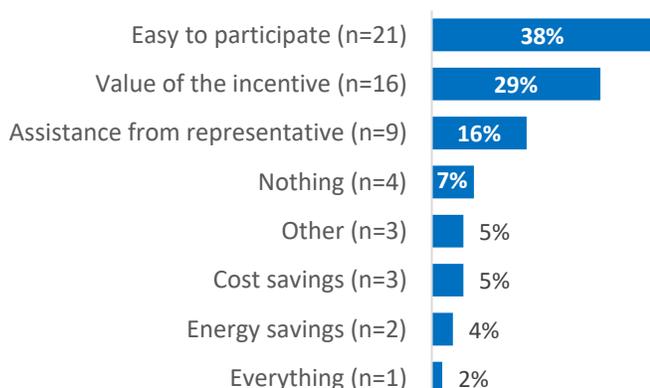
These participants were then asked to rate how satisfied they were with their overall offering experience. Nearly two-fifths of respondents (38%) reported they were “extremely satisfied” and 54% were “satisfied,” citing the ease of participation, value of the incentive, and assistance from an Enbridge Advisor (Figure 9-17). This level of satisfaction was consistent across all offerings.

Figure 9-17:

Satisfaction of Overall Offering Experience



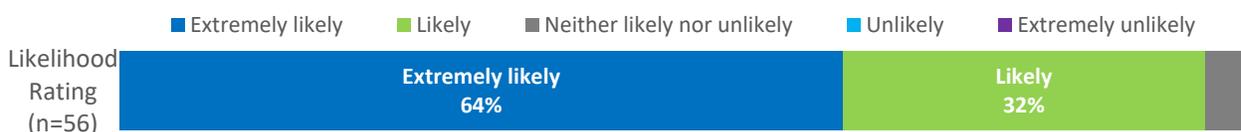
Reasons for Overall Satisfaction with Offering Experience*



*Responses do not equal to 100% as some participants mentioned more than one reason.

When participants were asked how likely they would be to participate in a future EGI program, 64% were “extremely likely” and 32% were “likely”. The majority of participants (89%) stated they would recommend offerings to their network (89%). This level of satisfaction was consistent across all offerings.

Figure 9-18: Likelihood to Participate in Future EGI Energy Efficiency Initiatives



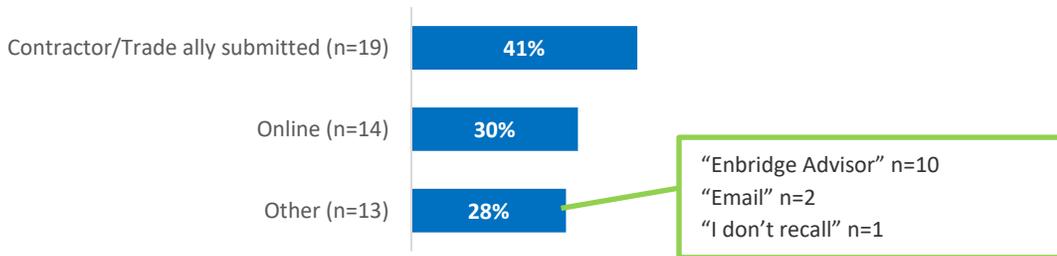
9.2.2 Application Process

The majority of the participants that completed the survey were involved in the offering application submission process. Over two-fifths (43%) of participants had primary responsibility for submitting the application, 39% had shared responsibility, and 20% were not involved. The reported main methods of application submission were through their contractor or trade alley (41%), online (30%), and “other methods” (28%) which mainly consisted of assistance from or through a LEG/LUG advisor. Figure 9-19 illustrates the main methods of application submission for all participants.

When responses were split by offering, LEG Direct Install participants were more likely to have shared responsibility (60%) of submitting the offering application. The main application submission method for LEG Direct Install participants was through their contractor or trade ally

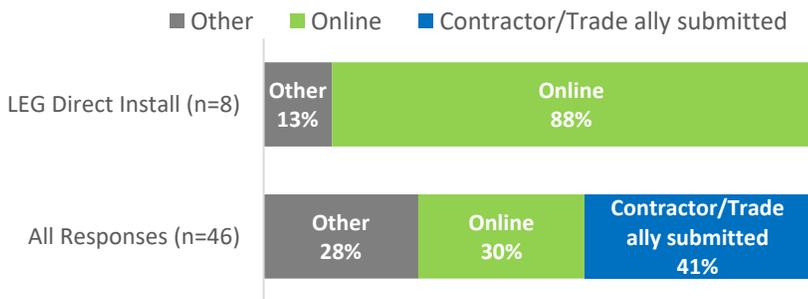
(88%). Figure 9-20 demonstrates how LEG Direct Install participants submitted their offering applications compared to all participants' submission methods.

Figure 9-19: Method of Overall Offering Application Submission



*Responses do not exactly equal to 100% due to rounding.

Figure 9-20: Method of LEG Commercial Direct Install vs. Overall Offering Application Submission

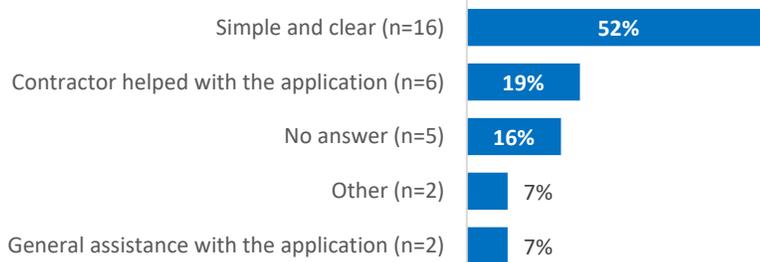


Participants involved in the offering application submission were asked to rate the level of difficulty of the process. Over one-fifth of participants (22%) stated the application process was “extremely easy,” 46% stated the process was “easy,” and 28% were neutral. Two participants (4%) did not know how to rate the ease of the application process. The main reasons for the ease of the application process were the simplicity of the application and the contractor’s assistance. Figure 9-21 presents the level of difficulty of the application submission process by participants.

Figure 9-21: Ease Rating of Application Submission Process (n=46)



Reason for Ease Rating of the Offering Application Submission Process*



*Responses do not exactly equal to 100% due to rounding.

9.2.3 Installation Process and Contractors

Overall, participants were satisfied with their contractors work and the completed upgrades. This level of satisfaction was consistent across all offerings.

The majority of participants (89%) reported that the installation process did not create any disruptions to their business. Five participants (9%) indicated disruptions, including the installation took longer than expected or needing to shut down a section of their business for the day.

Participants were then asked how satisfied they were with the quality of their contractors' work. Participants reported they were "extremely satisfied" (34%), "satisfied" (50%), and neutral (11%). When participants were asked why they provided these ratings, reasons included the work was completed on schedule and the high quality of the contractor's work. Figure 9-22 presents participants' satisfaction rating of their offering contractor's quality of work and their reasoning.

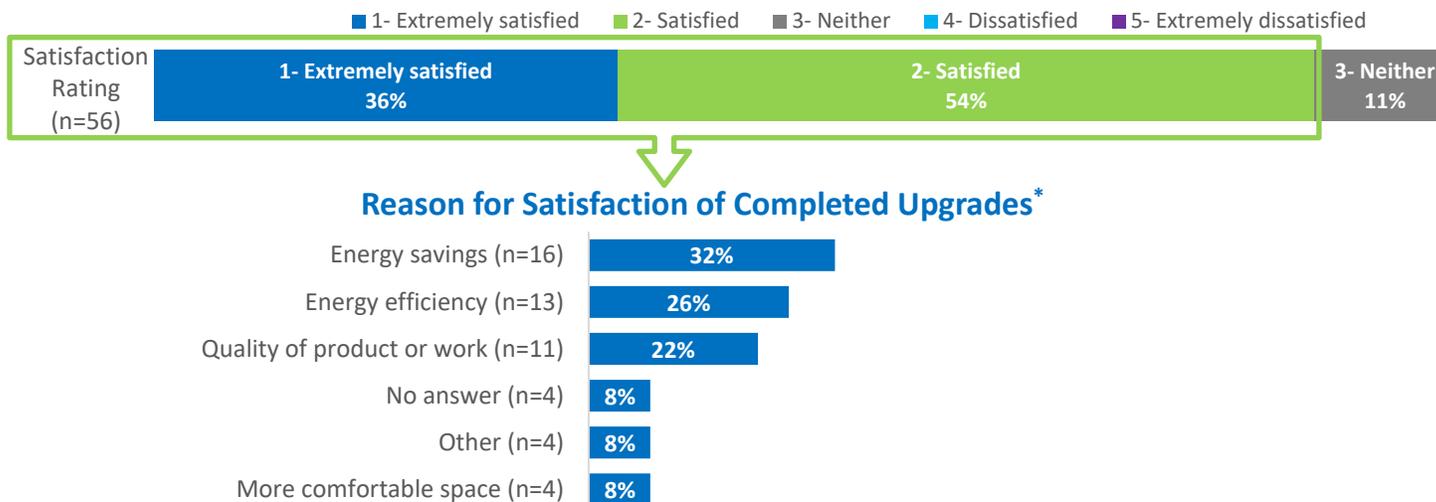
Figure 9-22: Overall Satisfaction with Offering Contractors Work and Reasons



*Responses do not equal to 100% as some participants mentioned more than one reason.

Generally, all respondents were was satisfied with the completed upgrades. Participants reported they were “extremely satisfied” (36%), “satisfied” (54%), and neutral (11%). The participants’ reasoning for these ratings included the energy savings they incurred (32%), the energy efficiency gained (26%), and the overall quality of their product or work (22%). Figure 9-23 presents participants’ satisfaction rating of the completed upgrades and their reasoning.

Figure 9-23: Overall Satisfaction with the Completed Upgrades (n=56)



*Responses do not equal to 100% as some participants mentioned more than one reason

9.2.4 Incentive Processing

Generally, participants had no challenges with the incentive paperwork and payment processing. Participants reported they were “extremely satisfied” (21%), “satisfied” (59%), or neutral (20%) when asked about their level of satisfaction with incentive paperwork turnaround time (Figure 9-24).

Figure 9-24: Overall Satisfaction with Incentive Paperwork Turnaround Time



Similarly, participants were satisfied with the offering incentive payment processing turnaround time. Participants rated their level of satisfaction with the offering incentive payment process turnaround time as “extremely satisfied” (23%), “satisfied” (50%), or neutral (25%) (Figure 9-25). One participant (2%) from the LUG Prescriptive offering stated they were “extremely dissatisfied” because they did not install the equipment they qualified for.

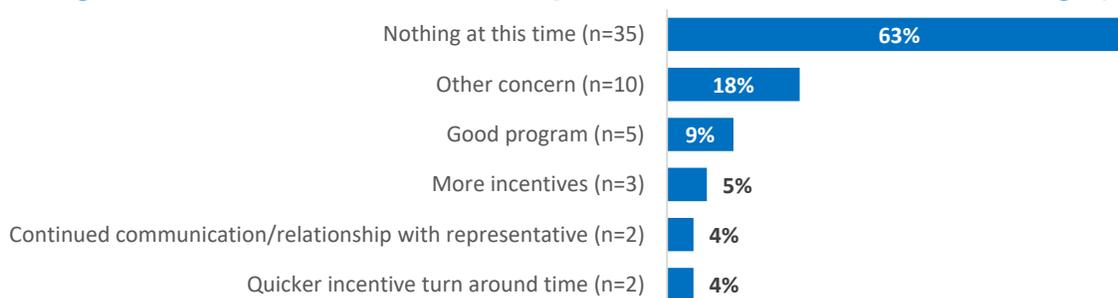
Figure 9-25: Overall Satisfaction with Incentive Payment Processing Turnaround Time



9.2.5 Suggestions for Future Improvements

Overall, there were not many suggestions for improvements or feedback that participants shared in the survey, which was consistent across all offerings. When participants were asked if there were anything they would like to share, the majority (63%) stated they had nothing to share at this time. Those few who provided feedback mentioned more incentives (5%), continued communication with Energy Advisors (4%), and quicker incentive turnaround time (4%). Figure 9-26 presents the general feedback and future offering improvements shared by the participants.

Figure 9-26: General Feedback or Improvements for the Future of Offerings (n=56)*



*Responses do not equal to 100% as some participants mentioned more than one reason

9.3 Prescriptive Offering

The following section discusses the key findings from the participant surveys of both LEG Prescriptive and LUG Prescriptive offerings. Of the 84 LEG Prescriptive participants who were contacted to participate in the survey, 6 participants responded, resulting in a response rate of 7%. Of the 282 LUG Prescriptive participants invited to participate in the survey, 19 participants responded, resulting in a response rate of 7%.

Table 9-1 presents the roles of the Prescriptive offering respondents. Five (5) LEG participants (83%) had primary or shared responsibility for making budget or program participation decisions. Similarly, 18 LUG participants (95%) have reported the same roles.

Table 9-1: Prescriptive Offering Respondent Roles

Respondent Title	LEG	LUG	Total
Environmental, Energy, Sustainability Managers	3	3	6
President/CEO/Owner	0	4	4
Facility or Business Manager	1	2	3
Director	1	2	3
Project Management Professional	0	3	3
Engineer	1	1	2
Building/Property Management Professional	0	2	2
Energy Technician/Analyst	0	2	2
Total	6	19	25

9.3.1 Overall Customer Experience and Satisfaction

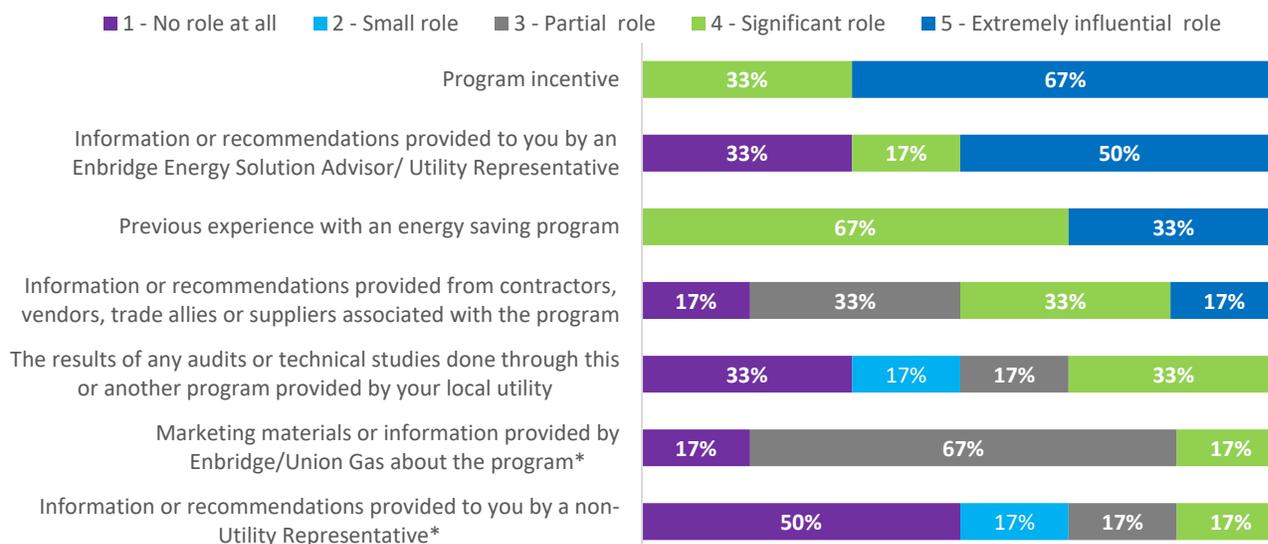
In multiple response questions, Prescriptive offering participants were asked how they became aware of the offering. For LEG Prescriptive participants, a majority of participants heard about the offering either through an email (25%), trade allies or contractors (25%), or Energy Advisors (25%). One LEG Prescriptive participant heard about the offering through word of mouth, and another participant through a previous employment position. For LUG Prescriptive participants, 50% of participants indicated they heard about the offering through Energy Advisors. Four LUG Prescriptive participants (17%) heard about the offering through email, four participants heard about the offering from contractors, and one participant (4%) through word of mouth. Two LUG Prescriptive participants (8%) reported they could not remember how they first became aware of the program.

On a five-point scale, participants were asked to rate how several factors influenced their company’s decision to participate in the offering. The majority (67%) of LEG Prescriptive participants stated that program incentives played an extremely influential role in their decision

making. While 50% (three participants) of LEG Prescriptive participants cited information or recommendations provided to them by an Energy Advisor as “extremely influential.” Additionally, every participant that rated the offering feature of “previous experience with an energy saving program”, which refers to any program and not only Enbridge offerings, reported that it played either a “significant role” (67%) or “extremely significant role” (33%) in their decision-making. Figure 9-27 presents the influence level various offering features had on LEG Commercial Prescriptive participants’ decision.

Similarly, LUG Prescriptive participants rated the offering’s incentives influence as “extremely influential” (42%) to their decision to participate in the offering. However, their ratings of the most influential offering features on their decision-making varied compared to LEG participants. This variation may be attributed to the larger sample size of participants. Overall, LUG Prescriptive participants rated their previous experience with an energy saving offering as either “extremely influential” (32%) or played a “significant role” (26%) in their decision-making. Information or recommendations from a non-utility representatives⁴ also influenced their decision, playing a “significant” (37%) or “extremely influential” (11%) role. Figure 9-28 presents the influence level various offering features had on LUG Prescriptive participants’ decision.

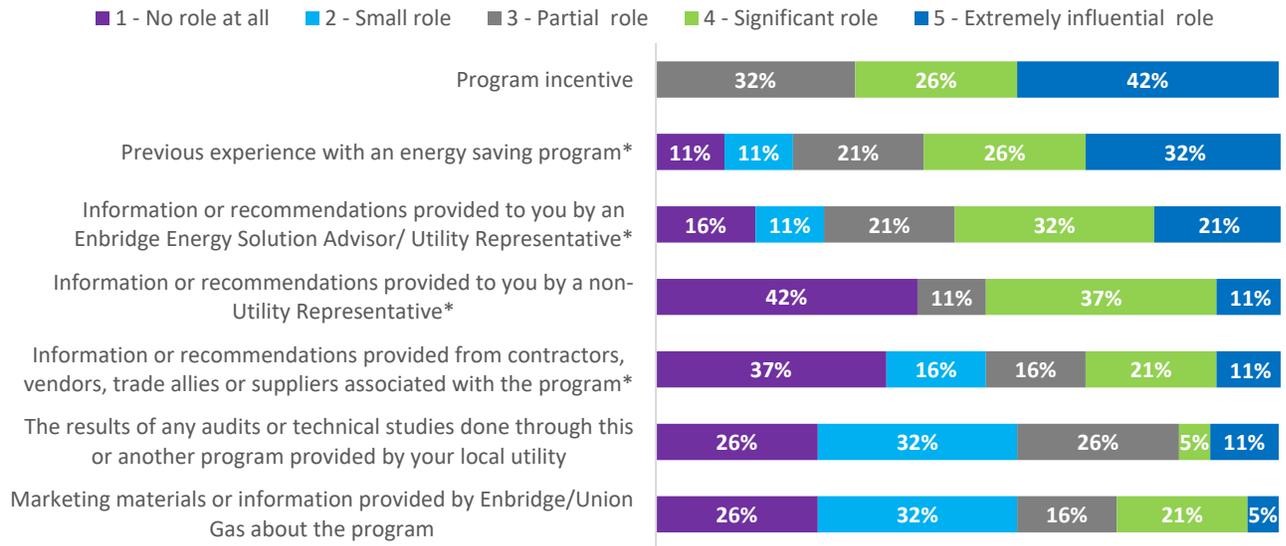
Figure 9-27: Offering Features Influencing Decision to Participate in LEG Prescriptive Offering (n=6)



*The responses for these two offering features do not exactly equal to 100% due to rounding.

⁴ Non-utility representatives are program delivery partners, which would include contractors hired by LEG/LUG to deliver programs.

Figure 9-28: Offering Features Influencing Decision to Participate in LUG Prescriptive Offering (n=19)



*The responses for these two offering features do not exactly equal to 100% due to rounding.

Participants were also asked if they had worked with an Energy Advisor throughout their offering experience. 67% (four responses) of LEG prescriptive participants and 63% of LUG participants reported they worked with an Energy Advisor. These participants were then asked how satisfied they were with their interactions with the Energy Advisor, and why, on a scale from one (1) to five (5), where one is “Extremely satisfied” and five is “Extremely dissatisfied.” All four (4) LEG prescriptive participants (100%) were “extremely satisfied” with their interactions. When asked why they provided these satisfaction ratings, they cited the Energy Advisors’ professionalism and responsiveness. Figure 9-29 illustrates the satisfaction ratings provided by the LEG prescriptive participants that interacted with an Energy Advisor and their explanation for their rating.

A total of eight (8) LUG participants (67%) were “extremely satisfied” with their Energy Advisor interaction, 25% (three responses) were “satisfied” and only one participant was “very dissatisfied.” When asked why they provided these satisfaction ratings, the main reasons were the Energy Advisors’ helpfulness, responsiveness, professionalism, and availability. Figure 9-30 illustrates the satisfaction ratings provided by the LUG prescriptive participants that interacted with an Energy Advisor and their explanation for their rating.

Figure 9-29: Satisfaction with Interaction with LEG Energy Advisor (n=4)

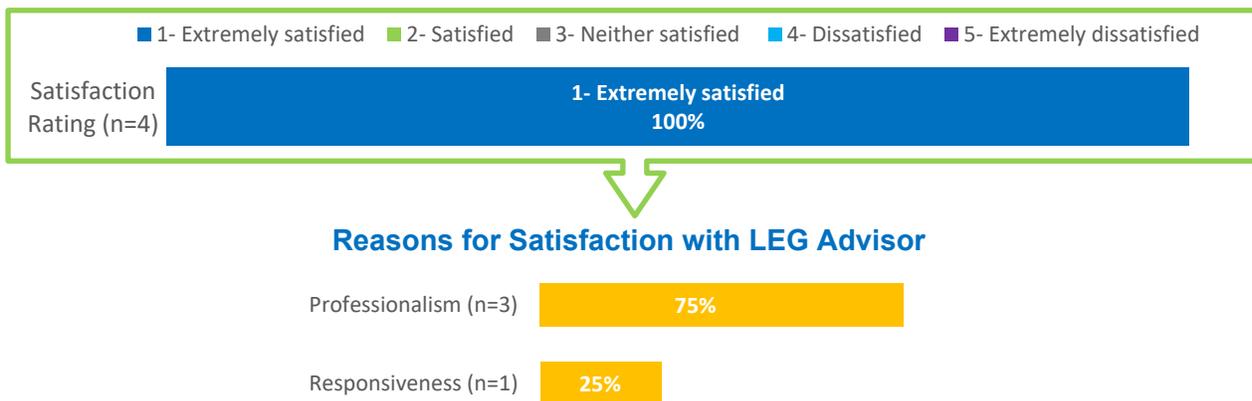
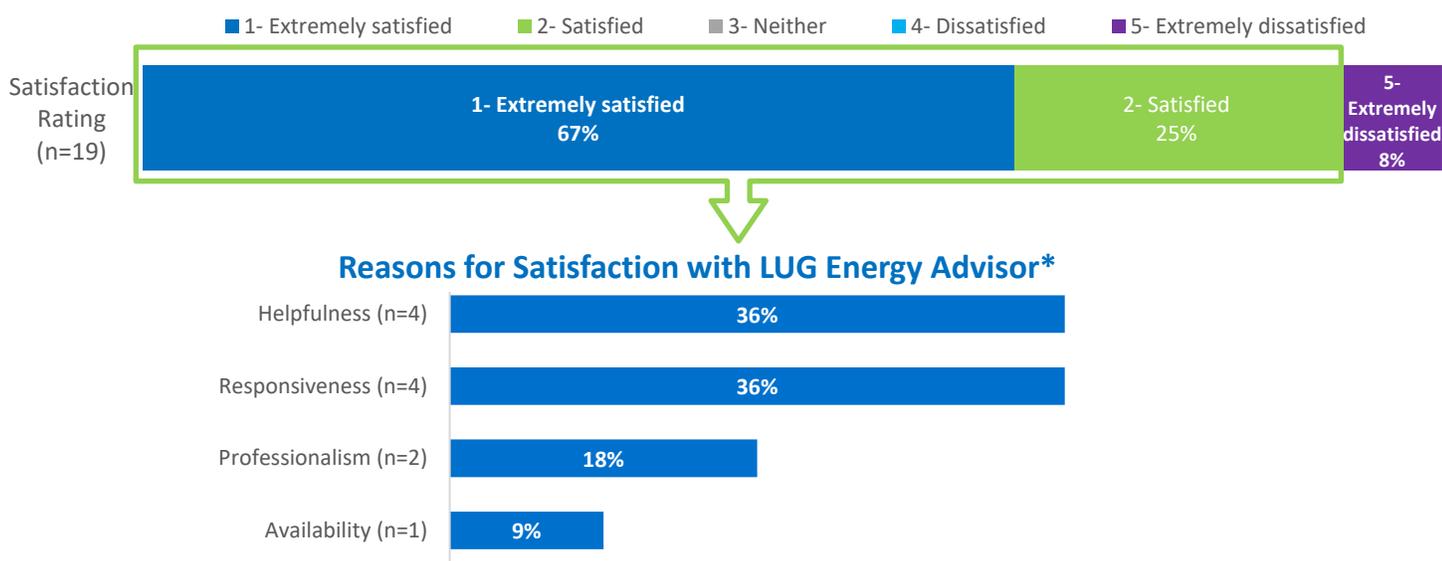


Figure 9-30: Satisfaction with Interaction with LUG Energy Advisor (n=19)



*Responses do not exactly equal to 100% due to rounding.

Prescriptive participants also mentioned they accessed offering resources online during their program experience. A total of three (3) LEG Commercial Prescriptive participants (50%) stated they mostly accessed offering eligibility criteria, contacts, and applications.⁵ When these participants were asked to rate how easy it was to find the information or documents they accessed, the majority found that it was “extremely easy” (33%) or “easy” (33%) due to help from an Enbridge Advisor or the fact that the information was online, while the rest of the participants found it neither easy or difficult (33%).

⁵ This analysis was based on a total of three LEG Commercial Prescriptive participant’s completed survey response of those who did access offering resources online. These participants were then able to select multiple documents or information they were searching for resulting in a choice total of nine.

Nearly half of LUG Prescriptive participants (47%) stated they accessed online offerings resources. All participants (100%) were searching for offering eligibility criteria. Other documents or information accessed was offering applications, contacts and success stories or testimonials.⁶ When these participants were asked to rate how easy it was to find the information or documents they accessed, the majority stated it was “extremely easy” (13%), “easy” (50%) or found it was neither easy nor difficult (38%). Of those participants that found it was “extremely easy” or “easy”, they explained it was due to the help from their contractor or advisors and the clear website navigation.⁷

Overall, participants were highly satisfied with the Prescriptive offering. On a scale from one (1) to five (5), where one is “extremely satisfied” and five is “extremely dissatisfied.” Half of LEG Prescriptive participants (50%) reported that they were “extremely satisfied”, as did 32% of LUG Prescriptive participants. In addition, the other half of LEG Prescriptive participants (50%) reported that they were “satisfied”, along with 53% of LUG Prescriptive participants. The remaining 16% of LUG Prescriptive participants reported being “neither satisfied nor dissatisfied”. Moreover, when both LEG and LUG participants were asked about the reason for their satisfaction levels, two (2) of LEG Prescriptive participants cited the value of the incentive (33%), while two (2) noted the cost savings (33%) and two (2) cited technical knowledge and overall assistance and from the Energy Advisors (33%).⁸ Seven (7) LUG Prescriptive participants reported that the ease of participation (44%) motivated their satisfaction rating, two (2) noted that the support and involvement of the Energy Advisors (13%) influenced their high satisfaction, while three (19%) appreciated the value of the incentive.

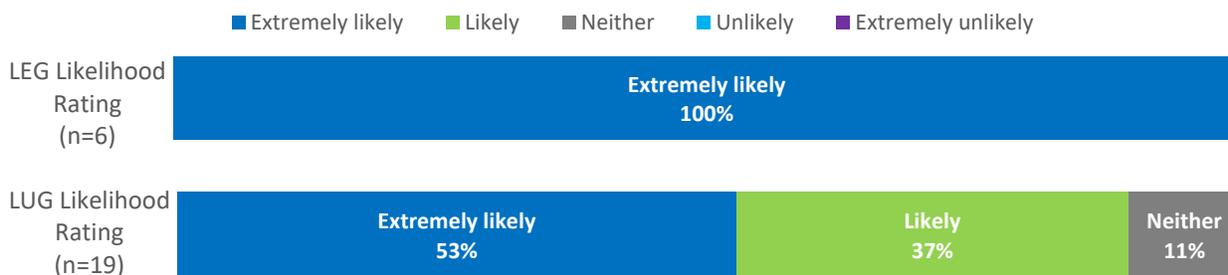
Lastly, when participants were asked how likely they would be to participate in a future EGI program, all LEG Prescriptive participants reported they would be “extremely likely” to do so, while LUG Prescriptive participants said that they were either “extremely likely” (53%) or “likely” (37%) to do so (Figure 9-31). Additionally, all six (6) LEG Prescriptive participants (100%) reported that they would recommend the offering to a colleague, as would 82% of LUG Prescriptive participants. This combination of results indicates that customers are very satisfied with their experience of the Prescriptive offering.

⁶ This analysis was based on a total of nine LUG Prescriptive participant’s completed survey response of those who did access offering resources online. These participants were then able to select multiple documents or information they were searching for resulting in a choice total of 18.

⁷ This analysis was based on a total of five LUG Prescriptive participant’s completed survey response of those of those who found it was easy to find the offering resources online.

⁸ This percentages do not equal to 100% due to rounding.

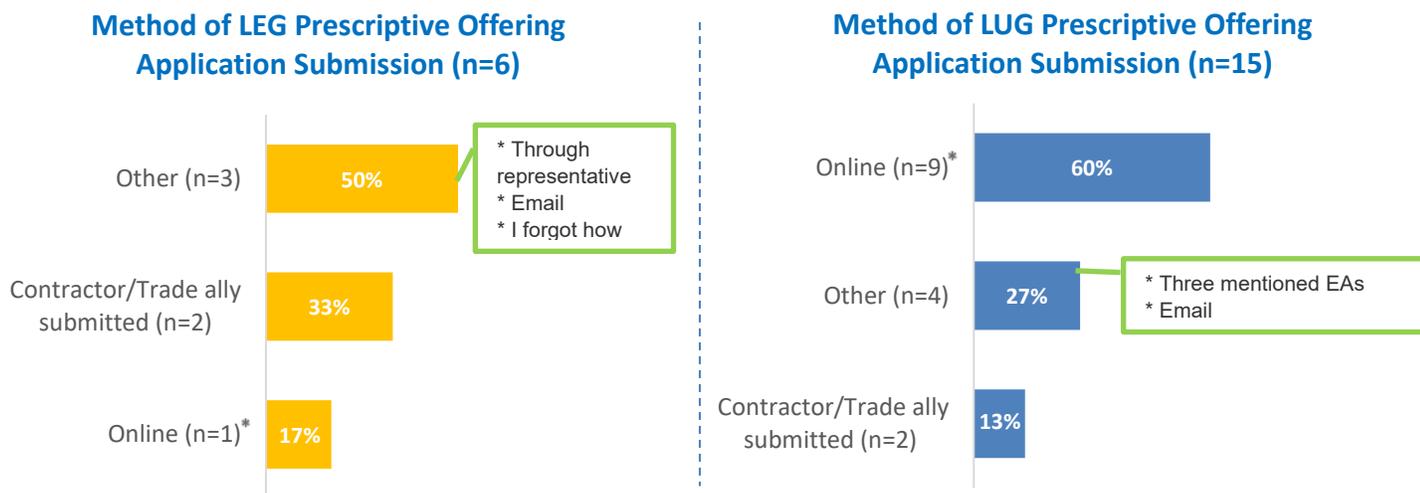
Figure 9-31: Likelihood to Participate in Future EGI Energy Efficiency Initiatives



9.3.2 Application Process

About half of both LEG (53%) and LUG (47%) Prescriptive participants were primarily responsible for submitting the application. The remaining three (3) LEG Prescriptive participants (50%) and six (6) LUG Prescriptive participants (32%) reported they had shared responsibility for submitting the offering application. A total of four (4) LUG Prescriptive participants (21%) reported not having any application submission responsibility. The participants who had full or partial responsibility were then asked how their applications were submitted. LEG Prescriptive participants reported submission methods of “other,” mentioning Energy Advisors, or through their contractor or trade ally. LUG Prescriptive participants reported they submitted their offering application either online or through “other” methods, citing Energy Advisors. Figure 9-32 demonstrates the main application submission methods by LEG and LUG Prescriptive participants.

Figure 9-32: Method of Program Application Submission



*The “online” method here was a selection option presented to the participant with no other explanation. However, the selection of this option indicates any online experience the participant may have had during the application process.

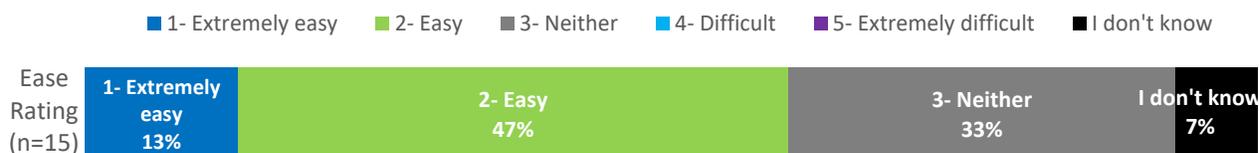
The participants were asked the level of difficulty of the overall application process. LEG Prescriptive participants noted that the process was “extremely easy” (17%) or “easy” (50%) (Figure 9-33). LUG Prescriptive participants also found the application process “extremely easy” (13%) or “easy” (47%) (Figure 9-34).

Figure 9-33: Rating of Ease of LEG Application Process (n=6)*



*Responses do not exactly equal to 100% due to rounding.

Figure 9-34: Rating of Ease of LUG Application Process (n=15)



When asked why they provided these answers, LEG Prescriptive participants indicated the primary reasons were the assistance they received from their Energy Advisor, the simplicity of the actual application as well as the entire participation process. Similarly, LUG Prescriptive participants predominantly noted the application and participation process is clear and straightforward. One LUG Prescriptive participants responded that their contractor had completed the necessary paperwork.

9.3.3 Installation Process and Contractor

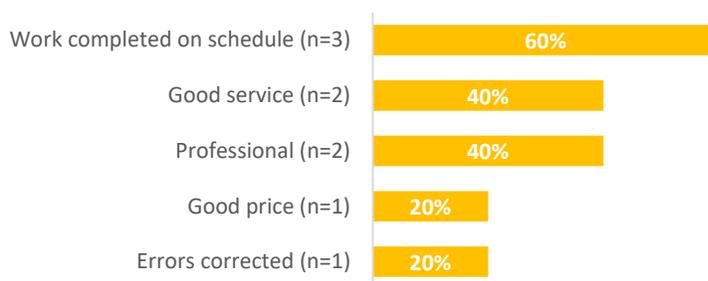
Both LEG and LUG Prescriptive participants reported few disruptions to their business due to their participation in the offering, with only one (1) respondent from each utility reporting a disruption. Overall, LEG Prescriptive participants were satisfied with their contractor’s quality of work, reporting they were “extremely satisfied” (33%) and “satisfied” (50%). These participants attributed their ratings to the completion of the work on schedule and their contractors’ professional service (Figure 9-35).

LUG Prescriptive participants reported they were “extremely satisfied” (21%) and “satisfied” (63%) with their contractor’s quality of work. These LUG Prescriptive participants’ reasons for satisfaction were the completion of the work on schedule and their contractors’ good and professional services (Figure 9-36).

Figure 9-35: Satisfaction with LEG Prescriptive Program Contractors Work and Reasons (n=6)



Reasons for Satisfaction with LEG Commercial Prescriptive Contractors Work (n=5)*

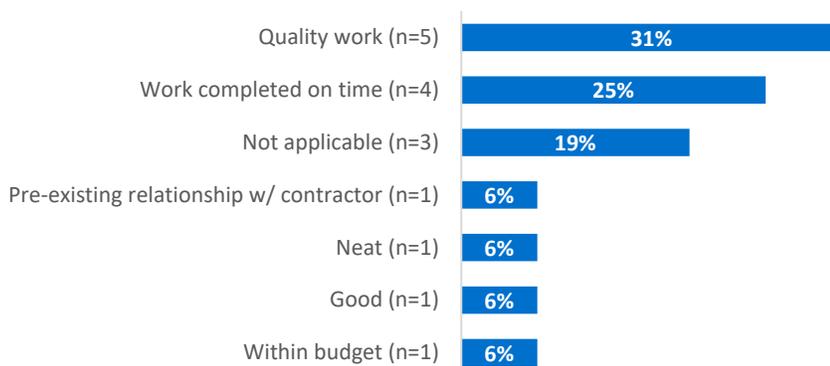


*Responses do not equal to 100% as some participants mentioned more than one reason.

Figure 9-36: Satisfaction with LUG Prescriptive Program Contractors' Work and Reasons (n=19)

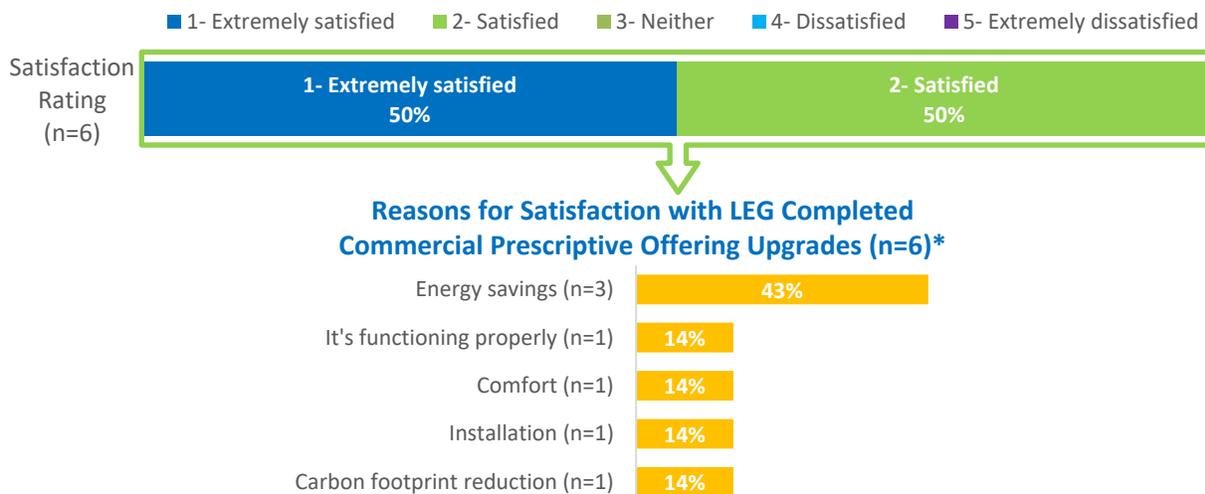


Reasons for Satisfaction with LUG Prescriptive Contractors Work (n=16)



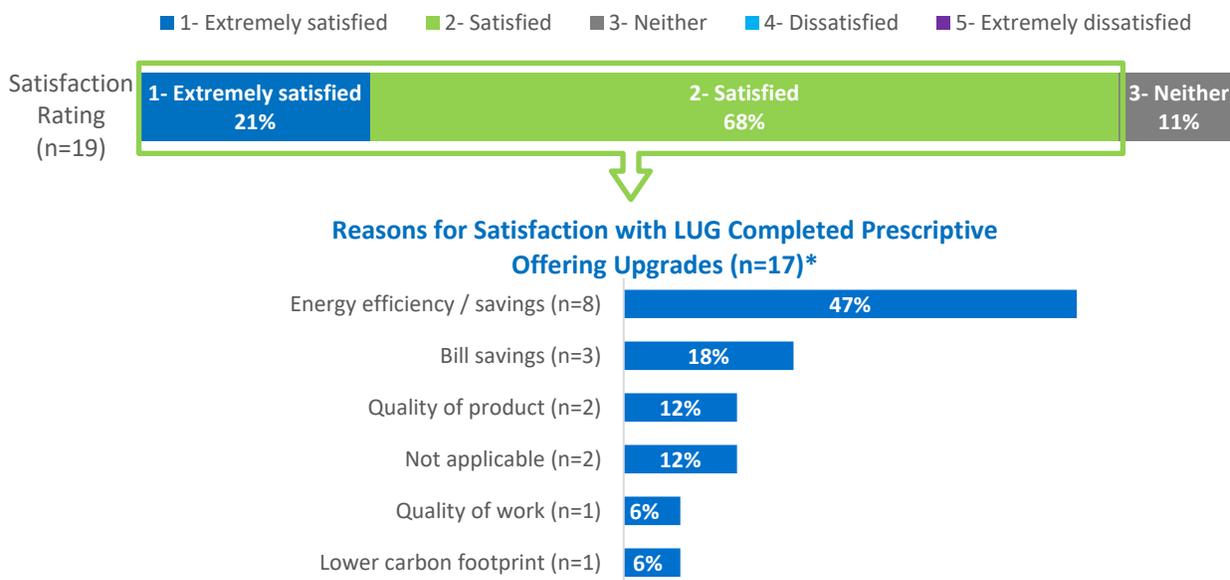
Both LEG and LUG participants were highly satisfied with the installed equipment through the Prescriptive offer. All LEG Prescriptive participants (100%) were either “extremely satisfied” (50%) or “satisfied” (50%) with their new equipment. While a total of 89% of LUG participants also reported they were either “extremely satisfied” (21%) or “satisfied” (68%) with their new equipment. The primary reasons customers rated a high satisfaction was due to either energy efficiency or savings. Figure 9-37 and Figure 9-38 present LEG and LUG Prescriptive participants’ satisfaction with the completed upgrades and the reason for providing this rating.

Figure 9-37: Satisfaction with LEG Completed Prescriptive Offering Upgrades (n=6)*



*Responses do not equal to 100% as some participants mentioned more than one reason.

Figure 9-38: Satisfaction with LUG Completed Prescriptive Offering Upgrades (n=19)



*Responses do not equal to 100% as some participants mentioned more than one reason.

9.3.4 Incentive Processing

Neither LEG nor LUG participants reported any significant dissatisfaction with the incentive processing. A total of 67% of LEG Prescriptive participants and 74% of LUG Prescriptive participants were either “extremely satisfied” or “satisfied” with paperwork turnaround time. Figure 9-39 illustrates LEG Prescriptive participants’ satisfaction, and Figure 9-40 illustrates the LUG Prescriptive participant’s satisfaction.

Figure 9-39: Satisfaction with LEG Prescriptive Offering Incentive Paperwork Turnaround Time (n=6)



Figure 9-40: Satisfaction with LUG Prescriptive Offering Incentive Paperwork Turnaround Time (n=19)



Participants were also asked how satisfied they were with the incentive turnaround time. Responses from both sets of participants indicated a reduction in satisfaction compared to previous offering components. Two (2) LEG Commercial Prescriptive participants indicated they were “satisfied” (33%) and four (4) indicated they were “neither satisfied nor dissatisfied” (67%) (Figure 9-41). Responses from LUG Prescriptive participants indicated four (4) “extremely satisfied” (21%) ten (10) were “satisfied” (53%) and four (4) were “neither satisfied nor dissatisfied” (21%) (Figure 9-42).

Figure 9-41: Satisfaction with LEG Prescriptive Incentive Processing Turnaround Time (n=6)



Figure 9-42: Satisfaction with LUG Prescriptive Incentive Processing Turnaround Time (n=19)



9.3.5 Suggestions for Future Improvements

Lastly, participants were asked if they had any suggestions for improving the Prescriptive offering or any general feedback. Five (5) LEG Prescriptive participants offered comments, which are summarized below:

- Incentive payout period could be improved by streamlining the process. More follow-up communication.
- More LEG staff with “boots on the ground” experience in the field should be involved in order to evaluate the legitimacy of and viability of projects.

Nine (9) LUG Prescriptive participants offered recommendations, which are summarized below:

- The operations and delivery of the offering is very good and should be continued.
- The incentive amount was good and did not need to change.
- More choices of equipment to receive incentives.
- A clear explanation of the process in obtaining the incentive such as being a payee of Enbridge.
- Improve communication with participants.
- Aim to minimize disruption to business operations.

9.4 Direct Install Offering

The following section discusses the key findings from the participant surveys of both LEG and LUG Direct Install offerings. Of the 122 LEG Direct Install participants who were contacted to participate in the survey, ten (10) participants responded, resulting in a response rate of 8%. Of the 33 LUG Direct Install participants invited to participate in the survey, four (4) participants responded, resulting in a response rate of 12%.

Table 9-2 presents the roles of the Direct Install offering participants. A total of four (4) LEG Direct Install participants (40%) had the primary responsibility for making budget or program participation decisions, five (5) participants (50%) had shared responsibility and one (1) participant (10%) had no responsibility. For LUG Direct Install participants, a total of three (3) participants (75%) had the primary responsibility and one (1) participant (25%) had shared responsibility for making budget and program participation decisions.

Table 9-2: Direct Install Offering Respondent Roles

Respondent Title	LEG	LUG	Total
Business Administration or Management	3	1	3
Engineer	2	0	2
Facility or Business Manager	0	1	1
Operation Support/Management	2	1	3
President/CEO/Owner	1	1	2
Quality manager	1	0	1
Regional FM	1	0	1
Total	10	4	

9.4.1 Overall Customer Experience and Satisfaction

Direct Install participants were asked how they became aware of the offering. For LEG Direct Install participants, majority (40%) heard about the offering through an Enbridge Advisor. Other methods through which LEG Direct Install participants became aware of the offering include emails (20%), trade allies or contractors (20%), word of mouth (10%) and advertisements (10%).

On a five-point scale, participants were asked to rate how several factors influenced their company’s decision to participate in the Direct Install offering. Offering incentive was identified as the most influential factor for LEG respondent’s participation. When asked how influential the program incentive was in their decision to participant in the offering, 50% stated that it was “extremely influential.” When asked to rate how influential “information or recommendations provided from contractors, vendors, trade allies or suppliers associated with the offering” was to their decision to participate in the offering, 40% reported it had a “significant role.” Figure 9-43 presents the influence level offering features had on LEG Direct Install participant’s decision.

LUG Direct Install participants reported they became aware of the offering through a few methods. Two (2) participants reported that advertisements (50%) were the source of their awareness. Whereas one (1) respondent reported trade allies or contractors (25%) as their main source of awareness and one (1) other respondent cited Energy Advisors (25%).

Similar to LEG Direct Install participants, when LUG Direct Install participants were asked to rate the influence program incentive had on their decision to participate in the offering, 25% reported it was “extremely influential” and 75% stated it had a “significant role.” Other offering features that influenced LUG Direct Install participants’ decision making were “marketing materials or information provided by LUG about the offering” and their “previous experience with an energy saving program.” Figure 9-44 presents the influence level offering features had on LUG Direct install respondent’s decisions.

Figure 9-43: Offering Features Influencing Decision to Participate in LEG Commercial Direct Install Offering (n=10)

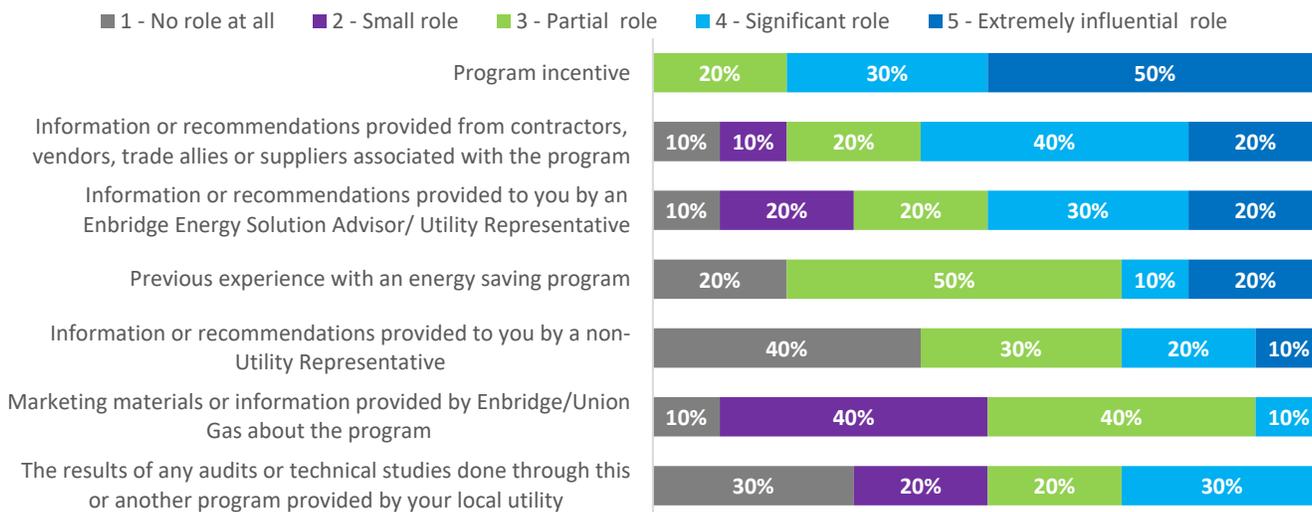
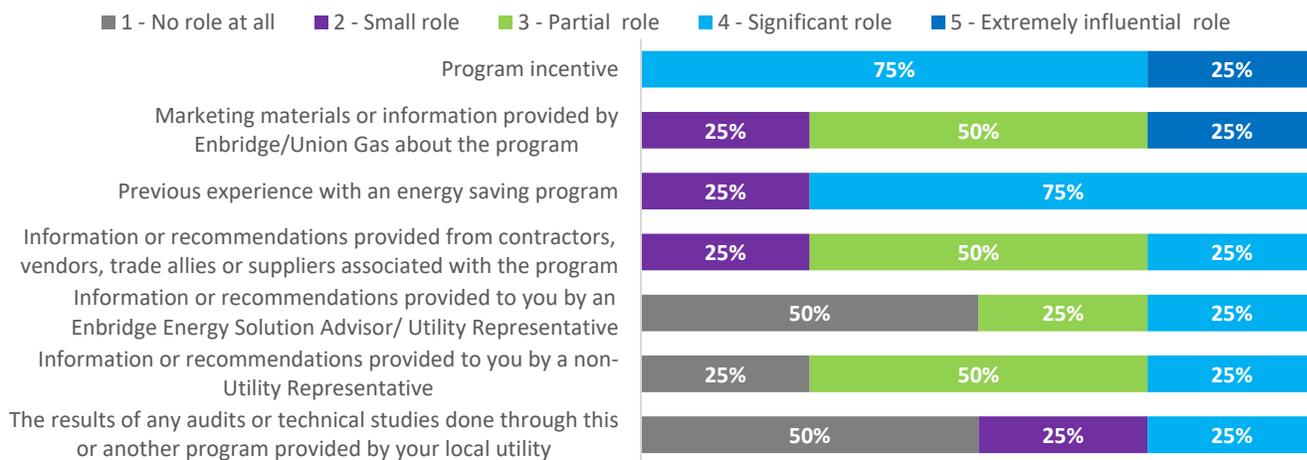
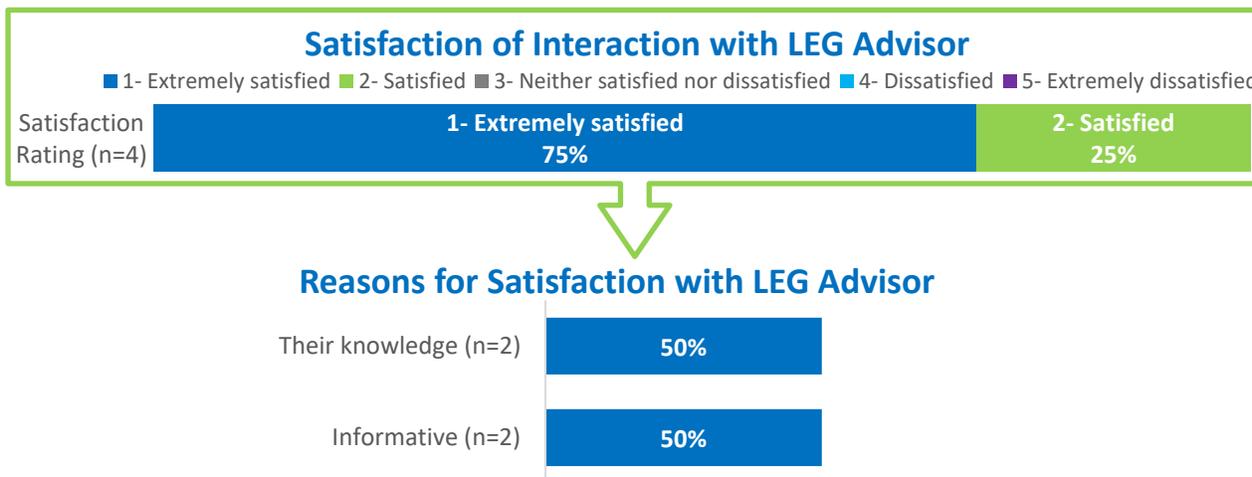


Figure 9-44: Offering Features Influencing Decision to Participate in LUG Direct Install Offering (n=4)



While participating in the offering, four (4) LEG Direct Install participants reported they worked with Enbridge Advisors (40%). All four participants stated they were either “satisfied” (25%) or “extremely satisfied” (75%) with their interaction citing advisors’ knowledge and the quality of information they provided are the reasons for their level of satisfaction (Figure 9-45). None of the four LUG Direct Install participants that completed the survey worked with an Enbridge Advisor.

Figure 9-45: Participant Satisfaction with LEG Advisor (n=4)



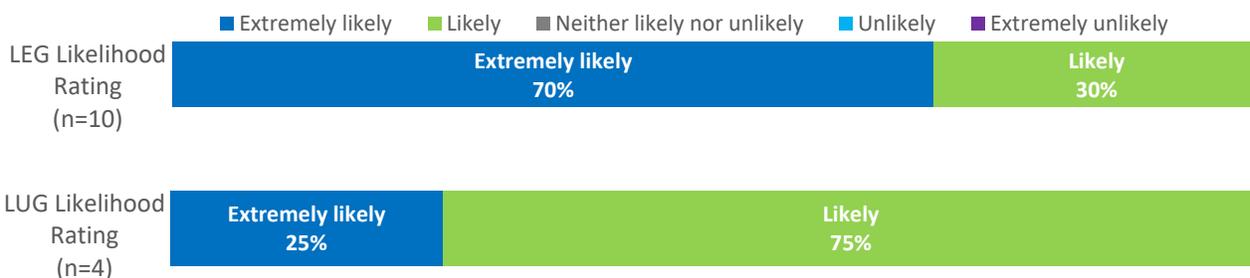
Direct Install participants also mentioned they accessed offering resources during their program experience. A total of four (4) LEG Direct Install participants accessed offering information or documents online (40%), which included offering applications, offering eligibility criteria, success stories or testimonials, and offering contacts. When these four (4) participants were asked to rate the level of difficulty of accessing these offering documents or information, one (1) participant stated it was “extremely easy”(25%), another stated it was “easy” (25%) and two (2) participants found it was neither easy nor difficult (50%). Only one (1) LUG Direct Install participant reported they accessed online offering information or documents searching for “offering eligibility criteria” and stated it was “neither easy nor difficult” to access.

Overall, LEG and LUG Direct Install participants were satisfied with their offering experience. When LEG Direct Install participants were asked how satisfied they were with their overall offering experience, 40% were “extremely satisfied,” 50% were “satisfied” and 10% (1) participant was neutral. LUG Direct Install participants were also “satisfied” with their offering experience, with three (3) reporting they were “satisfied” (75%) and one (1) participant was neither satisfied nor dissatisfied (25%). When participants were asked what aspects of the offering experience contributed to their satisfaction, two (2) LEG Direct Install participants mentioned the value of the incentive (22%), five (5) mentioned the ease of participating in the offering (56%) and two (2) cited the assistance they received from a Enbridge Advisor (22%). LUG Direct Install participants cited similar reasons with all participants mentioning the value of the incentive (100%) and one (1) mention of the ease of participating in the offering (33%).⁹

Lastly, when participants were asked how likely they would be to participate in a future EGI program, the majority of LEG and LUG Direct Install participants reported high ratings of likelihood. LEG Direct Install participants stated they were “extremely likely” (70%) or “likely” (30%) to do so. LUG Direct Install participants reported they were “extremely likely” (25%) or “likely” (75%) (Figure 9-46). The majority of LEG Direct Install (70%) and all LUG Direct Install participants (100%) stated they would promote the offering to their network.

⁹ This analysis is based on a total of three LUG Direct Install program participant responses that report they were satisfied. Also, responses do not equal to 100% as participants mentioned more than one reason.

Figure 9-46: Likelihood to Participate in Future EGI Energy Efficiency Initiatives

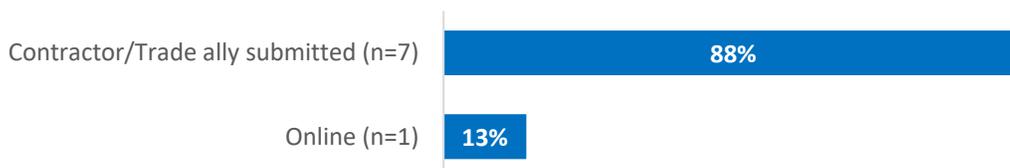


9.4.2 Application Process

More than half of LEG Direct Install participants were involved in the application submission process (80%). One-fifth (20%) of these LEG participants had primary responsibility for submitting the application, while 60% had shared responsibility and 20% were not involved. For the LUG Direct Install offering, one (1) participant was involved in the application submission process, having shared responsibility for submission.

The main method of application submission for the majority of LEG Direct Install participants that were involved in the process was through their contractor or trade ally (88%). The single LUG Direct Install participant that was involved in the application submission process reported they submitted the application through their contractor or trade ally. Figure 9-47 illustrates how the offering applications were submitted for LEG Direct Install participants.

Figure 9-47: Method of LEG Commercial Direct Install Offering Application Submission*



*Responses do not exactly equal to 100% due to rounding.

In general, participants indicated an easy application process. LEG Direct Install participants stated the process was “extremely easy” (25%), “easy” (25%), or were neutral (50%) (Figure 9-48). The single LUG Direct Install participant also found that the process was “easy.” The LUG participant indicated the primary reasons for the ease of the application process were the contractor’s assistance with the application submission and the process’s straightforward nature.

Figure 9-48: Ease Rating of LEG Commercial Direct Install Application Submission Process



9.4.3 Installation Process and Contractors

Generally, participants of both the LEG and LUG Direct Install offering were satisfied with the installation process and the contractors that completed the installation. When asked if the installation created disruptions in their business, the majority of LEG Direct Install participants (90%) reported it did not, and all four (4) LUG participants had the same experience.

Participants were then asked how satisfied they were with the quality of the contractors’ work. Overall the participants stated they were satisfied. LEG Direct Install participants identified they were either “extremely satisfied” (50%), “satisfied” (30%), or neutral (20%). When asked why they provided these answers top reasons included the contractors’ knowledge and competency (30%), work completed on time (20%) and their contractor resolved issues (10%) (Figure 9-49).

Similarly, LUG Direct Install participants were satisfied with the quality of their contractors’ work. Two (2) participants were “satisfied” (50%), while one (1) participant was neutral (25%). When these participants were asked why they provided these ratings, reasons included the work was completed on schedule. One (1) participant was “dissatisfied” (25%) with the quality of their contractor’s work and conveyed the installed equipment did not work properly due to a “poor install” (Figure 9-50).

Figure 9-49: Satisfaction with LEG Commercial Direct Install Offering Contractors Work and Reasons

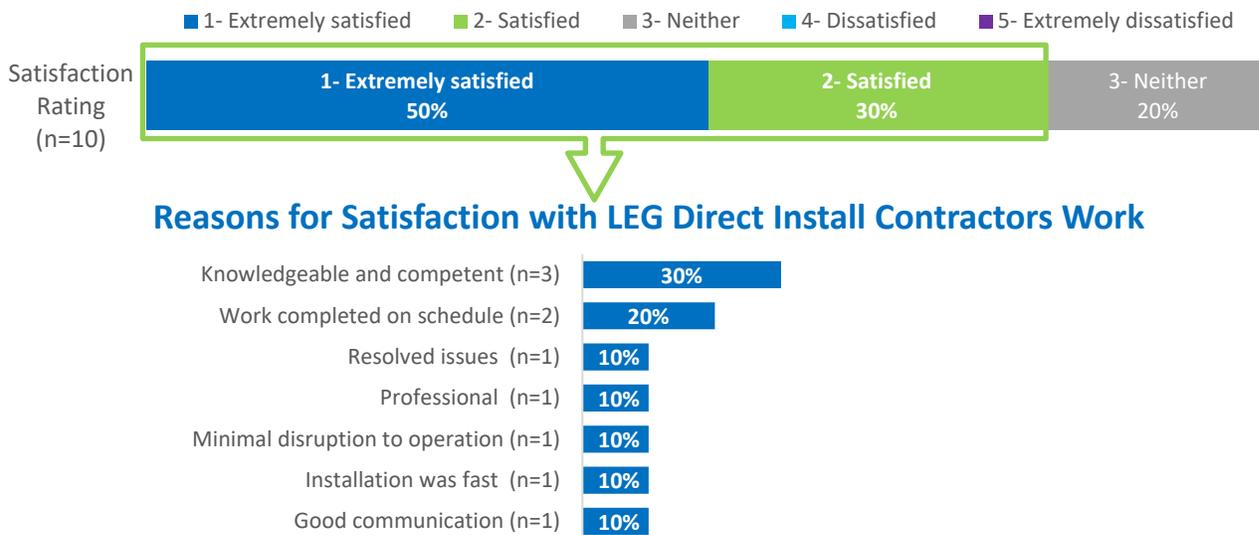


Figure 9-50: Satisfaction with LUG Direct Install Offering Contractors Work and Reasons



Satisfaction with the completed upgrades was generally positive among both LEG, and LUG Direct Install participants. LEG Direct Install participants stated they were either “extremely satisfied” (30%) or “satisfied” (60%) due to energy savings and a more comfortable space (Figure 9-51). In this context “energy savings” relates to the reduction in energy use, which usually results in cost savings, while “energy efficiency” is connected to the characteristics of the measure or equipment itself. For example, installing an energy efficient measure that is larger compared to the existing equipment may not result in energy savings when compared to existing smaller equipment.

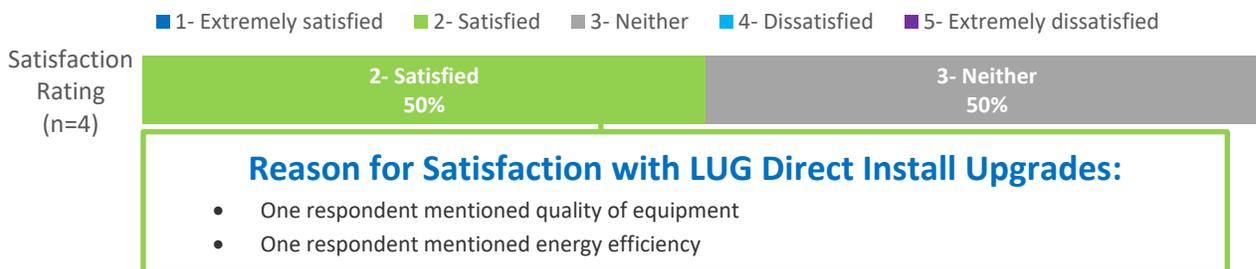
LUG Direct Install participants were also satisfied with the completed upgrades. Two participants reported they were “satisfied,” stating the quality of the product installed and the achieved energy efficiency as the main reasons for their satisfaction. Two participants mentioned their satisfaction was neutral. Figure 9-52 presents LUG Direct Install participants’ satisfaction rating and their corresponding reasons for this satisfaction.

Figure 9-51: Satisfaction with LEG Completed Direct Install Offering Upgrades



*Responses do not equal to 100% as some participants mentioned more than one reason.

Figure 9-52: Satisfaction with LUG Completed Direct Install Offering Upgrades



9.4.4 Incentive Processing

Both LEG and LUG Direct Install participants had no challenges with the incentive paperwork and payment processing. LEG Direct Install participants reported they were either “extremely satisfied” (20%), “satisfied” (70%), and one (1) respondent (10%) was neutral (Figure 9-53). LUG Direct Install participants reported they were “satisfied” (75%) and one (1) respondent (25%) was neutral (Figure 9-54).

Figure 9-53: Satisfaction with LEG Commercial Direct Install Offering Incentive Paperwork Turnaround Time



Figure 9-54: Satisfaction with LUG Direct Install Offering Incentive Paperwork Turnaround Time



When participants were asked about their satisfaction with the offering incentive payment processing turnaround time, there were no dissatisfied participants. LEG Direct Install participants rated their level of satisfaction as either “extremely satisfied” (20%), “satisfied” (60%), or neutral (20%) (Figure 9-55). While LUG Direct Install participants reported they were “extremely satisfied” (25%), “satisfied” (50%), or neutral (25%) (Figure 9-56).

Figure 9-55: Satisfaction with LEG Commercial Direct Install Offering Incentive Processing Turnaround Time



Figure 9-56: Satisfaction with LUG Direct Install Offering Incentive Processing Turnaround Time



9.4.5 Suggestions for Future Improvements

When participants were asked if there was anything they would like to improve or any feedback they wanted to provide, there were no responses.

9.5 Custom Offering

The following section discusses the key findings from the participant surveys of both LEG and LUG Custom Offerings. Of the 71 LEG Custom participants who were contacted to participate in the survey, nine (9) participants responded, resulting in a response rate of 13%. Of the 34 LUG Custom participants invited to participate in the survey, eight (8) participants responded, resulting in a response rate of 24%.

Table 9-3 presents the roles of the Custom Offering Participants. A total of three (3) LEG Custom Participants (33%) had the primary responsibility for making budget or program participation decisions, five (5) participants (67%) had shared responsibility. Of the total of five (5) LUG Custom participants (63%) had the primary responsibility, two (2) participants (25%) had shared responsibility and one participant (13%) could not recall their responsibility.

Table 9-3: Custom Offering Respondent Roles

Respondent Title	LEG	LUG	Total
Energy Manager	2	0	2
President/CEO/Owner	1	3	4
Facility Manager	1	2	3
Director	0	1	1
Building/Property Management Professional	1	0	1
Business Administration or Management	4	0	4
Engineer	0	2	2
Total	9	8	

9.5.1 Overall Customer Experience and Satisfaction

Custom participants were asked how they became aware of the offering. For LEG Custom participants, the majority (56%) heard about the offering through an Enbridge Advisor. Other methods through which Custom participants became aware of the offering include trade allies or contractors (33%) or word of mouth (11%).

On a five-point scale, LEG participants were asked to rate how several factors influenced their company’s decision to participate in the Custom offering. Offering incentive was identified as the most influential factor for LEG respondent’s participation (56%), followed by previous experience with an energy saving program (44%). When asked to rate how influential information or recommendations provided from a non-utility advisor was on their participation

decision, 22% reported it played an “extremely influential” role. Figure 9-57 presents the influence level offering features had on LEG Custom participant’s decision.

For LUG Custom participants, the majority heard about the offering through an Energy Advisor or consultant (75%). Other methods through which LUG participants became aware of the offering include trade allies or contractors (25%), advertisements (25%) and word of mouth (25%).

Similar to LEG Custom participants, when LUG Custom participants were asked to rate the influence of various offering’s features, 25% rated the offering’s incentive, and 25% rated previous experience with an energy saving program as the most influential features. When asked to rate how influential information or recommendations from LUG advisors was on their decision, 25% reported it was “extremely influential.” Program marketing materials or information was rated as having a “significant role” in influencing participants’ decisions (38%). Figure 9-58 presents the influence level offering features had on LUG Custom participant’s decision.

Figure 9-57: Program Features Influencing Decision to Participate in LEG Commercial Custom Offering (n=9)

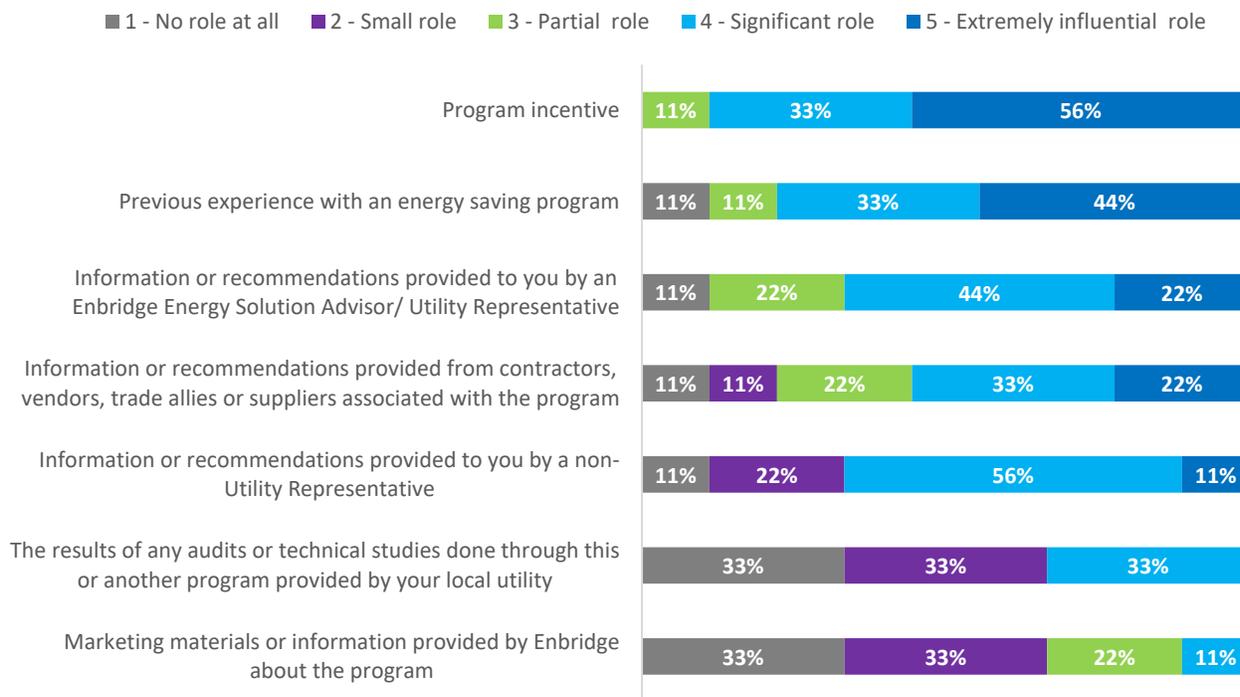
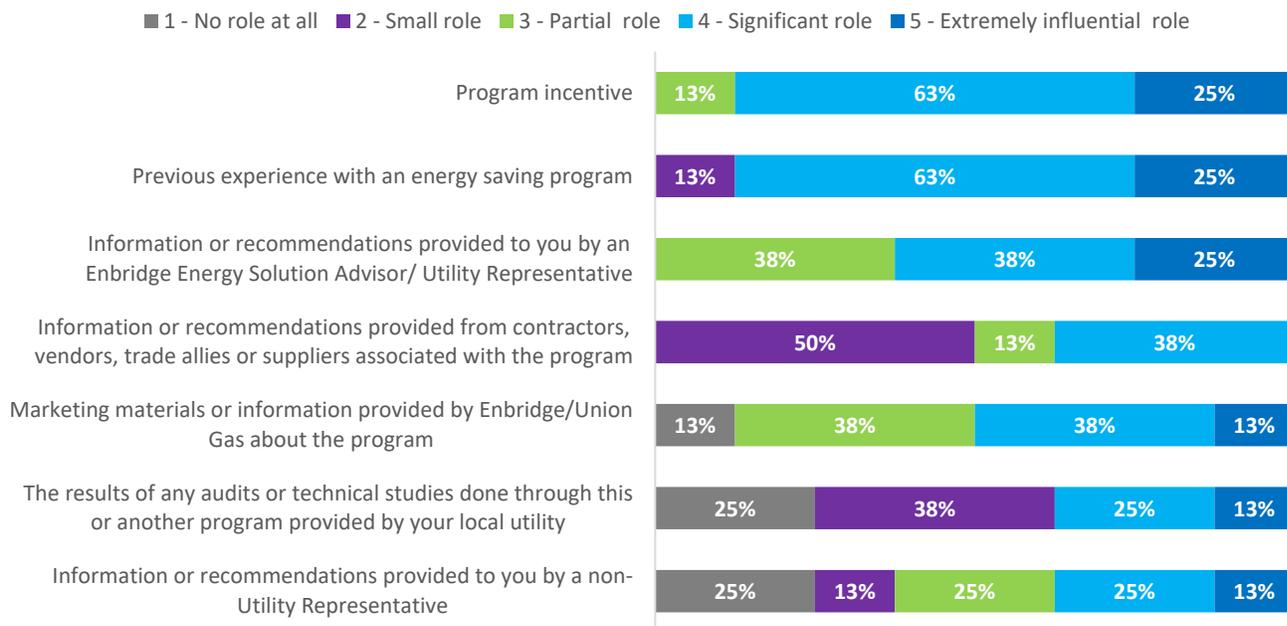
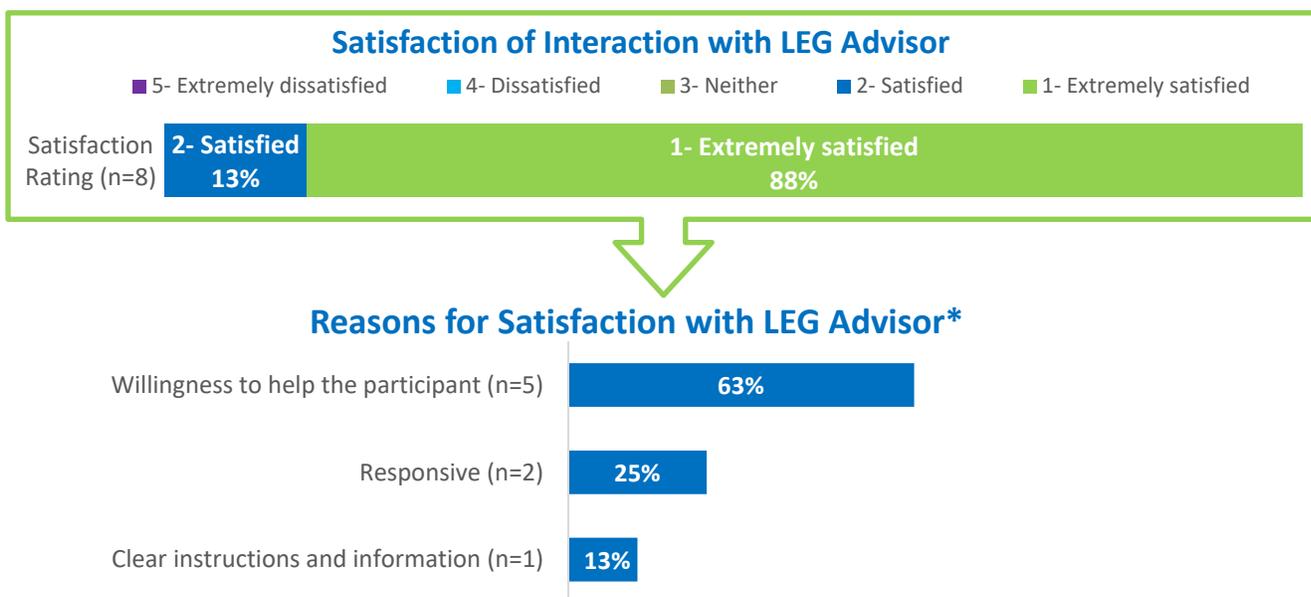


Figure 9-58: Program Features Influencing Decision to Participate in LUG Custom Offering (n=8)



While participating in the offer, the majority of LEG Custom participants (89%) reported they worked with an Enbridge Advisor. All participants stated they were either “extremely satisfied” (88%) or “satisfied” (13%) with their interaction, citing advisors’ willingness to help them as the main reason for their satisfaction (Figure 9-59).

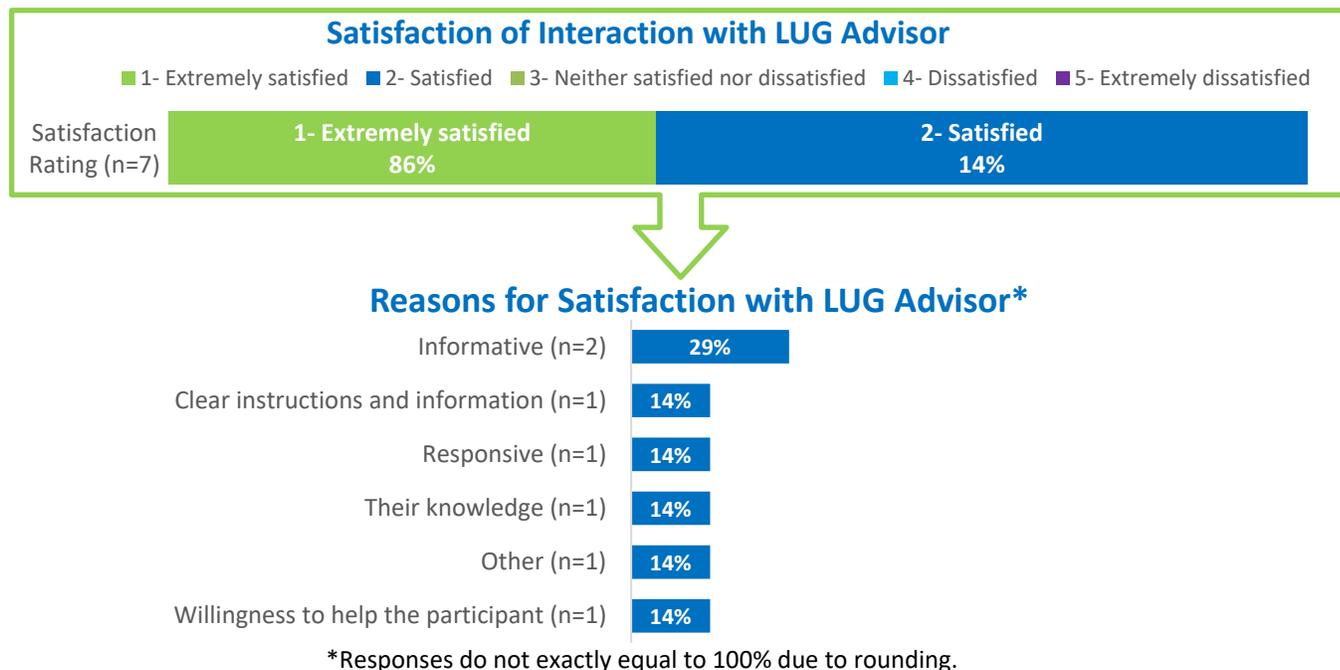
Figure 9-59: Participant Satisfaction with Enbridge Advisor (n=9)



*Responses do not exactly equal to 100% due to rounding.

The majority of LUG Customer participants (88%) also interacted with a utility advisor throughout the program and reported they were either “extremely satisfied” (86%) or “satisfied” (14%) with their interaction. LUG participants’ reasons for satisfaction varied. Figure 9-60 presents the various reasons LUG Custom participants provided for their satisfaction.

Figure 9-60: Participant Satisfaction with LUG Advisor (n=7)



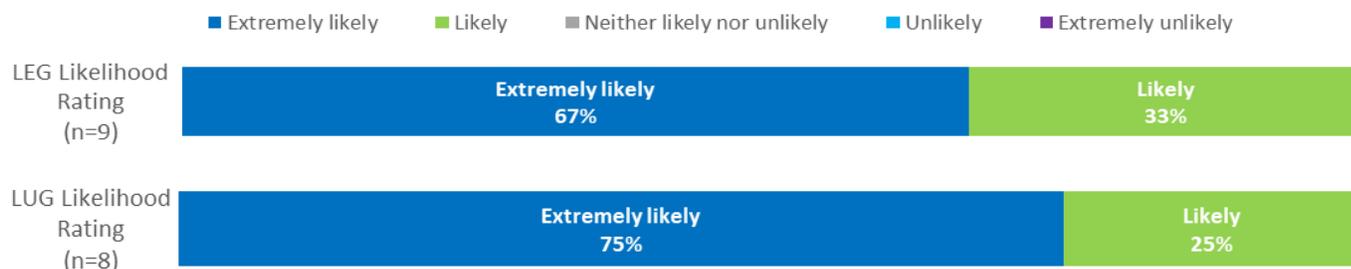
Custom participants also mentioned they accessed offering resources during the program. A total of two (2) participants (22%) accessed online program resources and searched for program eligibility criteria information. The participants reported that this information was “easy” or “extremely easy” to locate due to the website’s simple and straightforward layout. Only one of the LUG Custom participants accessed online program resources, searching for the program application or eligibility criteria. They also reported this information was easy to locate.

Overall, LEG and LUG Custom participants were satisfied with their offering experience. When LEG Custom participants were asked how satisfied they were with their overall offering experience, 67% indicated they were “satisfied,” and 33% reported they were “extremely satisfied.” LUG Custom participants were also satisfied with their offering experience, with 63% reporting they were “extremely satisfied” and 38% reporting they were “satisfied.” When participants were asked what aspects of the offering contributed to their satisfaction, both LEG (40%) and LUG Custom (20%) participants mentioned the value of the incentive and ease of participating in the offering. Three (3) LUG Custom participants noted that assistance from an advisor (30%) also contributed to their satisfaction with the offering experience.

Lastly, when participants were asked how likely they would be to participate in a future EGI program, both LEG and LUG Custom participants reported high ratings of likelihood. LEG Custom participants stated they were “extremely likely” (67%) or “likely” (33%) to do so. LUG

Custom participants reported they were “extremely likely” (75%) or “likely” (25%) (Figure 9-61). LEG and LUG Custom participants stated they would promote the offering to their network.

Figure 9-61: Likelihood to Participate in Future Energy Efficiency Initiatives

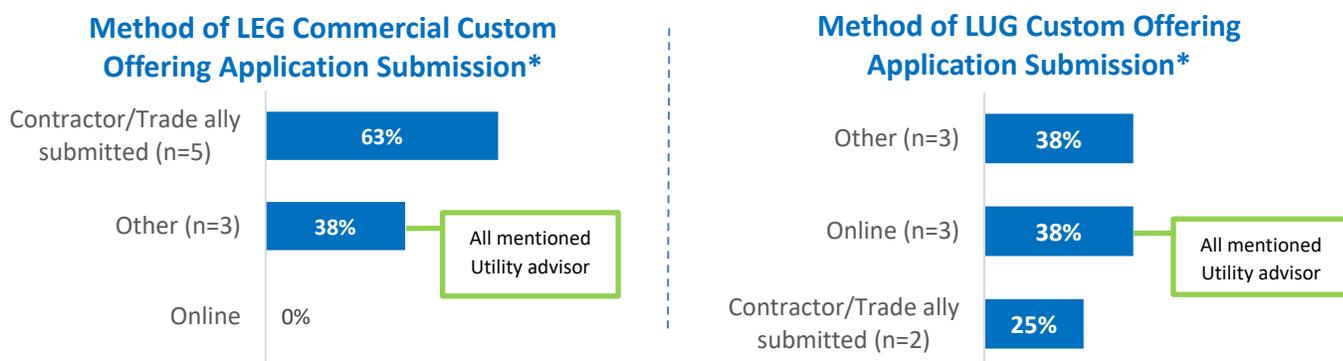


9.5.2 Application Process

More than half of LEG and LUG Custom Participants were involved in the application submission process. More than half (56%) of the LEG Custom participants had primary responsibility for submitting the application, while 33% had shared responsibility and 11% were not involved. For LUG Custom participants, 63% had primary responsibility for submitting the application, while 8% had shared responsibility for the application submission.

LEG Custom participants' main application submission methods were through their contractor or trade ally (63%) or their utility advisor (38%). For LUG Custom participants, application submission methods included through their contractor or trade ally (25%) or utility advisor (38%), and submitting online (38%). Figure 9-62 illustrates how the offering applications were submitted for both LEG and LUG participants.

Figure 9-62: Method of Program Application Submission



In general, participants indicated an easy application process. LEG Custom participants stated the process was “extremely easy” (63%) or “easy” (38%) (Figure 9-63). LUG Custom participants found the application process “easy” (63%) or were neutral (38%) (Figure 9-64).

Figure 9-63: Ease Rating of LEG Application Submission Process

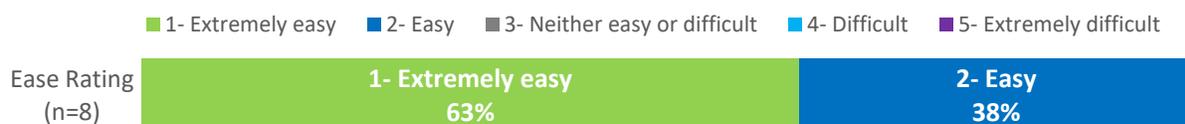


Figure 9-64: Ease Rating of LUG Application Submission Process



LEG Custom participants indicated the primary reasons for the ease of the application process was the received assistance with application submission and the straightforward process. LUG Custom participants reported that they found the process clear and simple.

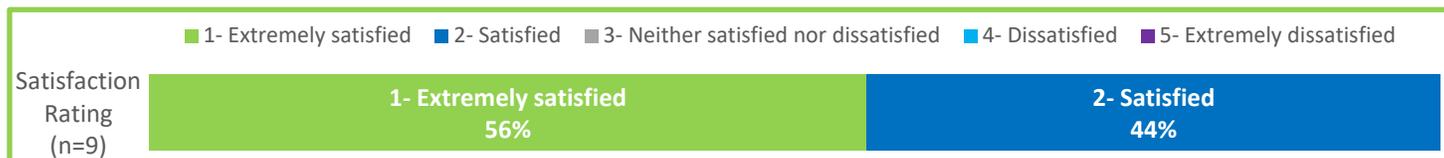
9.5.3 Installation Process and Contractors

Overall, participants of both the LEG and LUG Custom offerings were satisfied with the installation process and the contractors that completed the installation. When asked if the installation created disruptions in their business, 89% of LEG participants and 75% LUG participants reported it did not.

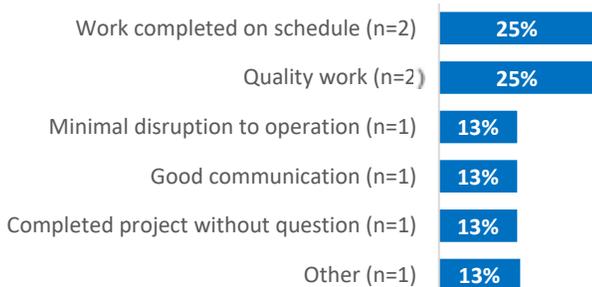
Participants were then asked how satisfied they were with the quality of the contractors’ work. LEG Commercial Custom participants reported they were either “extremely satisfied” (56%) or “satisfied” (44%) with the quality of their contractors’ work (Figure 9-65). When asked why they provided these answers, reasons included completion of the work on time (25%). Figure 9-65 presents LEG participants’ main reasons for satisfaction with their contractor’s work quality.

Similarly, LUG Custom participants were satisfied with the quality of their contractors’ work. Nearly two-fifths 38% reported they were “extremely satisfied,” and 50% reported they were “satisfied” (Figure 9-66). When asked why they provided these answers, reasons included the contractors’ knowledge (33%). Only one (1) LUG Custom participant was “dissatisfied” with their contractors’ work quality, citing the project exceeded timelines and the contractors were unprofessional (Figure 9-66).

Figure 9-65: Satisfaction with LEG Commercial Custom Program Contractors Work and Reasons



Reasons for Satisfaction with LEG Commercial Custom Program Contractors Work*

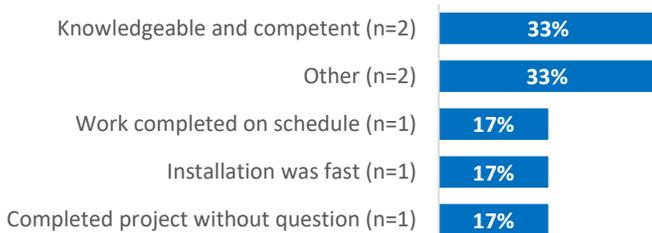


*Responses do not equal to 100% as some participants mentioned more than one reason.

Figure 9-66: Satisfaction with LUG Custom Offering Contractors Work and Reasons



Reasons for Satisfaction with LUG Custom Offering Contractors Work*



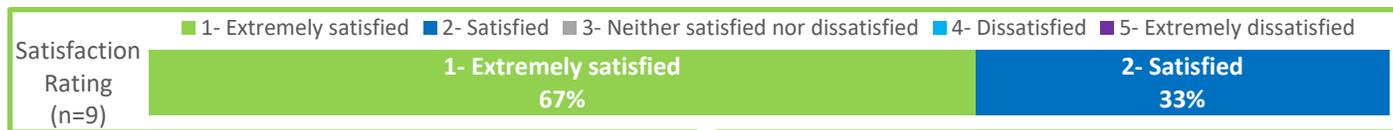
*Responses do not equal to 100% as some participants mentioned more than one reason

Satisfaction with the completed upgrades was generally positive among both LEG and LUG Custom participants. LEG Custom participants stated they were either “extremely satisfied” (67%) or “satisfied” (33%) with the upgrades due to the energy and cost savings they would experience (Figure 9-67).

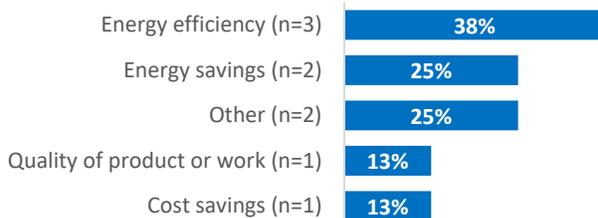
LUG Custom participants were similarly satisfied with the completed program upgrades. These participants reported they were either “extremely satisfied” (50%) or “satisfied” (38%) with the

upgrades, mentioning their contractor (29%), energy savings (29%), energy efficiency (14%) and the quality of the product installed (14%), and (Figure 9-68).

Figure 9-67: Satisfaction with LEG Completed Custom Offering Upgrades



Reasons for Satisfaction with LEG Commercial Custom Offering Upgrades*



*Responses do not equal to 100% as some participants mentioned more than one reason.

Figure 9-68: Satisfaction with LUG Completed Custom Offering Upgrades



Reasons for Satisfaction with LUG Custom Offering Upgrades



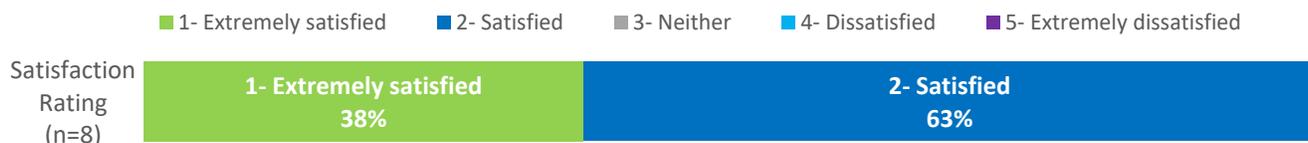
9.5.4 Incentive Processing

Both LEG and LUG Custom participants had no challenges with the incentive paperwork and payment processing. LEG Custom participants reported they were either “extremely satisfied” (22%), “satisfied” (56%), or were neutral (22%) (Figure 9-69). LUG Custom participants reported they were “extremely satisfied” (38%) and “satisfied” (63%) (Figure 9-70).

Figure 9-69: Satisfaction with LEG Commercial Custom Offering Incentive Paperwork Turnaround Time



Figure 9-70: Satisfaction with LUG Custom Offering Incentive Paperwork Turnaround Time



When participants were asked about their satisfaction with the offering incentive payment processing turnaround time, there were no dissatisfied participants. LEG Custom participants reported their level of satisfaction as either “extremely satisfied” (22%), “satisfied” (44%), or were neutral (33%) (Figure 9-71). While LUG Custom participants reported they were “extremely satisfied” (50%) and “satisfied” (50%) (Figure 9-72).

Figure 9-71: Satisfaction with LEG Commercial Custom Offering Incentive Processing Turnaround Time

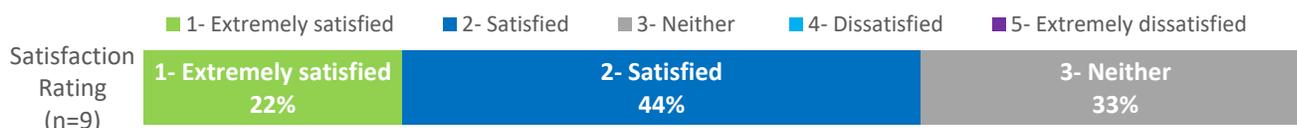


Figure 9-72: Satisfaction with LUG Custom Offering Incentive Processing Turnaround Time



9.5.5 Suggestions for Future Improvements

When participants were asked if there was anything they would like to improve or any feedback they wanted to provide, there were not many responses as the majority of participants were satisfied with the offering. Of the two LEG \ Custom participants that provided feedback, one mentioned having a shorter turnaround time on funding. The other respondent stated having more programs that offered substantial and better “payback” periods. The example provided

was having state of the art ceiling fans, which move free heat down, covered by a rebate offering.

Four (4) LUG Custom participants provided feedback, which included:

- Continue to support conducting gas leak testing.
- More promotion of the program.
- Utility advisors to reach out to customers, especially participants, every six months to keep these types of offerings at the forefront of their decision making.
- Improve estimates of initial prediction of incentives since incorrect initial estimates may negatively impact a participant's perception of the program.

10 Summary of Findings and Recommendations

To summarize the findings and recommendations of the process evaluation, the participant experience and satisfaction are summarized first. This provides a context for what the staff and contractors say. The final section summarizes the recommendations for process improvements, specifically pertaining to the offering material, data sets and future process evaluations. This section is a summary of all previous sections to consolidate all the findings and recommendations

10.1 Participant Experience and Satisfaction

Overall, 80% of the participants became aware of their respective offerings from the following source:

- Enbridge Advisors
- Trade allies or contractors

The offering features that played the most significant role in participants’ decisions to participant in their respective offerings were:

- Program incentive.
- Previous experience with an energy saving offering.
- Information or recommendation provided to by a LEG/LUG Energy Advisor.

The key insights regarding the participants offering experience and satisfaction are summarized in Table 10-1. Participants did not provide many suggestions for improvement or feedback. The few who provided feedback mentioned increased incentives, continued communication with Energy Advisors, and quicker incentive turnaround time.

Table 10-1: Summary of Participant’s Experience – Key Insights

Topic	Satisfaction	Insights
Overall Offering	92% of participants were either satisfied or extremely satisfied with the offerings over all.	<ul style="list-style-type: none"> ▪ The main reasons for participant’s high satisfaction rate were ease of participation, value of the incentive, and assistance from an Enbridge Advisor.
Offering Information	63% of participants rated accessing online information as easy or extremely easy.	<ul style="list-style-type: none"> ▪ Participants cited LEG/LUG Energy Advisor and clear website navigation as the main reasons for their rating. ▪ Information accessed online the most frequently were, offering eligibility criteria, offering application, offering contacts and success stories.

Topic	Satisfaction	Insights
Energy Advisor	97% of the participants were satisfied or extremely satisfied with LEG/LUG Energy Advisor interactions.	<ul style="list-style-type: none"> Main reasons for the high satisfaction were LEG/LUG advisor’s helpfulness, responsiveness, and knowledge.
Application	68% of participants rated offering application submission process as easy or extremely easy.	<ul style="list-style-type: none"> The main reasons for the ease of the application process were the simplicity of the application and the contractor’s assistance.
Installation	89% of participants reported that the installation process did not create any disruptions to their business.	<ul style="list-style-type: none"> Only five participants (9%) indicated disruptions as the installation took longer than expected or they needed to shut down a section of their business for the day.
Contractors	<p>84% of participants were satisfied or extremely satisfied with the quality of the contractors’ work.</p> <p>90% of participants reported they were satisfied or extremely satisfied with the completed upgrades.</p>	<ul style="list-style-type: none"> Main reasons for these ratings included the energy savings they incurred, the energy efficiency gained, and the overall quality of their product or work.
Incentive Process	<p>80% of the participants were satisfied or extremely satisfied with the incentive paperwork turnaround time.</p> <p>73% of the participants were satisfied or extremely satisfied with incentive payment processing turnaround time.</p>	

10.2 Recommendations from Program and Sales Staff

Program and sales staff recommendations are summarized in Table 10-2.

Table 10-2: Program and Sales Staff Recommendations

Topic	Recommendation
Goals, Implementation and Resources	
Free-ridership	<ul style="list-style-type: none"> Continue to address free-rider mitigation strategies across the integrated team and share best practices from each of the legacy utilities. Provide clear definition and clarification of how savings are evaluated, especially regarding free-ridership. Provide clear guidance on how to screen for free-riders.
Budget and Resources	<ul style="list-style-type: none"> Provide fixed annual budget and information about free-ridership early in year before offerings are launched. Use internal sales staff to deliver offerings, especially for custom projects, which will make the offerings more cost-effective. Review and address the internal sales team resource constraints.

Topic	Recommendation
	<ul style="list-style-type: none"> ▪ In the historically LEG rate territory add more support on larger accounts, since these accounts did not received sufficient attention in the past due to lack of account-dedicated resources. In the historically LUG rate territory reaching out to the population of smaller commercial customers (less than 50,000 m3) is recommended, since these customers were not targeted before. ▪ Review and address resource constraint with tracking and reporting team to help with the Direct Install offer.
Data	<ul style="list-style-type: none"> ▪ When creating a customer list for Direct Install delivery agents, segment these lists and coordinate with the internal sales team to ensure there is no duplication with the internal sales team customer list.
Offering Design	<ul style="list-style-type: none"> ▪ Internal program and sales teams to work collaboratively to define and plan implementation strategies when design changes are contemplated. ▪ Add new and emerging technologies to the offers, to expand the scope of the offerings and provide a wider selection of solutions for customers and increase participation. ▪ Work with manufacturers to help augment efficiencies of technologies upstream, to provide a wider selection of cost-effective efficient solutions for customers and increase participation
Offering Implementation	<ul style="list-style-type: none"> ▪ When designing and delivering the program, consider allowing longer timelines for project completion, as planning cycles for budgets and projects extend beyond an annual calendar period. ▪ Offer a bonus incentive to customers that act within a certain timeframe. This will incentivize participants to complete the projects within a shorter period. ▪ Utilize the Guardian tracking system to keep records updated to facilitate handovers due to changing roles.
Application Process	<ul style="list-style-type: none"> ▪ Allow tracking and reporting team to edit and adjust in the CRM when clarification is provided from the sales team, and not wait on the sales team to execute these changes.
Internal Team Engagement and Team Roles	
Communication	<ul style="list-style-type: none"> ▪ Optimize meetings based on the number of attendees and allocate adequate time for information sharing. ▪ Provide regular updates regarding internal communication.
Engaging Contractors or Trade Allies	
Engagement, Communication and Training	<ul style="list-style-type: none"> ▪ Provide more communication, training and support to vendors, especially for the Direct Install offering, and continue to alleviate the delivery vendors' application challenges by streamlining the process. The staff observed that the streamlining of the application process was addressed after 2019. ▪ Consider creating a joint online portal, where contractors can submit applications to internal Energy Advisors. ▪ Provide performance-based compensation to contractors to provide more motivation to increase participation. ▪ An increased budget that would allow for sufficient education and training of contractors to aid them in promoting and delivering the offers and resulting in increased participation. ▪ More engagement with, and assistance for, contractors (especially in distributor type offers) to improve supply chain process for targeted customers. ▪ Consider developing a formal trade ally network.
Outreach and Marketing	

Topic	Recommendation
Communication, Content and Branding	<ul style="list-style-type: none"> ▪ Develop more communications and marketing material. ▪ Provide more consistent and regular communications to customers for Prescriptive and Direct Install offers, to ensure the EGI name and brand are associated with the offers. ▪ Develop more customer case studies and examples of success stories detailing the equipment, financial benefit and their satisfaction with the projects. ▪ Improve communicating the benefits of offer technology to decision-makers by making the communication more novel and meaningful. ▪ Conduct research studies to define the influence and impact of different marketing strategies on program results, which will guide the selection of the most effective strategies. ▪ Ensure contractors have EGI branded material and can direct the customer to an EGI representative to verify the legitimacy of the offering.
Incentives	
Incentive Structure	<ul style="list-style-type: none"> ▪ The issues with the distributor incentives is potentially being addressed by the implementation of a new midstream program. ▪ Provision of higher incentive levels would allow for engaging broader and deeper tiers of customers who have not participated yet due to lack of time, budget and/or knowledge. ▪ Streamline the incentive amounts of some prescriptive technologies that have variable incentives, for example define a minimum or consistent amount.
Incentive Processing	<ul style="list-style-type: none"> ▪ Review the incentive processing and payment steps to identify areas to increase efficiency and turnaround time. ▪ Implement quality control and checks to ensure correct customer contact information is captured. ▪ Including a description and project information with the mailed cheques will help customers understand why they are receiving the cheques
Customer Experience and Satisfaction	
Support and Engagement	<ul style="list-style-type: none"> ▪ Consider including in offerings a cost-effective strategy to provide technical support for smaller accounts. ▪ Review and address turnover of Energy Advisor staff, and develop a strategy to maintain customer and Energy Advisor relationship. ▪ Streamline participant signing requirements and limiting the number of touch points with customers, for example, limit the times a LEG/LUG representative has to go back to the customer to verify their information. ▪ Although customer surveys were conducted by internal teams, it was recommended to consider conducting these surveys by an independent third party to increase the likelihood of a more accurate representation of customer satisfaction.

10.3 Direct Install Contractors Recommendations

Direct Install contractors recommendations are summarized in Table 10-3.

Table 10-3: Direct Install Contractors Recommendations

Topic	Recommendation
Application and Incentive Processing	
Overall Process	<ul style="list-style-type: none"> Optimize and streamline the application and incentive approval process. A good example is the process LUG had in place in 2019. Streamline the turnaround response process for participant eligibility approval and develop a service level agreement (SLA) between internal departments to expedite the eligibility approval response turnaround time.
Invoicing	<ul style="list-style-type: none"> Prior to 2019, project invoices were submitted and processed individually. This incentive payment process was more efficient. Implement a similar process to allow project invoices to be processed individually.
Outreach and Marketing	
Customer Lists	<ul style="list-style-type: none"> Provide contact information, which will increase participant recruitment efficiency. Provide an updated customer list mid-year.
Facility Ownership	<ul style="list-style-type: none"> Pre-screen customers and prioritize owner-occupied facilities.
Offering Timelines	<ul style="list-style-type: none"> Review the offering timelines to accommodate projects that carry over from one year to the next. Ensure consistency and continuity of the offering over years to increase the efficiency and effectiveness of offering delivery.
Continuous Improvement	<ul style="list-style-type: none"> Synchronizing the frequency of marketing campaigns with the contractor's key sales period, which tends to be seasonal. Additional marketing and an increased frequency of marketing campaigns. Include contractors in the early marketing and design stages when modifications to the offering are contemplated.
Offer Design	
Measures	<ul style="list-style-type: none"> Include additional measures in the offering and consider new and emerging technologies.
Incentive	<ul style="list-style-type: none"> Review incentives and offering benefits, especially for low incentivized measures.
Incentive Structure	<ul style="list-style-type: none"> Provide a margin of difference with the fixed criteria to allow participants to receive the full quoted incentive amount or as close to the amount as possible.
Eligibility	<ul style="list-style-type: none"> Review and clearly define customer eligibility when participating in different offerings.
Interaction with LEG and LUG	
Energy Advisors	<ul style="list-style-type: none"> Develop a process, for example, using a Responsible, Accountable, Consulted, Informed (RACI) chart approach, to manage customer interaction between EGI Energy Advisors and contractors. Clearly define the customers that Direct Install contractors can recruit.

10.4 Participant Contractors Recommendations

The main challenge the contractors experience was an increased level of technical detail required, which became onerous and significant in terms of labour cost for larger projects. One

strategy to reduce the level of effort could be if the information is collected while the project implementation is in progress.

10.5 Process Improvement Recommendations

Recommendations resulting from the process evaluation of offering material and data are summarized in Table 10-4.

Table 10-4: Process Evaluation of Offering Material and Data Recommendations

Topic	Recommendation
Offering Material	
Offer Plans and Applications	<ul style="list-style-type: none"> ▪ Ensure that each specific offer has a process map that is sufficiently detailed. Process maps document each stakeholder’s involvement in the program and highlight any obstacles in the program’s operations. ▪ Each program offer should have its own logic model which provides rationale for each step in the process map. ▪ Each offer should have an up-to-date summary sheet. Individual offer summary sheets are valuable resources for monitoring essential program elements (and changes), staff roles, incentive levels, and process maps. ▪ Implement applications and data tracking for all offerings.
Website	<ul style="list-style-type: none"> ▪ Improve website usability and presentation.
Marketing Material	<ul style="list-style-type: none"> ▪ Ensure marketing materials include pertinent information in a clear manner.
Data Sets	
Contact Information	<ul style="list-style-type: none"> ▪ Ensure contact information, specifically contact name, email address and telephone number, are captured for each project. A suggestion is to make these data fields mandatory on the application form. ▪ Ensure Energy Advisors understand the significance of accurate information capturing, since the validation of contact information for both LEG and LUG data sets rests solely on Energy Advisors.
Data Set Structure and Content	<ul style="list-style-type: none"> ▪ Review the structure of the data and define the information to be captured. Develop a data structure that captures the defined information and provide a clear definition of the data fields. ▪ Review how data is captured for the LEG Direct Install offer and revise how data is captured to avoid overstating incentives due to data duplication.
Process Evaluation	
Scheduling	<ul style="list-style-type: none"> ▪ Conduct process evaluation as soon as possible after project completion to minimize the amount of changes in contacts. ▪ Schedule process evaluations to occur during non-vacation periods.
Incentive	<ul style="list-style-type: none"> ▪ Consider including an incentive amount for participants and non-participants as motivation for survey completion.
Data Sets	<ul style="list-style-type: none"> ▪ Provide clear definition in data sets to enable easy identification of customers to be included in the process evaluation. ▪ Provide contact information, especially email addresses, for all participants and non-participants.



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ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board (STAFF)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 35

Question(s):

Enbridge Gas has proposed the process for determining when changes to input assumptions should be applied to its program results and targets.

- a) Please clarify what is meant by the highlighted text in the following excerpt “any changes to NTG adjustments for offerings with one-to-one implementation approaches are applied retroactively...”.
- b) Please confirm what Enbridge Gas is referring to when it notes that “verification adjustments are retroactively applied for all situations, assuming the verification methodology aligns with the program offering’s OEB-approved gross measurement methodology.” In your response, please discuss what verification methodology would not align with the gross measurement methodology.
- c) Please confirm that the delivery mechanism selected by Enbridge Gas for a particular offering can impact the installation rate of measures – for example, direct install vs self install.
- d) Please confirm that Enbridge Gas has proposed its suite of programs based on a number of factors, including balancing overall costs and resources required to implement its proposed DSM plan, including the cost associated with various delivery mechanisms.
- e) In Table 1: Retroactive vs. Prospective Application of Input Assumptions and Adjustment Factors to Results, please confirm what Enbridge Gas is referring to when it included the example “unique savings calculations determined by the utility”. Would eTools calculations fall under this definition? Please include all tools, calculators or processes that would be included.

Response

- a) One-to-one implementation approaches refers to “offerings where the utility has the ability to approve/reject individual projects in-year on a case-by-case basis”.¹ This is in contrast to mass-market implementation approaches, which refers to “offerings where projects are approved/rejected based on established program screening parameters, rather than by the utility on a case-by-case basis.”²

Table 1 at Exhibit E, Tab 5, Schedule 1, page 2 displays Enbridge Gas’s proposed offerings and their implementation approaches (i.e. one-to-one or mass-market).

- b) Gross measurement is defined as “the method(s) used by the program administrator (Enbridge Gas) to determine the gross resource savings claimed by a DSM program offering.”³ Furthermore:

Each DSM program offering proposed in the Multi-Year DSM Plan includes an approach to gross measurement.

It is critical that gross measurement approaches are determined and approved for each program offering at the beginning of the DSM Multi-Year Plan term, as they directly impact how the program offerings are delivered, and how DSM budgets and targets are set. Any impact evaluation undertaken should align with the gross measurement approach.⁴

As an example, the gross measurement methodology proposed for the residential Whole Home Offering is described at Exhibit E, Tab 1, Schedule 2, page 14 (i.e. NRCAN HOT2000 software). Enbridge views the DSM Plan proceeding as the mechanism for the OEB to test and approve the gross measurement methodology for DSM offerings. Should the OEB approve the offering and gross measurement methodology as filed, future evaluation and verifications for the offering should be based on the same measurement methodology (and not based on a different measurement methodology, for example using different modelling software other than NRCAN HOT2000 or using billing analysis). Evaluating and verifying a program using a different methodology than was approved for the design and delivery of the program can create significant challenges to subsequent design and delivery of the program.

- c) Confirmed.

- d) Confirmed.

¹ EB-2021-0002, DSM Multi-year Plan and Framework Application (Updated September 29, 2021), Exhibit C, Tab 1, Schedule 1, p. 37.

² Ibid.

³ Ibid, p. 25.

⁴ Ibid, p. 26.

- e) The statement refers to input assumptions determined by utility staff throughout the course of a program year. Any changes to these input assumptions as part of the evaluation process would be applied retroactively to the beginning of the program year being evaluated. This contrasts with input assumptions that are prescribed or “pre-approved”, such as input assumptions from the TRM and certain EULs. Should changes be made to prescribed or “pre-approved” input assumptions, those changes would be applied prospectively.

Input assumptions used for a particular eTools project would be developed by utility staff throughout the course of the program year, and therefore any changes to those input assumptions made through the evaluation process would be applied retroactively. This is generally consistent with current approach to Custom Project Savings Verification (CPSV) studies.

Rather than identifying a list of all input assumptions that could be developed by the utility (which could be many, considering the numerous custom projects the utility develops), it is more helpful and simpler to identify the input assumptions that are prescribed or “pre-approved”. This consists of input assumptions from the TRM, and the EULs at Exhibit E, Tab 5, Schedule 1, Attachment 1, page 6, and Exhibit E, Tab 5, Schedule 1, Attachment 2.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board (STAFF)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, p. 57

Question(s):

As part of Enbridge Gas's proposed DSM EAC Terms of Reference, it outlines the roles and accountabilities for all EAC members.

- a) Please confirm that Enbridge Gas understands that the Evaluation Contractor hired by the OEB may undertake impact evaluations, but likely will not execute all impact evaluations.

Response

- a) Enbridge Gas understands that the Evaluation Contractor would either execute all impact evaluations, or sub-contract the execution of certain impact evaluations. Regardless, all impact evaluations that are to be applied to the utility's DSM results would be managed in some way by the Evaluation Contractor in conjunction with the EAC.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Consumers Council of Canada (CCC)

Interrogatory

Issue 5

Reference:

Exhibit D, Tab 1, Schedule 1, pages 4-6

Question(s):

EGI is proposing a limited mid-point assessment to provide an opportunity to determine if any additional program offerings merit introduction, or if changing market factors/government policy necessitate some reconsideration in program design or deliver. EGI proposes that the mid-point assessment take the form of an application made by the Company to the OEB in 2024 outlining the DSM programs and supporting details for the second three-year period 2025-2027 with a description of any changes that EGI proposes:

- a. When does EGI specifically intend to file the application?
- b. What type of stakeholdering does EGI intend to do in advance of its application?
- c. What would be the timing of that stakeholder process?
- d. Is EGI seeking approval of that process through this current application? If so, please provide EGI's proposed scope for this review.

Response:

- a) & d) Please see response to Exhibit I.4.EGI.CME.6.
- b) & c) Enbridge Gas anticipates that through its regular ongoing customer outreach and stakeholdering efforts the Company will have gained insights into how customers and the market are responding to the new DSM Plan, including identifying areas for program improvements. In advance of the Company's proposed mid-point assessment application in 2024, Enbridge Gas will have the benefit of assessing the market evolution three years from now and consideration of its regular on-going engagement with stakeholders (customers, business partners and industry insiders) as well as feedback from two annual DSM Stakeholder Meetings. As outlined in evidence, Enbridge Gas plans to convene the annual DSM Stakeholder Meetings in the spring of 2023 and 2024, following the release of the DSM Annual Reports. This timing will be appropriate ahead of the development of a mid-point assessment application in mid-2024.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 9

Preamble:

Page 17 of OEB, *Report of the Board Demand Side Management Framework for Natural Gas Distributors (2015-2020)*, December 22, 2014 states as follows:

“Based on a \$2.00/month cost impact to a typical residential customer and considering the general historic program mix and the relative size of each utility, the Board has estimated total annual DSM amounts of \$85M for Enbridge and \$70M for Union (these amounts are inclusive of the maximum annual shareholder incentive).”

Please note that this interrogatory is also relevant to other issues, such as the reasonableness of the rate impacts (Issue 6) and whether DSM programs (and the shareholder incentive levels) should be increased.

Question(s):

- (a) The 2015-2020 DSM Framework estimated the DSM budgets with reference to \$2/month per residential customer bill, with the budgets for other sectors scaled correspondingly (see page 17 of the 2015-2020 DSM Framework for details). What would the DSM budget level be in 2023 if it was set based on \$2/month for residential customers and a corresponding adjustment for other sectors according to the historic program mix?
- (b) Please confirm that the 2015-2020 DSM Framework, which first contained the \$2/month yardstick, was published in 2014. If not, please explain.
- (c) Please confirm that \$2 in 2014 is worth \$2.27 in 2021 per the Bank of Canada Inflation Calculator.
- (d) What would the DSM budget level be in 2023 if it was set based on \$2.27/month for residential customers and a corresponding adjustment for other sectors according to the historic program mix?

- (e) Please describe how Enbridge calculated the bill impact figures that it included in the notice of hearing for this matter. Please provide those underlying figures.
- (f) Please complete the following table. If the entire table cannot be completed, please complete as much as possible and provide alternative information for the portions that cannot be completed. Please make and state assumptions and caveats as needed.

Average Monthly Residential Gas Bill			
	2015	...	2027
Variable rate (\$/m3)			
Variable costs (\$)			
Fixed costs			
Total bill			
# of customers			
Total residential gas costs			

- (g) Please complete the following table. (The purpose, in part, is to allow us to assess the DSM budgets and reasonableness of the rate/bill impacts against total costs borne by Enbridge customers, including commodity, distribution, and carbon costs).

Annual Gas Costs			
	2015	...	Latest year of data
Total Ontario gas consumption (m3) ¹			
Total Ontario Gas Customers			
Total Ontario gas consumption for which Enbridge has commodity price data ²			
Average annual commodity price (for gas that Enbridge has data for) – \$/m3			
Annual commodity costs (for gas that Enbridge has data for) – \$			
Annual commodity costs (estimate other customers) ³			
Annual distribution costs ⁴			

¹ Enbridge may wish to use the figure from the Natural Gas Yearbook figures.

² Presumably this would be everything but direct purchasers.

³ Please provide a best estimate of the cost incurred by other customers where Enbridge does not have specific data on the price. If no estimate is possible, please assume that the price is the same as it is for gas procured by Enbridge for its customers.

⁴ i.e. All costs charged by Enbridge to customers through rates in Ontario.

Annual carbon costs ⁵			
Annual gas related costs - other ⁶			
Annual gas costs - total			

(h) Please complete above table for 2023-2027 as best as possible.

(i) Please complete the following table based on the most current information available. Please state the source of figures. You may wish to focus on prices for gas procured by Enbridge for its customers.

Gas Prices (Commodity and Carbon) – Historic and Future			
	2015 (historic)	...	20nn (forecast future year as far as the current forecast goes)
Average annual gas commodity price (\$/m3), excl. carbon			
Annual carbon price \$/m3			

(j) Please ask Enbridge's gas supply planning group to provide their latest gas price forecasts. Please also ask that group to provide a copy of the most current third party gas price forecasts in their possession. Please file all of those. If any of those forecasts are in units other than \$/m3, please also provide a table converting them to \$/m3.

(k) Does Enbridge have any reason to expect that average annual gas commodity price paid by distribution customers who purchase from entities other the Enbridge would be higher or lower than the average annual gas commodity price for gas procured by Enbridge for its customers? Would the price paid by direct purchase customers potentially be higher because their do not have the same degree of buying power as Enbridge?

⁵ Please exclude carbon costs from the commodity prices above to avoid double counting. For customers responsible for their own carbon costs, please either estimate their cost or exclude them from this row and indicate so in the response.

⁶ If the above items are missing anything, please include them here.

Response

- a) The exercise of escalating the DSM Budget based a maximum monthly impact of \$2.00/month on residential customers assumes a historical mix based on the 2022 DSM Budget and applying 2021 billing units and representative annual billing units in line with Exhibit F, Tab 1, Schedule 3. The limiting factor of the escalations was based on reaching the \$2.00/month maximum for one of the three residential rate classes when escalated proportionally (Rate 1 in EGD rate zone, Rate M1 in Union South, Rate 01 in Union North). Based on the 2022 DSM Budget, Union South's M1 rate class would be the first rate class to reach \$2.00/month. An increase of approximately 25% would bring the M1 rate impact to \$2.00/month for a total M1 amount of \$34,285,837. The amounts for the remaining rate classes would be increased proportionally for a total amount of \$165,026,783. Please see the below table for the full scenario breakdown by rate class.

It is important to note that these calculations are based on residential bill impact values that do not include shareholder incentive amounts or any portion of the 15% allowable overspend permitted by the OEB's 2015-2020 DSM Framework and outlined in the Filing Guidelines and included in the Proposed Framework in this Application.

	2022 DSM Budget In Rates (\$000s) (1)	2023 Budget Escalated for Residential Rate Class Maximum Impact at \$2.00/month (\$000s)
EGD Rate Zone		
Rate 1	39,406	49,225
Rate 6	21,074	26,326
Rate 9	3	4
Rate 100	0	0
Rate 110	2,208	2,758
Rate 115	1,319	1,648
Rate 125	110	138
Rate 135	255	319
Rate 145	1,147	1,433
Rate 170	2,195	2,742
Rate 200	38	48
Rate 300	2	2
Total EGD	67,757	84,642
Union South Rate Zone		
Rate M1	27,446	34,286
Rate M2	10,658	13,314
Rate M4	4,765	5,953
Rate M5	499	623
Rate M7	2,034	2,541
Rate M9	0	0
Rate M10	0	0
Rate T1	1,569	1,960
Rate T2	4,725	5,903
Rate T3	0	0
Total Union South	51,698	64,580
Union North Rate Zone		
Rate 01	6,625	8,276
Rate 10	3,127	3,906
Rate 20	1,753	2,190
Rate 25		0
Rate 100	1,147	1,433
Total Union North	12,652	15,805
Total EGI	132,107	165,027

Notes:

(1) 2022 Rates application (EB-2021-0147, Exhibit D, Tab 2, Rate Order, Working Papers, Schedule 10, p. 1).

- b) Confirmed. The Demand Side Management Framework for the Natural Gas Distributors (2015-2020) was published on December 22, 2014.
- c) Confirmed. The Bank of Canada Inflation Calculator calculates \$2 in 2014 as being worth \$2.27 in 2021 dollars.

Enbridge Gas would like to support this response by providing context regarding the OEB's direction in the 2015-2020 DSM Framework wherein,

the Board has determined that for DSM activities between 2015 and 2020, the gas utilities' annual DSM budgets should be guided by the simple principle that DSM costs (inclusive of both DSM budget amounts and shareholder incentive amounts) for a typical residential customer of each gas utility should be no greater than approximately \$2.00/month.⁷

The OEB did not call for inflationary increases to DSM budgets nor to the \$2/month cap rate impact to residential customers over the duration of the 2015-2020 DSM Framework nor again in the extension of the 2015-2020 DSM Framework with its approval and extension of programs and budgets for each of the 2021 and 2022 legacy DSM plans. In fact, the OEB provided clarification of its expectation in its Decision and Order by rejecting Union Gas' proposal to adjust annual budgets for inflation. "The OEB rejects Union's proposal to add inflation to its annual budget. The significant increase in program budgets should provide sufficient opportunity for increased efficiency and offset any inflationary pressures."⁸

Enbridge Gas believes it has reasonably responded to the OEB's expectation for modest budget increases in the first year of the next multi-year plan period, 2023, and further believes it is appropriate that inflationary increases should be reflected in the budgets in the years that follow. The Company's five year budget escalation proposal contemplates inflationary increases in accordance with CPI on an annual basis beginning in 2024.

- d) The exercise of escalating the DSM Budget based on a maximum monthly impact of \$2.27/month on residential customers assumes a historical mix based on the 2022 DSM Budget and applying 2021 billing units and representative annual billing units in line with Exhibit F, Tab 1, Schedule 3. Please note, the methodology and assumptions presented in this response align with a). An increase of approximately 42% would bring the M1 rate impact to \$2.27/month for a total M1 amount of \$38,914,425. The amounts for the remaining rate classes would be increased proportionally for a total amount of \$187,305,399. Please see the below table for the full scenario breakdown by rate class.

⁷ EB-2014-0134, OEB Report of the Board Demand Side Management Framework for Natural Gas Distributors (2015- 2020) (December 22, 2014), p. 17.

⁸ EB-2015-0029/EB-2015-0049, OEB Decision and Order Application for approval of 2015-2020 demand side management plans (January 20, 2016), p. 61.

	2022 DSM Budget In Rates (\$000s) (1)	2023 Budget Escalated for Residential Rate Class Maximum Impact at \$2.27/month (\$000s)
EGD Rate Zone		
Rate 1	39,406	55,871
Rate 6	21,074	29,879
Rate 9	3	4
Rate 100	0	0
Rate 110	2,208	3,130
Rate 115	1,319	1,870
Rate 125 (5)	110	156
Rate 135	255	362
Rate 145	1,147	1,627
Rate 170	2,195	3,112
Rate 200 (5)	38	54
Rate 300 (5)	2	3
Total EGD	67,757	96,069
Union South Rate Zone		
Rate M1	27,446	38,914
Rate M2	10,658	15,111
Rate M4 (6)	4,765	6,757
Rate M5 (6)	499	707
Rate M7	2,034	2,884
Rate M9	0	0
Rate M10	0	0
Rate T1	1,569	2,225
Rate T2	4,725	6,700
Rate T3	0	0
Total Union South	51,698	73,299
Union North Rate Zone		
Rate 01	6,625	9,393
Rate 10	3,127	4,433
Rate 20	1,753	2,486
Rate 25		0
Rate 100	1,147	1,627
Total Union North	12,652	17,938
Total EGI	132,107	187,305

Notes:

(1) 2022 Rates application (EB-2021-0147, Exhibit D, Tab 2, Rate Order, Working Papers, Schedule 10, p. 1).

- e) Please see response to Exhibit I.5.EGI.EP.1a.
- f) Please see Attachment 1. Please note, Attachment 1 was completed based on the rates approved with the January QRAM for the years 2015 to 2021, and the 2022 Rate Application for 2022.⁹ Enbridge Gas does not forecast typical customer bill amounts for future years.
- g) Please see Attachment 2.
- h) Please see Attachment 3.
- i) Please see response to part g above.
- j) Enbridge Gas's gas supply planning group does not develop its own gas price forecast. For rate setting purposes, Enbridge Gas uses natural gas forward strip prices. The table below provides the October natural gas forward strip prices for various trading points, converted to C\$/m³.

October Natural Gas Forward Strip						
(C\$/m ³)*						
	2022F	2023F	2024F	2025F	2026F	2027F
AECO	0.1287	0.1082	0.1020	0.1041	0.1063	n/a
Empress	0.1355	0.1134	0.1089	0.1090	0.1113	n/a
Henry Hub	0.1743	0.1498	0.1401	0.1385	0.1386	n/a
Dawn	0.1590	0.1369	0.1288	0.1296	0.1303	n/a
Niagara	0.1446	0.1226	0.1153	0.1159	0.1162	n/a
Chicago	0.1664	0.1421	0.1341	0.1344	0.1354	n/a
MichCon	0.1570	0.1334	0.1253	0.1271	0.1292	n/a
Dominion South	0.1294	0.1087	0.0985	0.0963	0.0964	n/a
PEPL	0.1549	0.1264	0.1168	0.1164	0.1167	n/a
Iroquois	0.2742	0.2351	0.2240	0.2223	0.2224	n/a
<i>*Conversion factors: GJ/MMBtu = 1.055056; C\$/US\$ = 1.26; MJ/m³ = 38.96</i>						

ICF International is Enbridge Gas's primary third-party that provides natural gas price forecasts. The table below shows ICF International's 2021 Q3 Natural Gas Supply Price Forecast, converted to C\$/m³.

⁹ EB-2021-0147, EGI 2022 Rates Phase 1 Application (June 30, 2021).

ICF International 2021 Q3 - Natural Gas Supply Price Forecast						
C\$/m3*						
	2022F	2023F	2024F	2025F	2026F	2027F
AECO	0.1302	0.1160	0.1134	0.1397	0.1292	0.1182
Empress	0.1367	0.1225	0.1194	0.1456	0.1352	0.1242
Henry Hub	0.1584	0.1387	0.1340	0.1512	0.1404	0.1311
Dawn	0.1602	0.1439	0.1390	0.1588	0.1504	0.1399
Niagara	0.1505	0.1344	0.1293	0.1466	0.1368	0.1265
Chicago	0.1548	0.1388	0.1348	0.1555	0.1465	0.1358
MichCon	0.1551	0.1389	0.1348	0.1547	0.1454	0.1353
Dominion South	0.1263	0.1096	0.1048	0.1163	0.1019	0.0924
PEPL	0.1478	0.1308	0.1267	0.1447	0.1357	0.1253
Iroquois	0.1856	0.1669	0.1602	0.1814	0.1742	0.1627
<i>*Conversion factors: GJ/MMBtu = 1.055056; C\$/US\$ = 1.26; MJ/m3 = 38.96</i>						

- k) Enbridge Gas is a price taker and procures gas supply through competitive bidding processes with creditworthy suppliers at natural gas supply hubs in Canada and the United States. The price paid by any market participant for gas supply will reflect each market participant's procurement process and the market environment at the time the supply arrangements are set. As a result, Enbridge Gas is not privy to natural gas prices paid by other market participants, including direct purchase customers of Enbridge Gas.

ENBRIDGE GAS INC.
Average Monthly Bill Details for a Typical Residential Customer

Line No.	Particulars	2015 (a)	2016 (b)	2017 (c)	2018 (d)	2019 (1) (e)	2020 (f)	2021 (g)	2022 (7) (h)
	Variable Rate (\$/m³)								
1	Rate 1 - EGD rate zone	\$0.34	\$0.26	\$0.25	\$0.26	\$0.29	\$0.24	\$0.24	\$0.25
2	Rate M1 - Union South rate zone	\$0.27	\$0.17	\$0.22	\$0.21	\$0.23	\$0.19	\$0.20	\$0.20
3	Rate 01 - Union North rate zone	\$0.39	\$0.30	\$0.33	\$0.33	\$0.36	\$0.30	\$0.30	\$0.31
	Variable Charge (\$/mo) (2)								
4	Rate 1 - EGD rate zone	\$68.99	\$52.30	\$50.61	\$52.61	\$57.13	\$48.15	\$47.62	\$49.56
5	Rate M1 - Union South rate zone	\$49.14	\$30.59	\$39.83	\$38.19	\$42.46	\$35.31	\$35.98	\$37.12
6	Rate 01 - Union North rate zone	\$71.43	\$54.81	\$60.39	\$61.08	\$65.83	\$54.22	\$54.27	\$56.41
	Fixed Charge (\$/mo) (3)								
7	Rate 1 - EGD rate zone	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$21.48	\$21.83	\$22.12
8	Rate M1 - Union South rate zone	\$21.00	\$21.00	\$21.00	\$21.00	\$21.00	\$22.50	\$22.87	\$23.18
9	Rate 01 - Union North rate zone	\$21.00	\$21.00	\$21.00	\$21.00	\$21.00	\$22.50	\$22.87	\$23.18
	Carbon Charge (Customer-related) (\$/mo)								
10	Rate 1 - EGD rate zone	-	-	\$6.64	\$6.64	-	\$7.82	\$11.74	\$15.66
11	Rate M1 - Union South rate zone	-	-	\$6.08	\$6.08	-	\$7.17	\$10.76	\$14.36
12	Rate 01 - Union North rate zone	-	-	\$6.08	\$6.08	-	\$7.17	\$10.76	\$14.36
	Total Monthly Bill (\$/mo) (4)								
13	Rate 1 - EGD rate zone	\$88.99	\$72.30	\$77.24	\$79.25	\$77.13	\$77.45	\$81.19	\$87.34
14	Rate M1 - Union South rate zone	\$70.14	\$51.59	\$66.91	\$65.27	\$63.46	\$64.98	\$69.62	\$74.65
15	Rate 01 - Union North rate zone	\$92.43	\$75.81	\$87.47	\$88.16	\$86.83	\$83.89	\$87.90	\$93.94
	Number of Residential Customers (5)								
16	Rate 1 - EGD rate zone	1,930,657	1,959,569	1,990,032	2,017,128	2,042,127	2,064,531	2,089,012	2,112,540
17	Rate M1 - Union South rate zone	1,000,747	1,014,523	1,028,385	1,043,576	1,057,008	1,070,095	1,082,457	1,094,253
18	Rate 01 - Union North rate zone	305,748	311,180	316,128	320,746	324,933	328,766	332,530	336,195
	Total Residential Gas Charges (\$/mo) (6)								
19	Rate 1 - EGD rate zone	\$171,807,694	\$141,679,386	\$153,712,765	\$159,852,398	\$157,512,114	\$159,890,320	\$169,599,055	\$184,512,631
20	Rate M1 - Union South rate zone	\$70,188,191	\$52,337,559	\$68,810,925	\$68,113,304	\$67,081,230	\$69,533,897	\$75,355,221	\$81,686,905
21	Rate 01 - Union North rate zone	\$28,259,014	\$23,591,302	\$27,653,055	\$28,278,073	\$28,212,607	\$27,580,735	\$29,230,809	\$31,583,598

Notes:

- (1) 2019 annual rates adjustment was implemented in rates effective April 1, 2019.
- (2) Excludes variable carbon charges. Carbon charges are shown on lines 10-12.
- (3) Includes \$1.00/month for Bill 32 which was implemented in rates beginning July 2019.
- (4) Total average monthly bill as filed with the January QRAM each year, including cost/price adjustments. Union North rate zone is based on the gas supply charges for Union North East/Eastern zone.
- (5) Total number of residential customers for all zones per Exhibit I.10.EGI.ED.24, Attachment 1. Please note that Union rate zones Rate M1 and Rate 01 are not exclusive to residential customers. Actual number of customers in these rate classes are higher than provided in this table.
- (6) Total monthly bill (lines 13-15) x number of residential customers (lines 16-18).
- (7) Bill details provided for 2022 are from the 2022 Phase One Annual Rate application at April 1, 2021 QRAM rates (EB-2021-0147).

Enbridge Gas Inc. - Annual Gas Cost

	2015	2016	2017	2018	2019	2020
Total Ontario gas consumption (10 ⁶ m ³) ¹	25,702	24,564	24,533	26,088	26,704	25,065
Total Ontario gas customers ²	3,540,089	3,598,700	3,653,986	3,701,403	3,717,399	3,740,847
Total Ontario gas consumption for which Enbridge has commodity price data (10 ⁶ m ³)	12,102	11,249	12,066	13,460	13,753	12,441
Average annual commodity price (for gas that Enbridge has data for) (\$/m ³)	\$ 0.138	\$ 0.106	\$ 0.125	\$ 0.111	\$ 0.119	\$ 0.100
Annual commodity costs (for gas that Enbridge has data for) (\$000)	\$ 1,673,729	\$ 1,196,865	\$ 1,514,111	\$ 1,490,445	\$ 1,640,834	\$ 1,245,103
Annual commodity costs (estimate other customers) ³	\$ 1,873,562	\$ 1,319,030	\$ 1,740,315	\$ 1,556,562	\$ 1,633,807	\$ 1,243,629
Annual distribution costs (\$000) ⁴	\$ 1,972,233	\$ 1,982,456	\$ 2,074,811	\$ 2,274,557	\$ 2,350,719	\$ 2,314,764
Annual carbon costs (\$000) ⁵	\$ -	\$ -	N/A	N/A	\$ 347,142	\$ 809,072
Annual other gas related costs (\$000) ⁵	\$ 949,082	\$ 870,798	\$ 783,655	\$ 823,991	\$ 703,701	\$ 604,447
Total annual gas costs (for gas that Enbridge has data for) – (\$000)	\$ 4,595,044	\$ 4,050,119	\$ 4,372,577	\$ 4,588,992	\$ 5,042,397	\$ 4,973,387

¹Annual gas volumes include quantities of gas sold to system gas customers and quantities of gas delivered to direct purchase customers. Source: OEB Natural gas distributor yearbooks

²Total customers include system gas customers and direct purchase customers of gas marketers licensed by the OEB. Source: OEB Natural gas distributor yearbooks

³Estimate is calculated using direct purchase customer volumes and apply to the commodity prices equal to Enbridge system gas customers

⁴Fixed and Variable, please refer to Exhibit I.GEC.4 for the breakdown by rate class

⁵Other costs include transportation cost, load balancing & storage costs. Please refer to Exhibit I.GEC.4 for the breakdown by rate class

⁶2017 & 2018: These costs were filed as strictly confidential in EB-2018-0331; 2019: Refer to EB-2019-0247, EGI Updated Federal Carbon Pricing Program Application (May 14, 2020), Exhibit C, p.11-12

Enbridge Gas Inc. - Annual Gas Cost

	2023	2024	2025	2026	2027
Total Ontario gas consumption (10 ⁶ m ³) ¹	N/A				
Total Ontario gas customers ²	N/A				
Total Ontario gas consumption for which Enbridge has commodity price data (10 ⁶ m ³)	14,457	14,504	14,554	14,610	14,665
Average annual commodity price (for gas that Enbridge has data for) (\$/m ³) ³	\$ 0.122	\$ 0.122	\$ 0.122	\$ 0.122	\$ 0.123
Annual commodity costs (for gas that Enbridge has data for) (\$000)	\$ 1,762,818	\$ 1,774,854	\$ 1,779,680	\$ 1,788,883	\$ 1,797,650
Annual commodity costs (estimate other customers) ⁴	\$ 1,462,000	\$ 1,472,479	\$ 1,469,958	\$ 1,473,729	\$ 1,477,049
Annual distribution costs (\$000) ⁵	\$ 2,193,449	\$ 2,208,275	\$ 2,271,351	\$ 2,422,542	\$ 2,451,582
Annual carbon costs (\$000) ⁶	\$ 2,202,930	\$ 2,724,157	\$ 3,242,034	\$ 3,777,393	\$ 4,308,557
Annual other gas related costs (\$000) ⁷	\$ 804,052	\$ 711,318	\$ 754,775	\$ 807,502	\$ 697,397
Total annual gas costs (for gas that Enbridge has data for) (\$000)	\$ 6,963,249	\$ 7,418,604	\$ 8,047,840	\$ 8,796,321	\$ 9,255,187

¹Annual gas volumes forecast for the province of Ontario is not available. Please refer to Exhibit I.GEC.3 for the total volume forecast for Enbridge Gas

²Total customers forecast for the province of Ontario is not available. Please refer to Exhibit I.GEC.3 for the total customer forecast for Enbridge Gas

³Estimate commodity prices are based on the Board-Approved April 2021 QRAM

⁴Estimate is calculated using direct purchase customer volumes and apply to the commodity prices equal to Enbridge system gas customers

⁵Fixed and Variable, please refer to Exhibit I.GEC.4 for the breakdown by rate class. The estimated gas cost are calculated based on the current rates and rate class structures which may change as a result of the rate harmonization effort that is currently ongoing in anticipation of filing the Rebasing application at the end of 2022.

⁶This forecast only represents customer related carbon costs as Enbridge Gas does not complete long-range volume forecasts related to our facility operations beyond 2022. Please refer to Exhibit I.Anwaatin.2 for more information on these forecasts.

⁷Other costs include transportation cost, load balancing & storage costs. Please refer to Exhibit I.GEC.4 for the breakdown by rate class

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 14; Exhibit D, Tab 1, Schedule 2

Preamble:

Problem: No incentive to maximize net benefits

- Current model: utilities profit from meeting targets, but have:
 - No profit incentive to design optimal plans that maximize net benefits
 - No profit incentive to design the most cost-effective plans possible
 - Perverse incentives to propose modest savings targets
- Utilities are incentivized to *execute* DSM plans well, but not to *design and develop* optimal DSM plans

Solution: Incentivize maximization of net benefits & optimization

- Option 1: allow \$10M incentive cap to rise if UCT net benefits rise
 - E.g., for every X% increase in net benefits over the previous year the incentive cap rises by Y%
 - E.g. hold the current ratio of net benefits to the \$10M incentive pot constant
 - Incentives would still be earned for meeting targets, but the maximum incentives (~\$10M) could increase if more net benefits are achieved via better conservation plans over time
- Option 2: pay all or a portion of incentives as a growing percent of net benefits
 - Illustrative example:
 - 0% for the first \$100 million,
 - X% for the second \$100 million,
 - Y% for the third \$100 million, etc.
- Could be implemented now, but if it isn't, it should be flagged as a priority issue for the next DSM Framework

Note that this interrogatory is also relevant to issue 8, the appropriateness of the proposed shareholder incentives.

Question(s):

- (a) Please comment on whether Enbridge would oppose option 1 and/or 2 as detailed above in relation to future DSM plans involving a potential significant increase in savings and investment levels.
- (b) If, for example, the OEB orders a 300% increase in DSM savings levels and budgets, would Enbridge believe that the incentive envelop should increase? If yes, please comment on the appropriateness of options 1 and 2 above as a means to incentivize the creation of a plan that maximizes net benefits.
- (c) Why is Enbridge moving to incentives being primarily based on first-year savings instead of lifetime savings? Please respond to the concern that this would not sufficiently incentivize Enbridge to implement longer-lived measures.

Response

- a) As outlined in Exhibit D, Tab 1, Schedule 2, the Company has proposed an Annual Net Benefits shared savings mechanism as a significant component of the overall performance governance proposal, this mechanism as outlined is similar to the Option 2 proposal put forward by GEC/ED in its September 2018 presentation at the Mid-Term Review and referenced above. As such Enbridge Gas does not oppose the inclusion of a similar shareholder incentive approach as part of the overall performance proposal. The Company notes however that the OEB's guidance has been clear that it expects "modest" and not "significant" budget increases for the next multi-year DSM Plan.
- b) Enbridge Gas notes that the hypothetical suggestion that the OEB would order a 300% increase in DSM budgets (on the order \$530 million annually) does not reflect the OEB's expectation for modest budget increases. Hypothetically however, the Company believes it may be appropriate to include an increased incentive mechanism as one part of such a hypothetical plan that could be aimed at maximizing net benefits among other goals and priorities.
- c) Please see response to Exhibit I.10.EGI.STAFF.20a.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 38

Question(s):

- (a) Does Enbridge believe it would be appropriate to calculate the UCT/PAC as a secondary measure to use as a consideration in the prioritization of measures or offerings?
- (b) Does Enbridge believe it would be appropriate to use the UCT/PAC as the main cost-effectiveness measure?
- (c) Does Enbridge believe it would be appropriate to have the option of using the UCT/PAC as a cost-effectiveness test for certain measures where there are gaps in the application of the TRC (e.g. where there are high non-energy-benefits that are difficult to quantify and variable)?

Response

- a) Enbridge Gas does not oppose calculating the PAC (UCT) as a secondary screening measure generally. Previously, the Company was expected to use the PAC test as a secondary reference tool intended to assist with prioritizing programs. However, the consideration of DSM programming in terms of prioritization requires some context. Enbridge Gas's 2023-2027 DSM plan is aimed at providing a balanced proposal based on a number of objectives and guiding principles considered and discussed in the post-2020 DSM Framework consultation. Enbridge Gas has therefore proposed a collection of scorecards with this in mind. A program by program comparison of PAC calculations does not necessarily support efforts to balance these DSM principles and prioritize varied goals.

In addition to the specified primary and secondary objectives laid out by the OEB in its December 1, 2020 DSM Letter, Enbridge Gas has summarized in the Proposed Framework (see Exhibit C, Tab1, Schedule 1, page 6 of 66), guiding principles for DSM programming based on feedback shared by interested parties at the initial stage of the consultation. These principles are comprehensive and multi-faceted

and collectively require attention to varied and sometimes competing goals. As examples, in its December 1, 2021 DSM Letter, the OEB signaled the importance of efforts that support hard to reach, small volume and low-income customers.

- b) Enbridge Gas was directed by the OEB to consider prior feedback in consideration of its new multi-year DSM application including the OEB's Mid-Term Review Report. In the Company's review, it is apparent there has been little feedback on the PAC screening test, with no parties indicating an interest to switch to a PAC as the primary cost-effectiveness screening test. However, in its December 1, 2021 DSM Letter the OEB outlined it "expects that all programs continue to be cost-effective as defined in the Mid-Term Review Report."¹ Enbridge Gas has followed this direction in applying a cost-effectiveness test as outlined by the OEB in that report which detailed revisions to the approach originally laid at in the 2015-2020 DSM Framework. The updated TRC-Plus test is an enhanced TRC test (more akin to a Societal Cost Test (SCT)), which now includes both a 15% non-energy adder as well as a cost of carbon.
- c) Enbridge Gas believes a single, consistent cost-effectiveness screening test remains the most appropriate. The current enhanced TRC-Plus test measures the energy related benefits and costs of DSM programs experienced by both the gas utility system and program participant and includes a societal perspective. The TRC/SCT screening test has historically been supported by most interested parties and remains most prevalent upon review of other jurisdictions. Of note however, as a methodology to assess cost-effectiveness, often the application of the test is undertaken at the portfolio level, not the program level. This approach would be supported by the Company.

¹ EB-2019-0003, OEB Letter Post-2020 Natural Gas Demand Side Management Framework (December 1, 2020), p. 4.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 39

Preamble:

Enbridge states the following in relation to the TRC: “Under this test, benefits are driven by avoided resource costs, which are based on the marginal costs avoided by not producing and delivering the next unit of natural gas to the customer. Those marginal costs avoided include the natural gas commodity costs (both system and customer) and transmission and distribution system costs (e.g., pipes, storage, etc.).”

Question:

(a) Please provide a table showing Enbridge’s avoided cost figures for “transmission and distribution system costs (e.g., pipes, storage, etc.)” as described in the above passage.

Response

Please see response to Exhibit I.5.EGI.ED.2b.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 48

Preamble:

Enbridge states:

“Assumptions relating to the benefit of not having to supply an extra unit of natural gas or other resource (e.g., electricity, heating fuel oil, propane, or water) through the delivery of DSM programs are referred to as avoided costs. Avoided costs are required to quantify the benefits for the TRC-plus test.

Avoided costs are long-term estimates forecasted over the lifetime of DSM measures and include:

- Avoided natural gas commodity costs
- Avoided natural gas upstream transportation and third-party services costs
- Avoided natural gas seasonal storage requirement costs.
- Avoided unaccounted for natural gas fuel losses
- Avoided natural gas downstream infrastructure costs¹
- Avoided costs, other resources (electricity, heating fuel oil, propane, and/or water)
- Avoided carbon costs”

Note that this question is also relevant to a number of other issues, including issue 13 (appropriateness of avoided cost input assumptions) and 10 (optimal suite of program offerings). Please feel free to move it to a different section of the interrogatory responses. This information is also important to promote consistency between intervenor evidence and Enbridge’s evidence.

¹ [Footnote 61] “For DSM this reflects passive avoided distribution costs driven by broad-based DSM programs, rather than active/geo-targeted avoided distribution costs unique to a specific initiative.”

Question(s):

- (a) Please provide a live excel spreadsheet (or spreadsheets) containing a full breakout of all of the prices and inputs for the avoided cost calculations underlying Enbridge's application (e.g. $\$/m^3$, $\$/kWh$, etc.).
- (b) For each of the avoided cost categories listed above, please indicate the approximate date that the forecast of future costs was made.
- (c) Please provide a table (ideally as an excel spreadsheet) showing the forecast carbon price for avoided carbon costs for each year both as $\$/tonne CO_2e$ and as $\$/m^3$ of gas.
- (d) Please describe the rationale for Enbridge's forecast avoided carbon price in 2031 and beyond.
- (e) Please provide a table (ideally as an excel spreadsheet) showing the forecast electricity prices for avoided electricity costs.
- (f) Please describe the basis used by Enbridge to forecast electricity prices for the purposes of avoided electricity costs.
- (g) Please describe the degree to which and why avoided gas costs in the TRC calculations differ from the rates appearing on customer bills. Please compare the avoided gas costs with the rates from a typical bill.
- (h) Please describe the degree to which and why avoided electricity costs in the TRC calculations differ from the rates appearing on customer bills. Please compare the avoided gas costs with the rates from a typical bill.
- (i) With respect to electricity price forecasts and avoided costs: (i) Does Enbridge differentiate between peak and off-peak times? (ii) Does Enbridge differentiate between energy ($\$/kWh$) and capacity costs ($\$/kW$)? For each, please explain the rationale.
- (j) If a measure would decrease gas consumption but cause somewhat of an increase in electricity consumption (e.g. a custom commercial or industrial project), how would Enbridge calculate the cost impact of the increased electricity consumption (e.g. for cost-effectiveness calculations or otherwise)? Would Enbridge use the same electricity price forecasts for this purpose as it uses to measure the value of electricity consumption reductions (e.g. from more electrically efficient gas furnace blowers)?

Response

- a) Please see Attachment 1 for the EGD rate zone 2021 avoided cost workbook.
Please see Attachment 2 for the Union rate zones 2021 avoided cost workbook.

Within the “Avoided DS Infrastructure” tab in Attachment 1, an Avoided Distribution Cost study is referenced. This study is provided at Attachment 3.

Within the “Avoided DS Infrastructure” tab in Attachment 2, an Avoided Local Distribution System Infrastructure Costs study is referenced. This study is provided at Attachment 4.

- b) Please refer to “Summary of Updates” tabs in Attachment 1 and Attachment 2.
- c) Please refer to “Avoided Carbon” tabs in Attachment 1 and Attachment 2.
- d) Federal Carbon Charge projections provided by the federal government end in 2030. For avoided carbon costs for 2031 and beyond, as there is no specified federal price beyond this date, Enbridge Gas increased the 2030 avoided carbon costs annually by inflation. The inflation rate used follows the description outlined at Exhibit C, Tab 1, Schedule 1, page 48, section 11.1, which was 2.0% for the 2021 avoided costs.
- e) Please refer to “Avoided Electricity” tabs in Attachment 1 and Attachment 2.
- f) First year avoided electricity costs are based on the IESO’s year-to-date weighted average wholesale rate. For the 2021 avoided costs specifically (as shown at Exhibit E, Tab 5, Schedule 1, Attachment 3, page 2), the rate used is from the IESO October 2020 Monthly Market Report, generated in December 2020. Avoided electricity costs are increased by inflation annually (including for the first year). The inflation rate of 2.0% used for the avoided costs filed in the evidence follows the description outlined at Exhibit C, Tab 1, Schedule 1, page 48, section 11.1.
- g) Benefits for the TRC-Plus calculation are based on the avoided cost of not producing and delivering the next unit of a resource (i.e. the marginal throughput-variable cost). Rates on a customer bill will differ as they are the costs from the customer perspective, and are not the necessarily the marginal cost to the system.

By way of example, the 2021 first year baseload avoided gas cost used for TRC-Plus purposes are:

- \$0.148 per m³ for the EGD rate zone (Exhibit E, Tab 5, Schedule 1, Attachment 3, page 2); and
- \$0.130 per m³ for the Union rate zones (Exhibit E, Tab 5, Schedule 1, Attachment 3, page 4).

The 2021 average volumetric unit rate for a typical residential customer (including commodity and delivery charges but excluding the Federal Carbon Charge) are:

- \$0.24 per m³ for a Rate 1 customer in the EGD rate zone
- \$0.20 per m³ for a Rate M1 customer in the Union South rate zone
- \$0.30 per m³ for a Rate 01 customer in the Union North rate zone

Please see response to Exhibit I.5.EGI.ED.12, Attachment 1 for further details.

- h) See response to part g) for why avoided costs in TRC-Plus calculations differ from the rates appearing on customer bills. However, as discussed in parts f) and i), Enbridge Gas's electricity avoided costs are not developed by the utility and are established in a simplified manner to avoid burdensome complexity. By way of example, the 2021 first year avoided electricity cost used for TRC-Plus purposes is \$0.151 per kWh for both the EGD rate zone (Exhibit E, Tab 5, Schedule 1, Attachment 3, page 2) and the Union rate zones (Exhibit E, Tab 5, Schedule 1, Attachment 3, page 4).

A typical residential bill is much more complex than just kWh. For example, customers currently have an option to choose time of use ("TOU") or Tiered rates and these vary winter to summer. For the current winter rates, TOU off-peak rates are \$0.082/kWh, mid-peak are \$0.113/kWh and on-peak are \$0.17/kWh while tiered rates are \$0.098/kWh for up to 1,000 kWh and \$0.115/kWh for more than 1,000 kWh. In addition, there are changes by each local LDC. For example, Toronto Hydro residential rates also contain, delivery charges, regulatory charges and additional charges. Some of these components are fixed charges and some are variable by kWh.

- i) Enbridge Gas uses annual electricity savings (kWh) for its TRC calculations, rather than peak and off-peak savings or capacity cost savings (kW).

Electricity savings contribute approximately 10% to Enbridge Gas's total TRC benefits. Differentiating between peak and off-peak electricity savings and incorporating capacity savings would add complexity to both the development of avoided electricity cost assumptions and the estimation of electricity savings. Adding this level of complexity is not expected to materially impact the cost effectiveness of Enbridge Gas's DSM offerings and programs.

- j) Confirmed. In this scenario, Enbridge Gas would calculate increased electricity costs over the lifetime of the measure in the same way it would calculate avoided electricity costs, but the value would be negative and would appear as a negative benefit in cost effectiveness calculations. The same avoided electricity cost table would be used regardless of whether electricity consumption increases or is reduced.

2021 Avoided Costs - EGD Rate Zone (updated Mar 22, 2021)

Inflation Factor	2.00%
Discount Rate	6.08%

Gas Avoided Costs (\$/m3)				
Year	Baseload		Weather Sensitive	
	Rate	NPV	Rate	NPV
2021	0.148	0.148	0.160	0.160
2022	0.178	0.316	0.197	0.346
2023	0.160	0.458	0.190	0.515
2024	0.152	0.585	0.182	0.668
2025	0.185	0.731	0.216	0.838
2026	0.187	0.870	0.219	1.002
2027	0.186	1.001	0.219	1.155
2028	0.203	1.135	0.236	1.312
2029	0.211	1.266	0.245	1.464
2030	0.220	1.395	0.255	1.614
2031	0.240	1.529	0.276	1.767
2032	0.253	1.661	0.290	1.918
2033	0.261	1.790	0.298	2.065
2034	0.282	1.921	0.320	2.213
2035	0.286	2.046	0.324	2.355
2036	0.275	2.159	0.314	2.485
2037	0.299	2.275	0.339	2.617
2038	0.332	2.397	0.372	2.753
2039	0.337	2.513	0.378	2.884
2040	0.340	2.624	0.382	3.008
2041	0.342	2.729	0.386	3.127
2042	0.328	2.824	0.372	3.235
2043	0.336	2.916	0.381	3.339
2044	0.366	3.010	0.412	3.445
2045	0.398	3.107	0.445	3.553
2046	0.413	3.201	0.461	3.658
2047	0.429	3.293	0.478	3.761
2048	0.445	3.384	0.495	3.862
2049	0.462	3.472	0.513	3.960
2050	0.480	3.559	0.532	4.056

Avoided Carbon Costs (\$/m3)		
Year	Rate	NPV
2021	0.078	0.078
2022	0.098	0.171
2023	0.127	0.284
2024	0.157	0.415
2025	0.186	0.562
2026	0.216	0.722
2027	0.245	0.894
2028	0.274	1.076
2029	0.304	1.265
2030	0.333	1.461
2031	0.340	1.649
2032	0.347	1.830
2033	0.353	2.004
2034	0.361	2.172
2035	0.368	2.333
2036	0.375	2.488
2037	0.383	2.636
2038	0.390	2.779
2039	0.398	2.917
2040	0.406	3.049
2041	0.414	3.177
2042	0.422	3.299
2043	0.431	3.416
2044	0.440	3.530
2045	0.448	3.638
2046	0.457	3.743
2047	0.466	3.843
2048	0.476	3.940
2049	0.485	4.033
2050	0.495	4.122

Water Avoided Costs (\$/m3)		
Year	Rate	NPV
2021	0.994	0.994
2022	1.014	1.950
2023	1.034	2.869
2024	1.055	3.753
2025	1.076	4.603
2026	1.098	5.420
2027	1.120	6.206
2028	1.142	6.962
2029	1.165	7.688
2030	1.188	8.387
2031	1.212	9.058
2032	1.236	9.704
2033	1.261	10.325
2034	1.286	10.922
2035	1.312	11.496
2036	1.338	12.048
2037	1.365	12.579
2038	1.392	13.090
2039	1.420	13.580
2040	1.448	14.052
2041	1.477	14.506
2042	1.507	14.942
2043	1.537	15.362
2044	1.568	15.765
2045	1.599	16.153
2046	1.631	16.526
2047	1.664	16.885
2048	1.697	17.229
2049	1.731	17.561
30	1.766	17.880

Electricity Avoided Costs (\$/KWh)		
Year	Rate	NPV
2021	0.151	0.151
2022	0.154	0.296
2023	0.157	0.435
2024	0.160	0.569
2025	0.163	0.698
2026	0.167	0.822
2027	0.170	0.941
2028	0.173	1.056
2029	0.177	1.166
2030	0.180	1.272
2031	0.184	1.374
2032	0.188	1.472
2033	0.191	1.566
2034	0.195	1.657
2035	0.199	1.744
2036	0.203	1.828
2037	0.207	1.908
2038	0.211	1.985
2039	0.215	2.060
2040	0.220	2.131
2041	0.224	2.200
2042	0.229	2.267
2043	0.233	2.330
2044	0.238	2.391
2045	0.243	2.450
2046	0.247	2.507
2047	0.252	2.561
2048	0.257	2.613
2049	0.263	2.664
2050	0.268	2.712

Notes:

- 1- Non-energy Benefits Adder is not added in the avoided costs. Its needs to be incorporated into TRC-Plus calculation.
- 2- For actual cost effectiveness tests, Avoided Carbon costs are weighted based on Rate Class (as show in the Table A below) of the customer.
- 3- For forecasting cost effectiveness, Avoided Carbon costs are weighted based on Market Segment (as show in the Table B below) of the customer.

Rate Class	% Subject to Carbon Charge
1	100.0%
6	96.3%
9	-
100	59.1%
110	74.2%
115	9.4%
125	0.0%
135	100.0%
145	75.0%
170	21.6%
200	0.0%
300	0.0%

Market Segment for Forecasting	Weighted % Subject to Carbon Charge	% Subject to Carbon Charge Min	% Subject to Carbon Charge Max
Residential	100.0%	100.0%	100.0%
Commercial/Industrial	83.9%	9.4%	100.0%

Year one of the Avoided Costs table	2021
Inflation Factor	2.00%
Discount Rate	6.08%
U.S. \$ to Canadian \$ Exchange Rate	1.3
GJ/m3 Natural Gas Conversion Factor	0.03888
MMBtu/m3 Natural Gas Conversion Factor	0.03685

GDP IPI FDD four quarter moving average updated Sep 2, 2020

Exchange rate provided by Financial Forecasting Group
Heat rate provided by Gas Supply

Summary of Updates	
Avoided Cost Component	Updated
Inflation Factor	Sep 2020
SENDOUT Report	Mar 2021
ICF Natural Gas Strategic Prices	Q3 2020
Avoided Downstream Infrastructure Costs	Various, last update Dec 2020
Avoided Unaccounted for Fuel Losses	Dec 2020
Avoided Cost of Carbon	Mar 2021
Water Avoided Costs	Dec 2020
Electricity Avoided Costs	Dec 2020

DSM Volumes - 2018 Post-Audit Results	
Load Type	Net Annual Natural Gas Savings (m3)
Weather Sensitive (Space Heating)	26,751,126
Baseload (Water Heating and Industrial)	15,637,442
Total	42,388,568

SENDOUT Report				
Next Generation Version				
Volumes and Total Costs, 2021 - 2023				
	Col. 1	Col. 2	Col. 3	
<u>Item No.</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	
Base Case				
1	Demand (10 6 m3)	12,163	12,201	12,232
2	Total Cost (\$000)	1,492,033	1,760,983	1,702,908
3				
	Average Cost (\$/10 3m3)			
	Seasonal Cost (\$/103m3)	123	144	139
Decrement in Baseload				
4	Demand Reduction (10 6 m3)	16	16	16
5	Total Cost (\$000)	1,489,791	1,758,267	1,700,479
6				
	Unit Avoided Gas Cost (\$/10 3m3)			
	Unit Avoided Seasonal Gas Cost (\$/103m3)	143	174	155
Decrement in Weather Sensitive				
7	Demand Reduction (10 6 m3)	27	27	27
8	Total Cost (\$000)	1,488,181	1,756,150	1,698,260
9				
	Unit Avoided Gas Cost (\$/10 3m3)			
	Unit Avoided Seasonal Gas Cost (\$/103m3)	144	181	174

Updated March 2021

Avoided Gas Commodity, and Upstream Transmission/Storage Costs		
Year	Base Load \$/m3	Weather Sensitive \$/m3
2021	0.143	0.144
2022	0.174	0.181
2023	0.155	0.174
2024	0.147	0.166
2025	0.180	0.199
2026	0.182	0.202
2027	0.181	0.201
2028	0.198	0.218
2029	0.205	0.226
2030	0.214	0.236
2031	0.235	0.256
2032	0.248	0.270
2033	0.255	0.278
2034	0.276	0.299
2035	0.280	0.303
2036	0.268	0.292
2037	0.292	0.317
2038	0.325	0.350
2039	0.330	0.355
2040	0.333	0.359
2041	0.336	0.362
2042	0.321	0.348
2043	0.329	0.356
2044	0.359	0.387
2045	0.390	0.419
2046	0.405	0.434
2047	0.421	0.451
2048	0.437	0.467
2049	0.454	0.485
2050	0.472	0.503

Sendout gas costs adjusted by inflation and ICF Q3 2020 Natural Gas Strategic Gas Prices beyond year 2023

Levelized Distribution Cost for Baseload \$/m3 ¹				0.00379
Levelized Distribution Cost for Weather Sensitive \$/m3 ¹				0.01396
Year of Study				2015
Avoided Seasonal Storage Costs at Dawn for Baseload \$/GJ				-
Avoided Seasonal Storage Costs at Dawn for Weather Sensitive \$/GJ				-
Year of Study				-
Avoided Downstream Infrastructure Costs				
	Distribution		Seasonal Storage at Dawn	
Year	Baseload \$/m3	Weather Sensitive \$/m3	Baseload \$/m3	Weather Sensitive \$/m3
2021	0.004	0.016	-	-
2022	0.004	0.016	-	-
2023	0.004	0.016	-	-
2024	0.005	0.017	-	-
2025	0.005	0.017	-	-
2026	0.005	0.017	-	-
2027	0.005	0.018	-	-
2028	0.005	0.018	-	-
2029	0.005	0.018	-	-
2030	0.005	0.019	-	-
2031	0.005	0.019	-	-
2032	0.005	0.020	-	-
2033	0.005	0.020	-	-
2034	0.006	0.020	-	-
2035	0.006	0.021	-	-
2036	0.006	0.021	-	-
2037	0.006	0.022	-	-
2038	0.006	0.022	-	-
2039	0.006	0.022	-	-
2040	0.006	0.023	-	-
2041	0.006	0.023	-	-
2042	0.006	0.024	-	-
2043	0.007	0.024	-	-
2044	0.007	0.025	-	-
2045	0.007	0.025	-	-
2046	0.007	0.026	-	-
2047	0.007	0.026	-	-
2048	0.007	0.027	-	-
2049	0.007	0.027	-	-
2050	0.008	0.028	-	-

Avoided Distribution Costs by Navigant dated Dec 2015 p. 26

Avoided Distribution Costs by Navigant dated Dec 2015 p. 26

Update Dec 2020

¹ The derivation of the avoided distribution costs is based on a proprietary model

Unaccounted for Fuel Loss Rate		0.162%
Avoided Unaccounted for Fuel Losses		
Year	Baseload \$/m3	Weather Sensitive \$/m3
2021	0.00023	0.00023
2022	0.00028	0.00029
2023	0.00025	0.00028
2024	0.00024	0.00027
2025	0.00029	0.00032
2026	0.00029	0.00033
2027	0.00029	0.00033
2028	0.00032	0.00035
2029	0.00033	0.00037
2030	0.00035	0.00038
2031	0.00038	0.00042
2032	0.00040	0.00044
2033	0.00041	0.00045
2034	0.00045	0.00048
2035	0.00045	0.00049
2036	0.00043	0.00047
2037	0.00047	0.00051
2038	0.00053	0.00057
2039	0.00053	0.00058
2040	0.00054	0.00058
2041	0.00054	0.00059
2042	0.00052	0.00056
2043	0.00053	0.00058
2044	0.00058	0.00063
2045	0.00063	0.00068
2046	0.00066	0.00070
2047	0.00068	0.00073
2048	0.00071	0.00076
2049	0.00074	0.00079
2050	0.00076	0.00082

UG rate zone number is used for EGD rate zone as well. This rate is updated in each years annual rates application. The rate for 2020, 0.162%, was approved in EB-2019-0194 Decision and Order, Dec. 5, 2019.

Updated Dec 2020

Aoided Cost of Carbon		
Year	\$/tCO2e	Cost of Carbon (\$/m3)
2021	40	0.078
2022	50	0.098
2023	65	0.127
2024	80	0.157
2025	95	0.186
2026	110	0.216
2027	125	0.245
2028	140	0.274
2029	155	0.304
2030	170	0.333
2031	173	0.340
2032	177	0.347
2033	180	0.353
2034	184	0.361
2035	188	0.368
2036	191	0.375
2037	195	0.383
2038	199	0.390
2039	203	0.398
2040	207	0.406
2041	211	0.414
2042	216	0.422
2043	220	0.431
2044	224	0.440
2045	229	0.448
2046	233	0.457
2047	238	0.466
2048	243	0.476
2049	248	0.485
2050	253	0.495

Assumptions:
 1-No change in conversion from \$/tCO2e to cents/m3 from 2019-2022 to 2023-2030
 2- Increase in cost of carbon beyond 2030 as per inflation
 3-Weighted application of carbon price across Res/Com and Ind sectors

Updated March 2021

<https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/fcrates/fuel-charge-rates.html>

<https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information/federal-benchmark-2023-2030.html>

Filed: 2020-12-08
EB-2020-0212
Exhibit IEP 3
Attachment 1
Page 1 of 2

Enbridge Gas Inc.
EGD Rate Zone
Updated Exhibit B, Tab 1, Schedule 1
2021 Customer-Related Volumes by Rate Class (April 2021 to March 2022)
(10³m³)

Line No.	Rate Class	Forecast Volumes ¹	Col. 2 OBPS Participant & Other Exempt Volumes ²	Col. 3 (Col. 1 - Col. 2) Net Volumes	% subject to Carbon Charge
2	6	4,903,468	#####	4,723,930	96%
3	9	-	-	-	-
4	100	33,431	#####	19,771	59%
5	110	957,019	#####	709,936	74%
6	115	469,919	#####	44,317	9%
7	126 ³	560,000	#####	-	0%
8	135	61,643	-	61,643	100%
9	145	27,157	6,780	20,377	75%
10	170	267,329	#####	57,638	22%
11	200 ⁴	181,853	#####	-	0%
12	300	-	-	-	-
13	Total Customer-Related	12,578,074	#####	10,753,413	

Notes:
 (1) Forecast Volumes after DSM from April 1, 2021 to March 31, 2022.
 (2) Estimated forecast volumes for mandatory and voluntary participants in the Output Based Pricing System (OBPS), volumes qualifying for exemption for non-covered activities and partial relief (80%) for greenhouse operators.
 (3) Dedicated unbundled customers.
 (4) Includes volumes delivered to downstream distributors and landfill gas.

Rate Class for Forecasting		
	Residential	Commercial/Industrial
	1	6
Weighted % Subject to Carbon Charge	100.0%	83.9%
Min	100.0%	9.4%
Max	100.0%	100.0%

Step 1 - Update the population in each sample municipality and calculate their relative within each region
Population is based on the 2016 Census

		Population	Regional Total Population	Weighting within each region
Niagara	Niagara Falls	88,071	221,184	40%
	St. Catharines	133,113		60%
York	Richmond Hill	195,022	830,221	23%
	Vaughan	306,233		37%
	Markham	328,966		40%
Toronto	Toronto	2,731,571	2,731,571	100%
Ottawa	Ottawa	934,243	934,243	100%
Total		4,717,219		

Tip: Confirm the above municipalities represent the majority of the population in each region.

Step 2 - Determine the retail rates for water and waste water in each municipality
 Note: Many municipalities only report the combined retail rate, rather than separate rates for water and waste water

EXAMPLE: 2020				
		Water (\$ / 1000 l)	Waste Water (\$ / 1000 l)	Combined Rate
Niagara	Niagara Falls	1.104	1.2280	2.3320
	St. Catharines	1.352	2.0050	3.3570
York	Richmond Hill	n/a	n/a	4.7424
	Vaughan	2.0725	2.4957	4.5682
	Markham	n/a	n/a	4.4680
Toronto	Toronto	n/a	n/a	4.0735
Ottawa	Ottawa - Tier 1	0.83	0.75	1.5800
	Ottawa - Tier 2	1.65	1.49	3.1400
	Ottawa - Tier 3	1.82	1.65	3.4700
	Ottawa - Tier 4	2.03	1.85	3.8800

	Regional Retail Rate	Discounted by a Factor of 4	Regional Weighting	Avoided Cost by Region Weight
Niagara	2.95	0.74	5%	0.03
York	4.57	1.14	18%	0.20
Toronto	4.07	1.02	58%	0.59
Ottawa	3.02	0.75	20%	0.15

Avoided Cost of Water \$/m3		0.974727
-----------------------------	--	----------

Avoided water rate is calculated by discounting retail rate to 25% based on 2015 audit finding.

Ottawa has a new tiered system for water rates as of 2019. The rate includes water and wastewater together.

Tier 1 - 0 to 6^{m3}
 Tier 2 - 6^{m3} to 25^{m3}
 Tier 3 - 25^{m3} to 180^{m3}
 Tier 4 - 180^{m3}

Water Avoided Costs	
Year	\$/m3
2021	0.994
2022	1.014
2023	1.034
2024	1.055
2025	1.076
2026	1.098
2027	1.120
2028	1.142
2029	1.165
2030	1.188
2031	1.212
2032	1.236
2033	1.261
2034	1.286
2035	1.312
2036	1.338
2037	1.365
2038	1.392
2039	1.420
2040	1.448
2041	1.477
2042	1.507
2043	1.537
2044	1.568
2045	1.599
2046	1.631
2047	1.664
2048	1.697
2049	1.731
2050	1.766

Updated December 2020

IESO Wholesale Weighted Average Year to Date Rate \$/MWh	147.85
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IESO Monthly Market Report October 2020, accessed Dec 2020

Electricity Avoided Costs	
Year	\$/KWh
2021	0.151
2022	0.154
2023	0.157
2024	0.160
2025	0.163
2026	0.167
2027	0.170
2028	0.173
2029	0.177
2030	0.180
2031	0.184
2032	0.188
2033	0.191
2034	0.195
2035	0.199
2036	0.203
2037	0.207
2038	0.211
2039	0.215
2040	0.220
2041	0.224
2042	0.229
2043	0.233
2044	0.238
2045	0.243
2046	0.247
2047	0.252
2048	0.257
2049	0.263
2050	0.268

Updated Dec 2020

2021 Avoided Costs - UG Rate Zone (updated Mar 11, 2021)

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGI.ED.16, Attachment 2

Inflation Factor	2.00%
Discount Rate	6.08%

Gas Avoided Costs (\$/m3)				
Year	Baseload		Weather Sensitive	
	Rate	NPV	Rate	NPV
2021	0.130	0.130	0.173	0.173
2022	0.127	0.249	0.176	0.339
2023	0.131	0.366	0.179	0.498
2024	0.122	0.468	0.171	0.641
2025	0.159	0.594	0.208	0.806
2026	0.165	0.717	0.216	0.966
2027	0.163	0.831	0.214	1.117
2028	0.182	0.951	0.234	1.272
2029	0.193	1.072	0.246	1.425
2030	0.198	1.188	0.253	1.574
2031	0.218	1.309	0.274	1.726
2032	0.234	1.431	0.291	1.878
2033	0.238	1.549	0.296	2.024
2034	0.259	1.669	0.319	2.172
2035	0.265	1.785	0.325	2.314
2036	0.250	1.888	0.311	2.442
2037	0.270	1.993	0.333	2.572
2038	0.306	2.105	0.370	2.707
2039	0.311	2.213	0.376	2.837
2040	0.312	2.314	0.379	2.961
2041	0.313	2.410	0.381	3.078
2042	0.295	2.496	0.364	3.183
2043	0.299	2.578	0.370	3.284
2044	0.329	2.662	0.401	3.387
2045	0.359	2.749	0.432	3.492
2046	0.371	2.834	0.446	3.594
2047	0.384	2.917	0.460	3.693
2048	0.397	2.997	0.475	3.790
2049	0.411	3.076	0.491	3.884
2050	0.425	3.153	0.507	3.975

Avoided Carbon Costs (\$/m3)		
Year	Rate	NPV
2021	0.078	0.078
2022	0.098	0.171
2023	0.127	0.284
2024	0.157	0.415
2025	0.186	0.562
2026	0.216	0.722
2027	0.245	0.894
2028	0.274	1.076
2029	0.304	1.265
2030	0.333	1.461
2031	0.340	1.649
2032	0.347	1.830
2033	0.353	2.004
2034	0.361	2.172
2035	0.368	2.333
2036	0.375	2.488
2037	0.383	2.636
2038	0.390	2.779
2039	0.398	2.917
2040	0.406	3.049
2041	0.414	3.177
2042	0.422	3.299
2043	0.431	3.416
2044	0.440	3.530
2045	0.448	3.638
2046	0.457	3.743
2047	0.466	3.843
2048	0.476	3.940
2049	0.485	4.033
2050	0.495	4.122

Water Avoided Costs (\$/m3)		
Year	Rate	NPV
2021	0.882	0.882
2022	0.899	1.730
2023	0.917	2.545
2024	0.936	3.329
2025	0.955	4.083
2026	0.974	4.808
2027	0.993	5.505
2028	1.013	6.175
2029	1.033	6.819
2030	1.054	7.439
2031	1.075	8.034
2032	1.096	8.607
2033	1.118	9.158
2034	1.141	9.688
2035	1.164	10.197
2036	1.187	10.687
2037	1.211	11.157
2038	1.235	11.610
2039	1.260	12.045
2040	1.285	12.464
2041	1.310	12.867
2042	1.337	13.253
2043	1.363	13.626
2044	1.391	13.983
2045	1.418	14.327
2046	1.447	14.658
2047	1.476	14.976
2048	1.505	15.282
2049	1.535	15.576
2050	1.566	15.859

Electricity Avoided Costs (\$/KWh)		
Year	Rate	NPV
2021	0.151	0.151
2022	0.154	0.296
2023	0.157	0.435
2024	0.160	0.569
2025	0.163	0.698
2026	0.167	0.822
2027	0.170	0.941
2028	0.173	1.056
2029	0.177	1.166
2030	0.180	1.272
2031	0.184	1.374
2032	0.188	1.472
2033	0.191	1.566
2034	0.195	1.657
2035	0.199	1.744
2036	0.203	1.828
2037	0.207	1.908
2038	0.211	1.985
2039	0.215	2.060
2040	0.220	2.131
2041	0.224	2.200
2042	0.229	2.267
2043	0.233	2.330
2044	0.238	2.391
2045	0.243	2.450
2046	0.247	2.507
2047	0.252	2.561
2048	0.257	2.613
2049	0.263	2.664
2050	0.268	2.712

Notes:

- 1- Non-energy Benefits Adder is not added in the avoided costs. Its needs to be incorporated into TRC-Plus calculation.
- 2- For actual cost effectiveness tests, Avoided Carbon costs are weighted based on Rate Class (as show in the Table A below) of the customer.
- 3- For forecasting cost effectiveness, Avoided Carbon costs are weighted based on Market Segment (as show in the Table B below) of the customer.

Rate Class	% Subject to Carbon Charge
1	100.0%
10	98.0%
M1	100.0%
M2	93.2%
20	19.7%
25	13.8%
100	0.0%
M4	61.9%
M5	73.2%
M7	25.1%
M9	0.0%
M10	85.7%
T1	29.4%
T2	0.0%
T3	0.0%

Market Segment for Forecasting	Weighted % Subject to Carbon Charge	% Subject to Carbon Charge Min	% Subject to Carbon Charge Max
	Residential	100.0%	100.0%
Commercial/Industrial	69.2%	25.1%	98.0%
Large Volume	0.0%	0.0%	0.0%

Year one of the Avoided Costs table	2021
Inflation Factor	2.00%
Discount Rate	6.08%
U.S. \$ to Canadian \$ Exchange Rate	1.3
GJ/m ³ Natural Gas Conversion Factor	0.03928
MMBtu/m ³ Natural Gas Conversion Factor	0.03723

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGI.ED.16, Attachment :

GDP IPI FDD four quarter moving average updated Sep 2, 2020

Exchange rate provided by Financial Forecasting Group
Heat rate provided by Gas Supply

Summary of Updates	
Avoided Cost Component	Updated
Inflation Factor	Sep 2020
SENDOUT Report	Mar 2021
ICF Natural Gas Strategic Prices	Q3 2020
Avoided Downstream Infrastructure Costs	Various, last update Dec 2020
Avoided Unaccounted for Fuel Losses	Dec 2020
Avoided Cost of Carbon	Mar 2021
Water Avoided Costs	Dec 2020
Electricity Avoided Costs	Dec 2020

DSM Volumes - 2018 Post-Audit Results		Net Annual Natural Gas Savings (m3)	SENDOUT Report			Avoided Gas Commodity, and Upstream Transmission/Storage Costs		
Summary by LRAM Rate Class			Volumes and Total Costs, 2021 - 2023			Year	Base Load \$/m3	Weather Sensitive \$/m3
			Col. 1	Col. 2	Col. 3			
M1 South Residential	8,556,037	Next Generation Version				2021	0.118	0.122
M1 South Commercial	4,818,322					2022	0.115	0.124
M1 South Industrial	666,269					2023	0.120	0.126
M2 South Commercial	7,014,347	Item No.	<u>2021</u>	<u>2022</u>	<u>2023</u>	2024	0.110	0.117
M2 South Industrial	2,095,779					2025	0.146	0.153
M4 South Industrial	19,330,137	Base Case				2026	0.153	0.160
M5 South Industrial	700,494	1 Demand (10 6 m3)	5,122	5,165	5,172	2027	0.150	0.157
M7 South Industrial	6,032,908	2 Total Cost (\$000)	691,866	721,468	738,074	2028	0.168	0.176
T1 South Industrial	2,325,576					2029	0.179	0.187
T2 South Industrial	7,510,553	3 Average Cost (\$/10 3m3)				2030	0.184	0.192
South Total	59,050,422	Seasonal Cost (\$/103m3)	135	140	143	2031	0.204	0.212
01 North Residential	1,011,053					2032	0.220	0.228
01 North Commercial	1,318,160	Decrement in Baseload				2033	0.224	0.232
10 North Commercial	1,517,635	4 Demand Reduction (10 6 m3)	6	6	6	2034	0.244	0.253
10 North Industrial	115,665	5 Total Cost (\$000)	691,159	720,787	737,366	2035	0.249	0.258
20 North Industrial	2,565,182					2036	0.234	0.243
100 North Industrial	545,191	6 Unit Avoided Gas Cost (\$/10 3m3)				2037	0.254	0.263
North Total	7,072,886	Unit Avoided Seasonal Gas Cost (\$/103m3)	118	115	120	2038	0.289	0.298
						2039	0.294	0.303
Industrial		Decrement in Weather Sensitive				2040	0.295	0.305
North	3,110,373	7 Demand Reduction (10 6 m3)	12	12	12	2041	0.296	0.305
South	35,899,668	8 Total Cost (\$000)	690,352	719,922	736,506	2042	0.278	0.287
						2043	0.282	0.291
		9 Unit Avoided Gas Cost (\$/10 3m3)				2044	0.310	0.320
		Unit Avoided Seasonal Gas Cost (\$/103m3)	122	124	126	2045	0.340	0.350
						2046	0.352	0.362
						2047	0.365	0.375
		Updated March 2021				2048	0.378	0.388
						2049	0.391	0.402
						2050	0.405	0.416
						Sendout gas costs adjusted by inflation and ICF Q3 2020 Natural Gas Strategic Gas Prices beyond year 2023		

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGI.ED.16, Attachment 2

Levelized Distribution Cost for Baseload \$/m3 ¹	0.01060
Levelized Distribution Cost for Weather Sensitive \$/m3 ¹	0.04524
Year of Study	2018
Avoided Seasonal Storage Costs at Dawn for Baseload \$/GJ	-
Avoided Seasonal Storage Costs at Dawn for Weather Sensitive \$/GJ	0.057
Year of Study	2014

Assessment of Union Gas Avoided Local Distribution System Infrastructure Costs by ICF dated June 2018 p. 35
 Assessment of Union Gas Avoided Local Distribution System Infrastructure Costs by ICF dated June 2018 p. 35

Rebasing Application Rate Order - Appendix B. Storage Charge from Rate M1 Rate Schedule: EB-2011-0210

Avoided Downstream Infrastructure Costs				
Year	Distribution		Seasonal Storage at Dawn	
	Baseload \$/m3	Weather Sensitive \$/m3	Baseload \$/m3	Weather Sensitive \$/m3
2021	0.011	0.048	-	0.003
2022	0.011	0.049	-	0.003
2023	0.012	0.050	-	0.003
2024	0.012	0.051	-	0.003
2025	0.012	0.052	-	0.003
2026	0.012	0.053	-	0.003
2027	0.013	0.054	-	0.003
2028	0.013	0.055	-	0.003
2029	0.013	0.056	-	0.003
2030	0.013	0.057	-	0.003
2031	0.014	0.059	-	0.003
2032	0.014	0.060	-	0.003
2033	0.014	0.061	-	0.003
2034	0.015	0.062	-	0.003
2035	0.015	0.063	-	0.003
2036	0.015	0.065	-	0.003
2037	0.015	0.066	-	0.004
2038	0.016	0.067	-	0.004
2039	0.016	0.069	-	0.004
2040	0.016	0.070	-	0.004
2041	0.017	0.071	-	0.004
2042	0.017	0.073	-	0.004
2043	0.017	0.074	-	0.004
2044	0.018	0.076	-	0.004
2045	0.018	0.077	-	0.004
2046	0.018	0.079	-	0.004
2047	0.019	0.080	-	0.004
2048	0.019	0.082	-	0.004
2049	0.020	0.084	-	0.004
2050	0.020	0.085	-	0.005

Update Dec 2020

¹ The derivation of the avoided distribution costs is based on a proprietary model

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGI.ED.16, Attachment 2

Unaccounted for Fuel Loss Rate	0.162%	
Avoided Unaccounted for Fuel Losses		
	Baseload	Weather Sensitive
Year	\$/m3	\$/m3
2021	0.00019	0.00020
2022	0.00019	0.00020
2023	0.00019	0.00020
2024	0.00018	0.00019
2025	0.00024	0.00025
2026	0.00025	0.00026
2027	0.00024	0.00025
2028	0.00027	0.00028
2029	0.00029	0.00030
2030	0.00030	0.00031
2031	0.00033	0.00034
2032	0.00036	0.00037
2033	0.00036	0.00038
2034	0.00040	0.00041
2035	0.00040	0.00042
2036	0.00038	0.00039
2037	0.00041	0.00043
2038	0.00047	0.00048
2039	0.00048	0.00049
2040	0.00048	0.00049
2041	0.00048	0.00049
2042	0.00045	0.00047
2043	0.00046	0.00047
2044	0.00050	0.00052
2045	0.00055	0.00057
2046	0.00057	0.00059
2047	0.00059	0.00061
2048	0.00061	0.00063
2049	0.00063	0.00065
2050	0.00066	0.00067

This rate is updated in each years annual rates application. The rate for 2020, 0.162%, was approved in EB-2019-0194 Decision and Order, Dec. 5, 2019.

Updated Dec 2020

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGL.ED.16, Attachment 2

Aoided Cost of Carbon		
Year	\$/tCO2e	Cost of Carbon (\$/m3)
2021	40	0.078
2022	50	0.098
2023	65	0.127
2024	80	0.157
2025	95	0.186
2026	110	0.216
2027	125	0.245
2028	140	0.274
2029	155	0.304
2030	170	0.333
2031	173	0.340
2032	177	0.347
2033	180	0.353
2034	184	0.361
2035	188	0.368
2036	191	0.375
2037	195	0.383
2038	199	0.390
2039	203	0.398
2040	207	0.406
2041	211	0.414
2042	216	0.422
2043	220	0.431
2044	224	0.440
2045	229	0.448
2046	233	0.457
2047	238	0.466
2048	243	0.476
2049	248	0.485
2050	253	0.495

Assumptions:
 1-No change in conversion from \$/tCO2e to cents/m3 from 2019-2022 to 2023-2030
 2- Increase in cost of carbon beyond 2030 as per inflation
 3-Weighted application of carbon price across Res/Com and Ind sectors

Updated March 2021

<https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/frates/fuel-charge-rates.html>

<https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information/federal-benchmark-2023-2030.html>

Filed: 2020-12-08
EB-2020-0212
Exhibit I.EP-3
Attachment 2
Page 1 of 2

Enbridge Gas Inc.
Union Rate Zone
Updated Exhibit B, Tab 2, Schedule 1
2021 Customer-Related Volumes by Rate Class (April 2021 to March 2022)
(10³ m³)

Line No.	Rate Class	Forecast Volumes ¹	OBPS Participant & Other Exempt Volumes ²	Net Volumes	% Subject to Carbon Charge
1	1	1,023,567	270	1,023,297	100%
2	10	358,449	7,173	351,276	98%
3	M1	3,141,401	1,566	3,139,836	100%
4	M2	1,334,183	90,944	1,243,239	93%
5	20	668,106	536,195	131,911	20%
6	25	79,886	68,897	10,989	14%
7	100	1,018,057	1,018,057	-	0%
8	M4	679,456	259,001	420,455	62%
9	M5	69,356	18,601	50,755	73%
10	M7	560,929	420,055	140,873	25%
11	M9 ³	101,338	101,338	-	0%
12	M10 ³	379	54	325	86%
13	T1	320,854	226,391	94,463	29%
14	T2	4,128,487	4,128,487	-	0%
15	T3 ³	283,374	283,374	-	0%
16	Total Customer-Related	13,767,822	7,160,404	6,607,418	

Notes:
 (1) Forecast Volumes after DSM from April 1, 2021 to March 31, 2022.
 (2) Estimated forecast volumes for mandatory and voluntary participants in the Output Based Pricing System (OBPS), volumes qualifying for exemption for non-covered activities and partial relief (80%) for greenhouse operators.
 (3) Includes volumes delivered to downstream distributors and landfill gas.

Rate Class for Forecasting			
	Residential	Commercial/Industrial	Large Volume
1			
M1		10	
		M2	
			100
		M4	
		M5	
		M7	
		T1	
			T2
Weighted % Subject to Carbon Charge			
Min	100.0%	25.1%	0.0%
Max	100.0%	98.0%	0.0%

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGI.ED.16, Attachment 2

2021 RESIDENTIAL WATER & WASTEWATER RATES
Water/Wastewater Cost (per L)

VARIABLE CHARGES, BASED ON MONTHLY CONSUMPTION OF:

30 m³
 30,000 L (1 m³ water = 1,000 L)

CITY	m ³ PER TIER	VARIABLE CHARGES						TOTAL VARIABLE COST	TOTAL VARIABLE COST/m ³	TOTAL VARIABLE COST/L	
		WATER			WASTEWATER						OTHER VARIABLE COSTS
		RATE (\$)	Cost	TOTAL	Rate (\$) or % of	Cost	TOTAL				
Burlington (Milton, Halton Hills, Oakville)	30	2.6072	78.22	78.22	0.0000	0.00	0.00	78.22	2.60720	0.003	
Cambridge	30	2.3752	71.26	71.26	2.4450	73.35	73.35	144.61	4.82020	0.005	
Chatham	30	1.3500	40.50	40.50	1.3100	39.30	39.30	79.80	2.66000	0.003	
Hamilton	30	1.6400	49.20	49.20	1.7500	52.50	52.50	101.70	3.39000	0.003	
Kingston	25	1.3961	34.90	43.63	1.3002	32.51	39.01	82.63	2.75447	0.003	
	5	1.7451	8.73		1.3002	6.50					
London	7	0.0000	0.00	64.59	0.0000	0.0000	57.41	122.00	4.06669	0.004	
	8	2.3069	18.46		2.0503	16.4024					
	10	2.9659	29.66		2.6361	26.361					
	5	3.2956	16.48		2.929	14.645					
North Bay	30	1.3700	41.10	41.10	83.56%	58.99	58.99	100.09	3.33645	0.003	
Orillia	30	1.5700	47.10	47.10	1.8800	56.40	56.40	103.50	3.45000	0.003	
Sarnia	30	0.3841	11.52	11.52	116.26%	53.51	53.51	65.03	2.16764	0.002	
Sault Ste Marie	15	0.7120	10.68	42.18	62%	41.06	41.06	83.24	2.77475	0.003	
	15	2.1000	31.50			0.00					
Sudbury	30	1.8090	54.27	54.27	112.00%	79.96	79.96	134.23	4.47423	0.004	
Thunder Bay	30	1.7700	53.10	53.10	90%	47.79	47.79	100.89	3.36300	0.003	
Waterloo	30	1.9700	59.10	59.10	2.5300	75.90	75.90	135.00	4.50000	0.005	
Windsor	30	0.6470	19.41	19.41	2.8600	85.8	85.80	121.52	4.05075	0.004	
Average Cost/M³									3.45824		
Average Cost/L										0.003	

Updated December 2020

Average Cost \$/m³
 0.864560

Avoided water rate is calculated by discounting retail rate to 25% based on 2015 audit finding.

Water Avoided Costs	
Year	\$/m ³
2021	0.882
2022	0.899
2023	0.917
2024	0.936
2025	0.955
2026	0.974
2027	0.993
2028	1.013
2029	1.033
2030	1.054
2031	1.075
2032	1.096
2033	1.118
2034	1.141
2035	1.164
2036	1.187
2037	1.211
2038	1.235
2039	1.260
2040	1.285
2041	1.310
2042	1.337
2043	1.363
2044	1.391
2045	1.418
2046	1.447
2047	1.476
2048	1.505
2049	1.535
2050	1.566

Updated December 2020

Filed: 2021-11-15, EB-2021-0002, Exhibit I.5EGI.ED.16, Attachment 2

IESO Wholesale Weighted Average Year to Date Rate \$/MWh	147.85
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IESO Monthly Market Report October 2020, accessed Dec 2020

Electricity Avoided Costs	
Year	\$/KWh
2021	0.151
2022	0.154
2023	0.157
2024	0.160
2025	0.163
2026	0.167
2027	0.170
2028	0.173
2029	0.177
2030	0.180
2031	0.184
2032	0.188
2033	0.191
2034	0.195
2035	0.199
2036	0.203
2037	0.207
2038	0.211
2039	0.215
2040	0.220
2041	0.224
2042	0.229
2043	0.233
2044	0.238
2045	0.243
2046	0.247
2047	0.252
2048	0.257
2049	0.263
2050	0.268

Updated Dec 2020



AVOIDED DISTRIBUTION COSTS

Prepared for:

Enbridge Gas Distribution



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December 2015





TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	1
1 INTRODUCTION.....	5
1.1 Background and Objectives.....	5
1.2 Structure of Report.....	6
2 SECONDARY RESEARCH	7
2.1 Overview	7
2.2 Jurisdictional Research (Gas and Electric).....	8
2.3 Past Enbridge Avoided Gas Cost Efforts.....	11
3 METHODOLOGY.....	15
3.1 Overview	15
3.2 Distribution System Costs	16
3.3 Peak Day Demand	18
3.4 Distribution Avoided Cost Calculation	19
3.5 DSM Load Shapes.....	23
4 RESULTS.....	25
4.1 Summary of Results.....	25
APPENDIX A: ENBRIDGE REVENUE REQUIREMENT ASSUMPTIONS.....	27
APPENDIX B: DSM LOAD SHAPES.....	29
5 SOURCES.....	32



LIST OF FIGURES AND TABLES

Figure 1 – Illustrative Avoided Distribution Cost Calculation Methodology	2
Figure 2 – Illustrative Avoided Distribution Cost Calculation Methodology	15
Figure 3 – Actual and Forecast Reinforcement Costs (\$ million).....	17
Figure 4 – Actual and Forecast Peak Day Demand (103m3)	18
Figure 5 – Illustrative Peak Demand Day Load Growth	19
Figure 6 – Illustrative Peak Demand Day Load Growth with DSM Program	20
Figure 7 – Illustrative Peak Demand Day Load Growth at EUL DSM Program.....	21
Figure 8 – Difference in Revenue Requirement with and without DSM Program	22
Figure 9 – Components of Avoided Reinforcement Cost Calculation.....	23
Figure 10 – Avoided Distribution Cost Calculation	28
Figure 11 – Residential Space Heating DSM Load Shape.....	29
Figure 12 – Residential Water Heating DSM Load Shape	29
Figure 13 – Space and Water Heating DSM Load Shape.....	30
Figure 14 - Industrial Processes DSM Load Shape	30
Table 1 – Avoided Distribution Costs by Load Shape (\$/10 ³ m ³).....	3
Table 2 – Avoided Distribution Costs by Load Shape (nominal \$/103m3)	4
Table 3 – New England: Representative Load Segments.....	8
Table 4 – Hampton Strategies Methodology: Load Shape Scenarios.....	12
Table 5 –Avoided Cost Methodologies in Past DSM Filings.....	13
Table 6 – Avoided Distribution Costs (\$/10 ³ m ³).....	25
Table 7 – Annual Avoided Distribution Costs (nominal \$/10 ³ m ³).....	26
Table 8 - Enbridge-Specific Revenue Requirement Assumptions	27
Table 9 - Ratios for each Load Shape	31



EXECUTIVE SUMMARY

Navigant Consulting Ltd. (Navigant) has been retained by Enbridge Gas Distribution (Enbridge) to determine the downstream or distribution avoided costs. These costs are a potential addition to the currently approved avoided costs that are used for cost effective screening purposes in the Total Resource Cost test (TRC) as outlined in the DSM Guidelines for Natural Gas Utilities.

During the initial discovery stage of this assignment it was determined that Enbridge's upstream or transmission avoided costs are already fully and accurately captured in their existing avoided cost analysis. The objective was subsequently modified from a study of both transmission and distribution avoided costs to only include the determination of the distribution or downstream avoided costs. In addition, the distribution avoided cost determined in this study is to be used as an "adder" to the upstream avoided cost using the same metric and units (\$/10³ m³ of DSM savings) such that the two values may be summed to provide a single avoided cost amount covering the upstream and downstream avoided costs. The purpose of this study is to provide a reasonable approximation for a distribution avoided cost in order to capture the full franchise-wide benefits when screening DSM programs. For clarity, this avoided cost from this study is not applicable for DSM programs that provide only peak hourly demand reductions and no annual volume reduction, or that are targeted for a specific location within the franchise area. This analysis is one of the subjects for the IRP Study to be undertaken following the Board's direction in the 2015 DSM Framework.

As part of identifying a suitable methodology, Navigant researched a number of jurisdictions outside of Ontario, as well as the distribution avoided cost approaches previously used by Enbridge. The outcome of this research is a methodology that combines the Enbridge method with an approach used by Puget Sound Energy. This methodology is based on the "time value of money" principle and determines the value of deferring a distribution system project driven by an increase in peak demand. The methodology assumes a DSM program is implemented which eliminates one year of peak day demand growth for the time period that the energy efficiency measures or actions implemented as a result of the DSM program are in place, or what is commonly referred to as the Effective Useful Life (EUL) of the program. The outcome is that the distribution project required to serve the increase in peak demand growth that would have occurred absent the DSM program would no longer be required, and is deferred for the EUL of the DSM program.

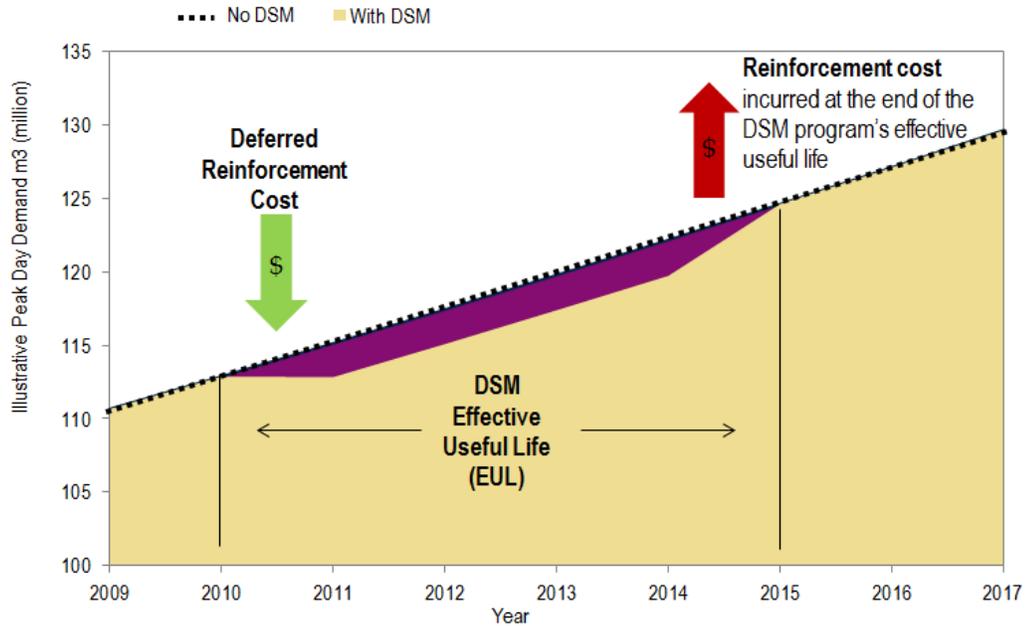
Enbridge investigated the impact of DSM on the four types of distribution mains (sales, reinforcement, replacement and relocation) in its 1996 DSM Plan. It was found that "*...the impact of DSM on sales, replacement and relocation mains is small, and would have only a marginal impact on*



the total avoided costs.¹⁷ Therefore, for the purpose of this study, only costs that can be directly attributed to reinforcement mains are examined to capture the load additions that can be avoided (or deferred) through DSM efforts.

The avoided cost methodology is illustrated in Figure 1.

Figure 1 – Illustrative Avoided Distribution Cost Calculation Methodology



The data inputs to the calculation include an estimate for one year’s reinforcement cost and a projected increase in peak day demand. Annual average values for both the reinforcement cost and the peak day demand have been estimated based on historical and forecast values supplied by Enbridge. The EUL assumed for the analysis is 18 years which is the weighted average EUL for Enbridge’s current portfolio of DSM programs. While demand has been stated in terms of peak day for the purpose of this analysis, it should be noted that for distribution system engineering and design, reinforcement project requirements are based on peak hourly demand. The TRC test is conducted from the point of view of all program participants and society and the ratepayer perspective is represented in the Ratepayer Impact test (RIM). In order for the avoided distribution cost analysis to also reflect the ratepayer perspective, the impact of deferring the reinforcement cost has been calculated in terms of the gas distribution rates customers pay, or revenue requirement. The avoided distribution cost is then calculated in each year by dividing the annual change in revenue requirement by the annual reduction in peak day demand. The

¹ EBRO 490, D2-6-1 Pg. IV-34



result is an annual avoided distribution cost per unit of peak day demand ($\$/10^3\text{m}^3$ annual peak day demand) for each year of the DSM program's EUL.

The last step of this analysis is to present the calculated avoided cost in terms of annual DSM volumes saved instead of peak day demand gas savings. This is done by using Enbridge's existing DSM load shape profiles using the peak day demand to annual volume ratio. Enbridge uses four DSM load shapes: i) industrial processes; ii) space heating; iii) water heating; and iv) space and water heating. The ratio of peak day demand to annual volume for each of the four DSM load shapes is used to convert the peak day demand distribution avoided cost ($\$/10^3\text{m}^3$ annual peak day demand) to a volumetric avoided cost. The result is a cost per annual volume of DSM savings metric ($\$/10^3\text{m}^3$) for each of the four load shapes representing avoided distribution costs that can be multiplied by the annual volume of gas savings from a DSM program in a given year. The results are summarized in Table 1.

Table 1 – Avoided Distribution Costs by Load Shape ($\$/10^3\text{m}^3$)

Year	Industrial Processing	Space Heating	Water Heating	Space and Water Heating
2015	\$5.14	\$17.95	\$4.88	\$16.51
2016	\$4.32	\$15.10	\$4.11	\$13.89
2017	\$4.27	\$14.93	\$4.06	\$13.73
2018	\$4.22	\$14.74	\$4.01	\$13.55
2019	\$4.16	\$14.53	\$3.95	\$13.36
2020	\$4.09	\$14.30	\$3.89	\$13.15
2021	\$4.02	\$14.06	\$3.82	\$12.93
2022	\$3.95	\$13.81	\$3.75	\$12.70
2023	\$3.87	\$13.54	\$3.68	\$12.45
2024	\$3.79	\$13.26	\$3.60	\$12.20
2025	\$3.71	\$12.97	\$3.53	\$11.93
2026	\$3.62	\$12.67	\$3.44	\$11.65
2027	\$3.54	\$12.36	\$3.36	\$11.36
2028	\$3.44	\$12.04	\$3.27	\$11.07
2029	\$3.35	\$11.71	\$3.18	\$10.77
2030	\$3.25	\$11.37	\$3.09	\$10.45
2031	\$3.15	\$11.02	\$3.00	\$10.14



Year	Industrial Processing	Space Heating	Water Heating	Space and Water Heating
2032	\$3.05	\$10.67	\$2.90	\$9.81

In addition to the annual avoided distribution cost values, the results have also been presented on a “levelized” basis with a single avoided distribution cost. This levelized value can be used as an alternative to the annual avoided costs for the EUL of the DSM program, and produces an equivalent result on a net present value basis. The results are provided in Table 2.

Table 2 – Avoided Distribution Costs by Load Shape (nominal \$/103m3)

Load Shape	Avoided Distribution Costs
Industrial Processing	\$3.99
Space Heating	\$13.96
Water Heating	\$3.79
Space and Water Heating	\$12.84



1 INTRODUCTION

Navigant Consulting Ltd. (Navigant) has been retained by Enbridge Gas Distribution (Enbridge) to determine distribution avoided costs. These costs are a potential addition to currently approved avoided costs that are used to in the Total Resource Cost (TRC) formula outlined in the DSM Guidelines for Natural Gas Utilities.

During the initial discovery stage of this assignment, it was concluded that Enbridge's existing avoided cost calculation methodology accurately captures all upstream avoided costs including transmission. The objective was subsequently modified from a study of both transmission and distribution avoided costs to only include the determination of the distribution or downstream avoided costs. Enbridge has calculated avoided transmission costs using a proprietary model (SENDOUT) since 1995, and plans to continue with this approach going forward.

1.1 Background and Objectives

1.1.1 Avoided Costs

An avoided cost is a metric used to quantify the benefits of DSM programs. It includes the costs associated with gas supply, transmission, and distribution that would no longer be incurred as a result of a decrease in annual and/or peak demand attributable to a DSM program.

For the purpose of this Report, transmission and distribution costs are defined as:

1. **Transmission costs:** is the supply cost for gas delivered to the "city gates" of the utility. Components include the commodity, pipeline transportation, storage, and peaking service costs. As defined, transmission costs are equivalent to "upstream" costs.
2. **Distribution costs:** also called "downstream" costs, includes costs associated with delivering gas from the city gates to the customer within Enbridge's franchise area or distribution system. Components include costs associated with reinforcement, sales, relocation, and replacement mains. For the purpose of this study, only costs that can be directly attributed to reinforcement mains driven by growth in peak demand are examined to capture the load additions that can be avoided through DSM efforts.

This terminology will be used throughout the report to describe the two components of avoided costs. Although the secondary research in Section 2 of this report discusses both avoided transmission and distribution costs, the focus of the analysis is on the approximation of avoided distribution costs only.

1.1.2 Objectives

The stated objective of this assignment is to determine a downstream or distribution avoided cost suitable for Enbridge to include in their current avoided gas costs. Note that the avoided



costs developed through this study represent average avoided distribution costs suitable for use on a franchise-wide basis as opposed to location-specific avoided costs for a specific infrastructure reinforcement project.

It was also noted that the avoided distribution costs are to be calculated using the same metric and units as Enbridge's avoided gas costs such that the two values may be summed to provide a single avoided gas cost amount suitable for use in The Total Resource Cost effectiveness test.

1.2 Structure of Report

Section 1, Introduction provides background information and states the objective of this Report. Section 2 provides an overview of the methodologies and approaches used in other jurisdictions to estimate the avoided costs of both transmission and distribution for gas and electricity. This section also reviews the gas transmission and distribution avoided cost methodologies used by Enbridge in previous DSM Plan submissions.

Navigant's recommended methodology to estimate the avoided distribution costs is described in Section 3, and the results of the avoided distribution cost analysis are presented in Section 4. The detailed descriptions, data, assumptions, and calculations for each component of the analysis are included in the appendices.

2 SECONDARY RESEARCH

2.1 Overview

This section examines the methodologies used in four jurisdictions to calculate avoided transmission and distribution costs in both gas and electric utilities. This section also examines the methodologies and approaches used by Enbridge to develop avoided transmission and distribution costs in past DSM plan filings with the Ontario Energy Board (OEB).

2.1.1 Avoided Transmission Costs

Avoided transmission costs are typically calculated using one of three approaches:

- marginal cost approach;
- decrement approach; or,
- a hybrid approach.

The marginal cost approach develops a per-unit metric to express the value of a specific transmission resource that is avoided as a result of DSM programs. This is the simplest approach and is often used due to its low data and modeling requirements.

The decrement approach develops load scenarios (e.g., peak day, winter season, etc.) and determines the value of transmission resources needed to satisfy each load scenario. The DSM programs are then valued based on the specific load scenario or combination of load scenarios, for an avoided load decrement. This approach is more complex and requires additional data and modeling capabilities.

A hybrid approach uses a combination of both approaches based on the data available and the level of sophistication desired.

2.1.2 Avoided Distribution Costs

Based on the jurisdictions researched, two approaches were identified to calculate avoided distribution costs.

- marginal cost approach; and
- avoided cost for distribution system capacity upgrades.

The marginal cost approach is based on the average difference in cost for gas delivered to the city gate, and the cost of gas delivered to the customer. The avoided cost for distribution system capacity upgrades is based on an estimate of the planned reinforcement costs through a planning horizon.



2.2 Jurisdictional Research (Gas and Electric)

2.2.1 New England

Gas

New England calculates avoided gas costs using a marginal cost approach considering both the avoided cost of gas delivered to the utility (considering both commodity and transmission costs), and the avoided cost of delivering gas within the utility (distribution). The resulting avoided costs are volumetric with no capacity component.

To determine the value of the avoided transmission cost, New England develops representative load shapes for each retail customer by dividing annual gas requirements into six load segments that correspond to types of gas resources. Table 3 lists the six representative load segments.

Table 3 – New England: Representative Load Segments

Representative Load Segments
Annual base load (365 days per year)
Winter/shoulder load (280 days per year)
Winter base load (151 days per year)
90-day load
30-day load
10-day load

The utility develops a lowest-cost portfolio of supply resources and determines the marginal supply resource based on the characteristics of the supply portfolio. The analysis considers the opportunities the utility has to add or eliminate resources from the supply portfolio taking into account existing agreements. The utility matches the supply resource to each load segment. The highest priced resource is considered the marginal cost that can be avoided. Avoided costs are developed for each end use (E.g., residential heating) and region.

To determine the value of the avoided distribution cost, New England measures the difference between the city gate price of gas and the price charged to each retail customer type, also called the “retail margin.” New England considers the “retail margin” as the change in the cost of distribution as demand for gas increases or decreases which depends on the customer segment and load type and expresses this metric as a percentage of embedded costs. In some regions, the “retail margin” is not considered avoidable.



Electric

Other components are also calculated such as avoided electric energy costs (\$/kWh) representing the reduction in the annual quantity of electric energy that load serving entities will need to purchase, and local transmission and distribution infrastructure costs that are avoided due to delays in the timing and/or any size reductions in new projects.

New England determines the value of avoided electric capacity (\$/kW-year) using the revenues gained from and the value of generating capacity avoided by demand reductions no longer bid into the Forward Capacity Market.

2.2.2 California

Gas

California calculates avoided transmission and distribution gas costs using a marginal cost approach. The resulting avoided costs are volumetric with no capacity component. California calculates the transmission and distribution components together.

Avoided commodity costs are calculated for each utility, month, and year using the forecasted market price (commodity cost), cost of avoided compression gas (expressed as a market price), and losses.

$$\begin{aligned} & \text{Commodity Cost} \times (1 + \text{Avoided Compression Gas}) \\ & \times \text{Reduced Loss as a Percent of Market Price} \end{aligned}$$

Avoided transmission and distribution costs are calculated using an estimate of the marginal transportation cost for delivering gas to the end user. This value is calculated for each utility, customer class, and year using the transmission and distribution marginal cost (average cost of delivering gas to each service class) and a monthly transmission and distribution allocation (assignment of the natural gas capacity cost to the winter season based on system throughput).

$$\text{T\&D Marginal Cost} \times \text{Monthly T\&D Allocation}$$

Electric

California determines the value of avoided electricity costs using costs from utility rate case filings used as proxy long-run marginal costs of a transmission and distribution investment. Transmission and distribution capacity costs are based on hourly temperature data, which consider local loads. The hottest hours are assumed to occur when the system is most constrained and will thus require upgrades.



2.2.3 Colorado

Gas

Colorado calculates avoided gas costs using a marginal cost approach. The avoided costs are calculated on a volumetric basis only with no capacity based rate.

Three components are considered in the calculation of avoided gas costs: avoided commodity costs, avoided capacity costs, and avoided variable O&M costs.

- Avoided commodity costs are developed using price forecasts.
- Avoided capacity costs represent the cost of service to transport incremental gas supplies to the metropolitan Denver area. The avoided capacity cost is assumed to be equal to Colorado Interstate Gas (CIG) firm transportation rate.
- Avoided variable O&M costs used are provided by the Public Service Company of Colorado public pricing and planning group.

Electric

Colorado determines the value of avoided electricity costs assuming a proxy resource on the margin. Avoided generation capacity costs are calculated using generic capacity cost estimates for a gas-fired combustion turbine and gas-fired combined-cycle plant. Avoided transmission and distribution capacity costs, which are developed by the Public Service Company of Colorado resource planning group, are calculated using an assumed flat rate which is escalated annually. Avoided marginal energy costs are calculated using costs for a gas-fired combustion turbine and gas-fired combined-cycle plant.

2.2.4 Puget Sound Energy

Gas

Puget Sound Energy calculates avoided gas costs using a marginal cost approach. The resulting avoided costs include both a volumetric and capacity component.

Avoided gas costs include five components: weighted average cost of gas (commodity cost), avoided pipeline demand charge (transmission cost), avoided pipeline transportation charge (transmission cost), pipeline fuel reimbursement (transmission cost), and avoided distribution capacity upgrades (distribution cost).

- The weighted average cost of gas is developed by end use and represents the weighted average commodity cost based on the timing of savings for six representative end uses.
- Avoided pipeline demand charge is calculated on the basis of the savings that occur on a peak day and is considered for each dekatherm of additional daily capacity that is avoided.



- Avoided pipeline variable transportation charge is calculated using the O&M on the pipeline.
- Pipeline fuel reimbursement is represented in the calculation as an adder calculated using the additional savings on the fuel used for compression.
- Avoided distribution capacity upgrades are calculated using the estimated cost of pipeline reinforcements through the planning period and are assumed to represent one time costs that can be deferred. These costs are modelled as an avoided payment or the yearly value of the levelized cost calculated over a time period provided by the Puget Sound Energy planning group.

2.3 *Past Enbridge Avoided Gas Cost Efforts*

2.3.1 **Avoided Gas Cost Study, 1994**

Enbridge (then Consumers Gas) retained Hampton Strategies, Inc. (Hampton) to provide an independent review and critique of its approach to determining avoided gas costs. The report was completed in 1994. The report recommended an increment/decrement methodology.

The methodology is built upon some key concepts that were recommended by Hampton to develop the avoided gas costs:

- Avoided Gas Costs (AGC) methodologies should be based upon the planning and operation of the local distribution company's (LDC's) system and the cost of decisions at the margin
- AGCs should be calculated by evaluating the change in costs that result from a change in the peak demand and the change in the volume of gas consumed
- Planners should consider: duration of load and opportunities to manage gas supplies between seasons, thus different supply mixes will meet different load shapes
- LDCs plan to meet the entire annual load duration curve, not the load at any single point along the supply curve, therefore unit AGCs at any point along the supply curve may vary between customers
- The gas system is dispatched to accommodate the total expected load on a given day, therefore unit short run marginal costs (SRMC) at any point along the load duration curve are the same for all customers
- AGC methodologies should be forward looking

The recommended methodology is built upon the utility planning process and essentially determines the costs associated with varying supply scenarios. The avoided costs become the difference between various scenarios and a "base case." Alternative supply plans are calculated for different load shapes that have varying effects on gas supply costs. Table 4 specifies each load shape scenario recommended in the Hampton methodology.



Table 4 – Hampton Strategies Methodology: Load Shape Scenarios

Load Shape Scenarios
Peak load reduction
Winter heating load reduction
Water heating load reduction
Off-peak load reduction
Annual constant load reduction
Residential cooling load increase
Commercial cooling load increase

The recommended methodology can be broken down into four steps:

1. Develop base case supply scenario to serve the requirements of a base case demand forecast.
2. Add or remove gas supply requirements and modify supply mix to meet the seven alternative demand scenarios.
3. The difference in total fixed and variable charges between the base supply scenario and each alternative supply plan is divided by the annual difference in demand requirements for the corresponding case to arrive at the AGC for that particular load shape.
4. The gas cost savings relate to the annual change in load.

2.3.2 Past Enbridge DSM Filings

Enbridge filed the 1995 DSM Plan using a decrement/increment methodology to calculate avoided gas costs using proxy resources where necessary. The three decrement scenarios included in the analysis were: peak day, winter season, and summer season. The avoided gas costs calculated represent the avoided gas costs for the service territory as a whole and do not include the avoided costs to deliver gas from the city gates to the customer (avoided distribution costs). Enbridge uses a proprietary model to develop the transmission or upstream avoided gas costs.

Enbridge also calculated avoided distribution or downstream costs for reinforcement mains. It was determined that the other distribution costs such as sales, relocation, and replacement mains were either immaterially affected by DSM programs or not impacted by customer additions. As an example, replacement and relocation mains are typically driven by events such as conflicts with other infrastructure developments or maintenance, and are not related to load growth. Avoided costs for reinforcement mains were calculated using the historical relationship between annual expenditures in reinforcements and load growth.



Table 5 outlines the methodologies used in Enbridge’s DSM filings from 1995 to 1999.

Table 5 –Avoided Cost Methodologies in Past DSM Filings

Proceeding	DSM Plan	Notes
EBRO 487	1995 DSM Plan	<p>Avoided Gas Costs The calculation used a “decrement approach” which compares long-term system supply costs under a “business-as-usual” scenario and three “decrement” scenarios: Peak Day, Winter Season, and Summer Season. The calculation included commodity, transportation, and storage.</p> <p>Avoided Distribution System Costs Focused only on reinforcement mains costs as being the primary category of distribution system costs affected by load reduction. The estimate was based on the ratio between historic annual expenditures on reinforcement mains and annual increases in demand over two 10 year periods.</p>
EBRO 490	1996 Plan	<p>Avoided Gas Costs Avoided gas costs were based on commodity, transportation, and storage. The long term demand forecast was updated. The decrement method was used to calculate the avoided gas costs and the load shapes were changed to Water Heating, Space Heating and Industrial Process from the seasonal load shapes used in 1995 DSM Plan.</p> <p>Avoided Distribution System Costs EBRO 492 indicates that avoided distribution costs were included in EBRO 490.</p>
EBRO 492	1997 Plan	<p>Avoided Gas Costs Used same methodology as in EBRO 490.</p> <p>Avoided Distribution System Costs Updated to reflect change to deferral of reinforcement rather than outright avoidance. “A more detailed analysis of the extra high pressure systems, assuming system-wide growth in demand and DSM savings, indicated that the average reinforcement would be postponed, but not avoided.” The updated avoided distribution system costs represent the carrying cost savings resulting from deferring the investment in reinforcement for two years.</p>
EBRO 495	1998 Plan	<p>Avoided Gas Costs Used the same methodology as in EBRO 492 with one exception. The scaling factor decrement of 2.5 percent recommended by Hampton Strategies was reduced to 1.0 to provide a more accurate forecast of avoided gas costs using the SENDOUT model. Hampton Strategies agreed with the change.</p> <p>Avoided Distribution System Costs Using the same method as in EBRO 492</p>



Proceeding	DSM Plan	Notes
EBRO 497. Ex D2, Tab 6, Sch 1, Page V60V18	1999 Plan	<p>Avoided Gas Costs Used same methodology as in EBRO 495 with updated avoided costs based on market changes.</p> <p>Avoided Distribution System Costs Used same methodology as for EBRO 492</p>

From 1999 to the present, EGD has updated avoided gas costs annually, using the same methodology in prior years, and filed the results with the Board as part of a DSM proceeding.



3 METHODOLOGY

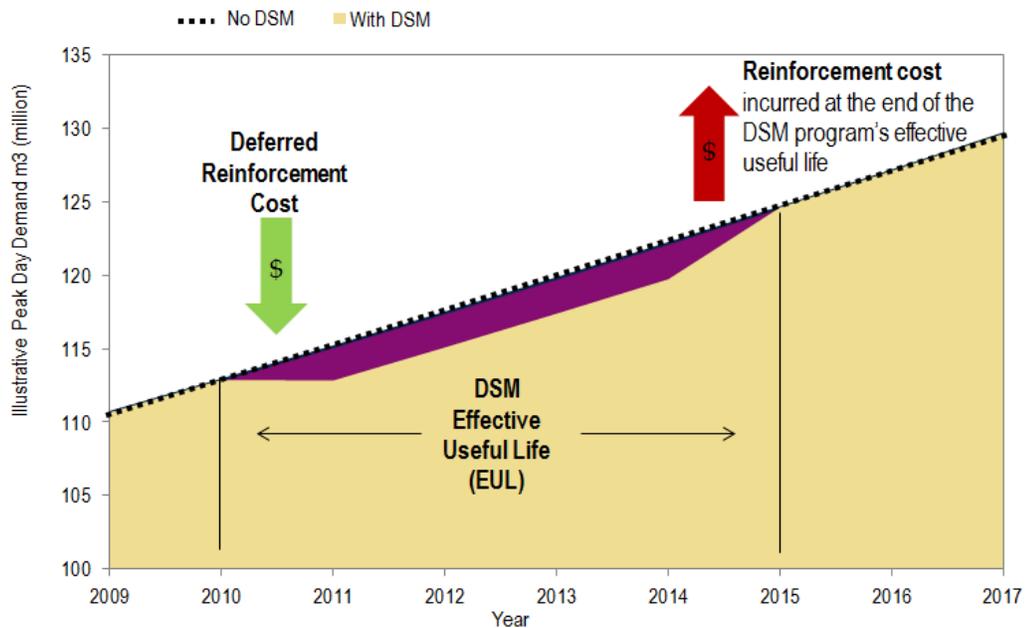
3.1 Overview

Navigant recommends a variation of the avoided distribution system capacity upgrade methodology to estimate the avoided “downstream” or distribution costs which is an adaptation of both Enbridge’s past methodologies and the Puget Sound approach. The proposed methodology is also a function of the data available from Enbridge.

At a high level, the methodology is based on estimating the value of deferring the need for an increase in the distribution system peak demand capacity or expenditure to reinforce the distribution system as a result of a DSM program. The value is measured by calculating the “time value of money” for the time period over which the reinforcement expenditure is deferred.

Conceptually, the methodology assumes a DSM program is implemented which eliminates one year of peak demand growth for the time period that the energy efficiency measures or actions implemented as a result of the DSM program are in place, or what is commonly referred to as the Effective Useful Life (EUL) of the program. The outcome is that the distribution reinforcement required to serve the increase in peak demand growth that would have occurred absent the DSM program would no longer be required, and is deferred for the EUL of the DSM program. Figure 2 illustrates Navigant’s recommended methodology.

Figure 2 – Illustrative Avoided Distribution Cost Calculation Methodology





The TRC test is conducted from the point of view of all program participants and society and the ratepayer perspective is represented in the Ratepayer Impact test (RIM). In order for the avoided distribution cost analysis to also reflect the ratepayer perspective, the impact of deferring the reinforcement cost has been calculated in terms of the annual change in revenue requirement. The avoided distribution cost is then calculated in each year by dividing the annual change in revenue requirement by the annual reduction in peak day demand. The result is an annual avoided distribution cost per unit of peak day demand ($\$/10^3\text{m}^3$ annual peak day demand) for each year of the DSM program's EUL. While demand has been stated in terms of peak day for the purpose of this analysis, it should be noted that for distribution system engineering and design, reinforcement project requirements are based on peak hourly demand. The peak hourly demand is assumed to be equal to one twentieth ($1/20^{\text{th}}$) of the peak day demand.

A detailed description of this avoided cost methodology is provided in Section 3.4.

3.2 *Distribution System Costs*

As discussed previously, components of distribution system costs include reinforcement, sales, relocation, and replacement mains.

- Reinforcement mains are driven by increases in annual peak demand (i.e., the highest volume of gas required in one hour of a given year) for existing gas lines.
- Sales mains are primarily small diameter mains and driven by the number of customer additions.
- Relocation and replacement mains are driven by routine maintenance and conflicts with other developments.

Enbridge investigated the impact of DSM on sales, replacement and relocation mains in its 1996 DSM Plan. It was found that "...the impact of DSM on sales, replacement and relocation mains is small, and would have only a marginal impact on the total avoided costs."² Therefore, for the purpose of this study, only costs that can be directly attributed to reinforcement mains are examined to capture the load additions that can be avoided (or deferred) through DSM efforts.

Enbridge provided Navigant with both actual and forecast reinforcement expenditures. Figure 3 below, displays actual reinforcement expenditures from 2010 and 2013 and forecast reinforcement expenditures from 2014 to 2019. Reinforcement costs for larger projects are adjusted to reflect the proportion of the project costs that are directly attributable to load growth.

² EBRO 490, D2-6-1 Pg. IV-34



Figure 3 – Actual and Forecast Reinforcement Costs (\$ million)



As can be seen in Figure 3, capital investments on reinforcement projects can change dramatically from one year to the next, and investments made in any one or two years would not be a reliable predictor of the following years’ reinforcement costs. Similarly, peak day demand can vary from one year to the next due to many factors such as economic performance. While reinforcement costs are directly attributable to growth in peak demand over time, for example over ten year period, this relationship is not particularly evident when viewed over a short-term period. Larger reinforcement projects will also occur when viewing the data over the long term, for example, the figure above contains two larger capital reinforcement projects in 2013 and 2015.

An average of the actual and forecast reinforcement costs has been used to smooth out the yearly variations and to provide a perspective that includes both recent historical values as well as the latest forecast.

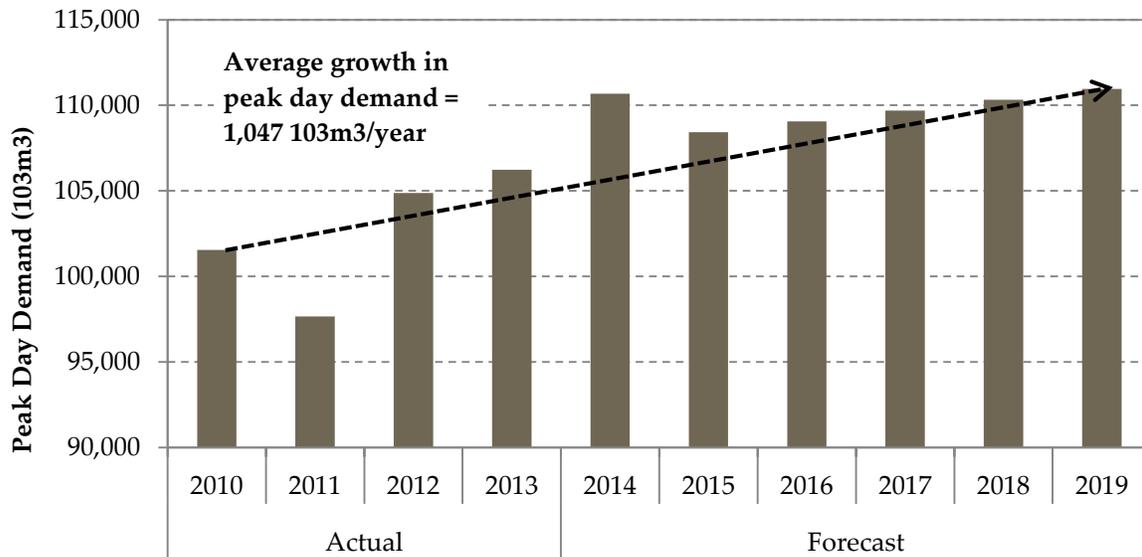
Navigant calculated an average annual reinforcement expenditure of \$21.5 million (2015 real dollars) using both actual and forecast reinforcement costs from 2010 to 2019.



3.3 Peak Day Demand

Enbridge provided gross peak day demand data from 2010 to 2013 and forecast gross peak day demand from 2014 to 2019. Figure 4 below displays the normalized actual gross peak day demand from 2010 to 2013 and forecast gross peak day demand from 2014 to 2019.

Figure 4 – Actual and Forecast Peak Day Demand (103m3)



Peak day demand is normalized to design conditions. Gross peak day demand is used in Navigant’s analysis and reflects the annual maximum daily demand for the Enbridge system including unbundled customers. Unbundled customers purchase gas from a marketer and Enbridge is not responsible for upstream delivery, however, Enbridge is responsible for unbundled customers on its distribution system. In addition, Enbridge DSM programs are available to all distribution customers. Therefore, for the purposes of Navigant’s analysis of avoided distribution costs, gross peak day demand is the appropriate perspective.

The peak day demand year over year varies significantly and at times decreases relative to the prior year. To develop an average annual peak demand day increase, Navigant calculated the peak demand day growth over the entire period and distributed the growth evenly into each year.

Using both actual and forecast peak day demand data from 2010 to 2019, Navigant calculated the average annual peak demand day increase of 39,653 GJ or 1,047 10³m³.



3.4 Distribution Avoided Cost Calculation

In order to calculate the impact of the reinforcement cost deferral, Navigant calculated the annual revenue requirement using two scenarios: 1) “no DSM” where the reinforcement cost is incurred in 2015, and 2) “with DSM” where the reinforcement cost is incurred 18 years later at the end of the EUL of the DSM program. The value of the distribution avoided cost is created by the timing difference of the annual revenue requirements for the two scenarios.

The distribution avoided cost is calculated by dividing the change in revenue requirement from the average annual reinforcement cost (as detailed in section 3.4) by the average annual peak day demand growth of 1,047 10³m³ (as detailed in Section 3.3). The result is an avoided cost per unit of peak day demand (\$/10³m³) over the 18 year EUL of the DSM program.

3.4.1 Detailed Methodology

Figure 5, below, illustrates annual peak day demand growth in absence of any new DSM programs. The Y-axis captures the annual increase in peak day demand and the X-axis captures time. Each year, average annual reinforcement costs are incurred to service the average annual growth in the peak day demand.

Figure 5 – Illustrative Peak Demand Day Load Growth

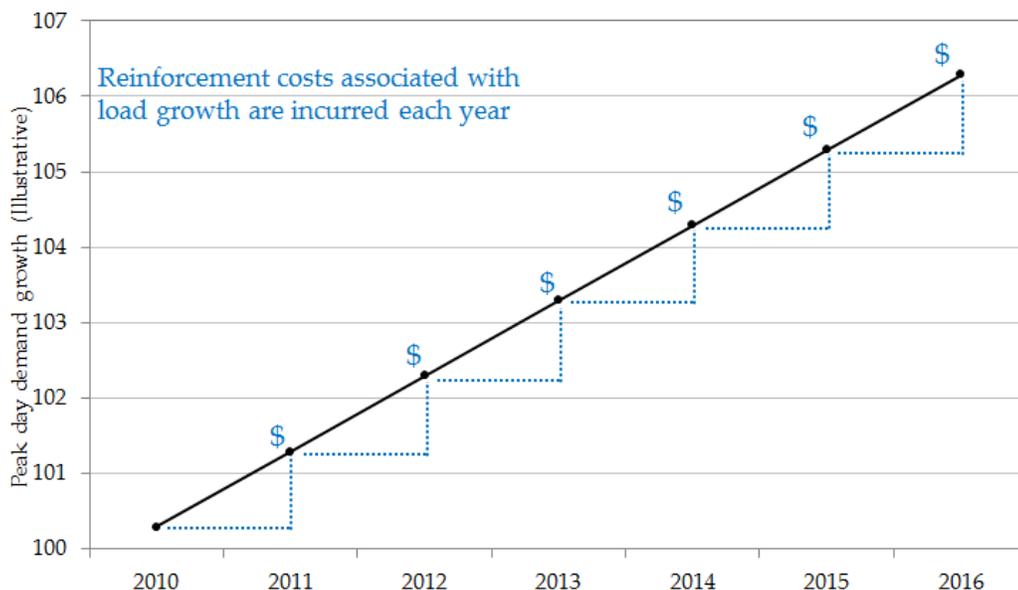


Figure 6, below, illustrates peak day demand growth following the implementation of a DSM program. Assume a DSM program is implemented in 2015 and flattens annual peak day demand growth from 2014 to 2015. In this scenario, there is no growth to trigger the need for



reinforcement costs in 2015. The DSM program is only implemented in one year (2015), so peak day demand continues to grow year over year and reinforcement costs are incurred annually in the future. To summarize, due to the DSM program the annual peak day demand is lower in each year, but continues to grow at the same pace.

Figure 6 – Illustrative Peak Demand Day Load Growth with DSM Program

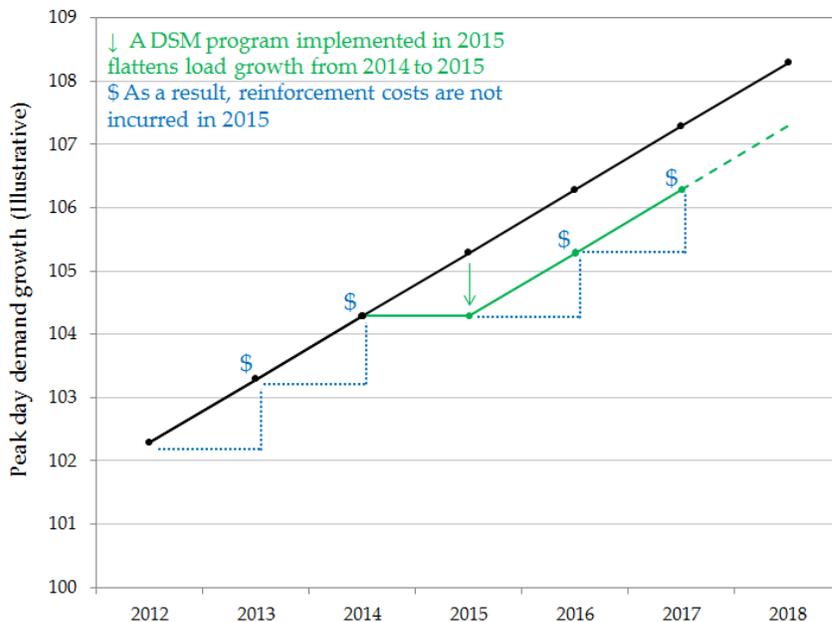
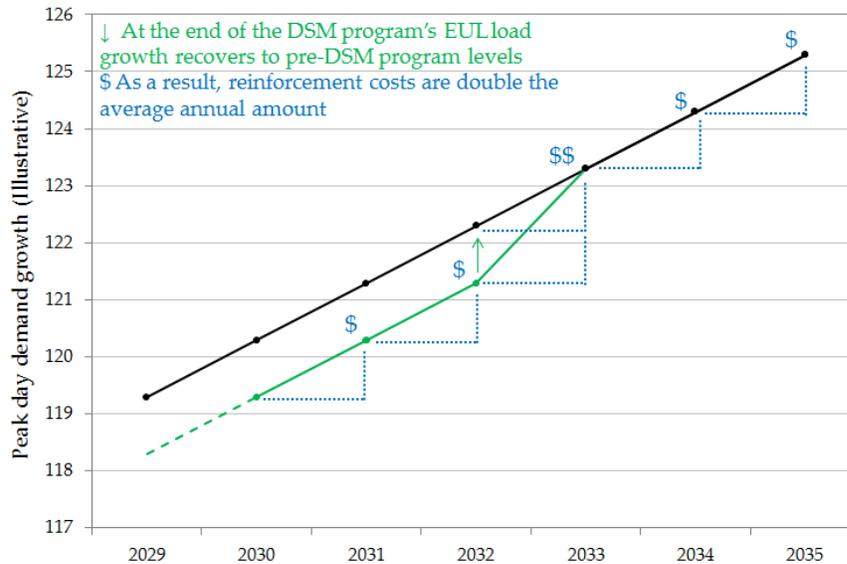


Figure 7, below, illustrates peak day demand growth once the DSM program reaches the end of its effective useful life (EUL). In this example and throughout the study it is assumed that the average EUL of a DSM program is 18 years, which is the average EUL of Enbridge’s portfolio of DSM programs. Once the DSM program reaches the end of its EUL, peak day demand returns to the levels observed prior to the implementation of the DSM program. The peak day demand growth is double the annual average reflecting the normal annual growth plus the peak day demand growth returning to pre-DSM levels. Recall that reinforcement costs are triggered by the growth in peak day demand observed annually. Since growth is double, the reinforcement costs are also double.



Figure 7 – Illustrative Peak Demand Day Load Growth at EUL DSM Program



The reinforcement costs that would have been incurred in 2015, that are instead incurred at the end of the DSM program’s EUL are considered the deferred reinforcement cost. Even though reinforcement costs are expected to be higher due to inflation, deferring the reinforcement costs generates a present value benefit due to the time value of money³.

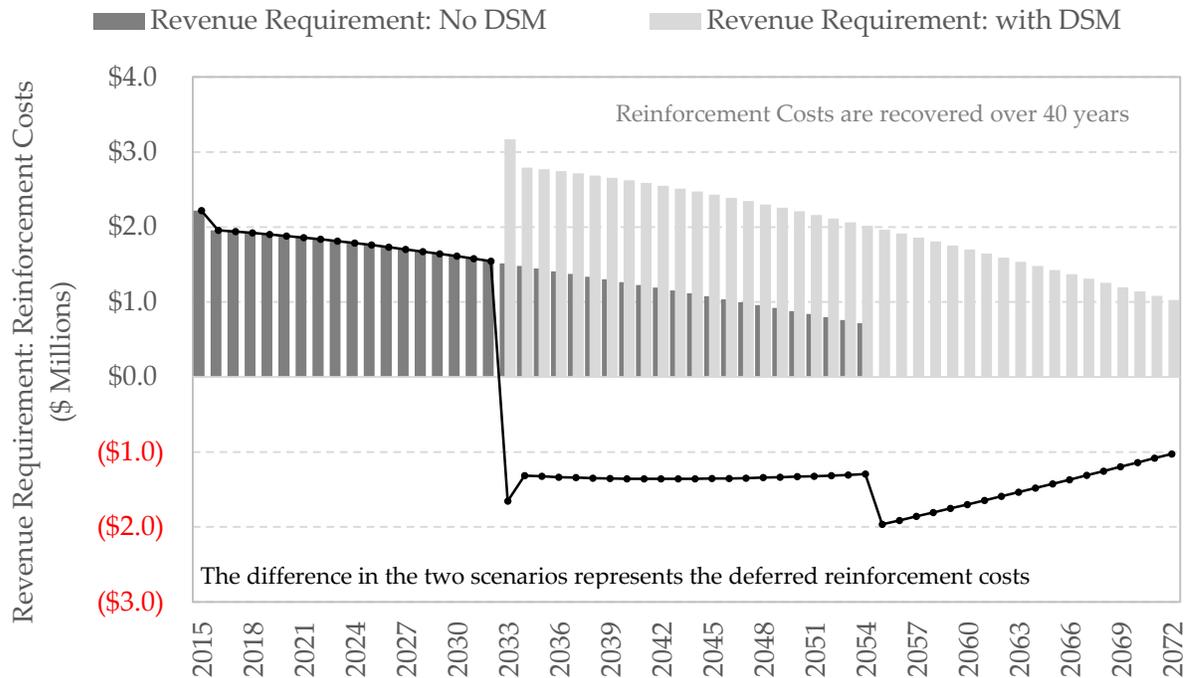
The benefit associated with the deferred reinforcement cost is shown by the difference between the “No DSM” (i.e., the black line) and the “With DSM” (i.e., the green line) scenarios. The value is determined by calculating the annual revenue requirement to recover the costs associated with the reinforcement using Enbridge-specific assumptions.

Figure 8, below, illustrates the annual revenue requirement associated with the two scenarios. The difference between the “With DSM” and “No DSM” scenarios represents the value of the deferred reinforcement costs and is illustrated by the black line.

³ In theory, the value is realized from the returns that can be earned on the foregone investment each year the costs are deferred.



Figure 8 – Difference in Revenue Requirement with and without DSM Program



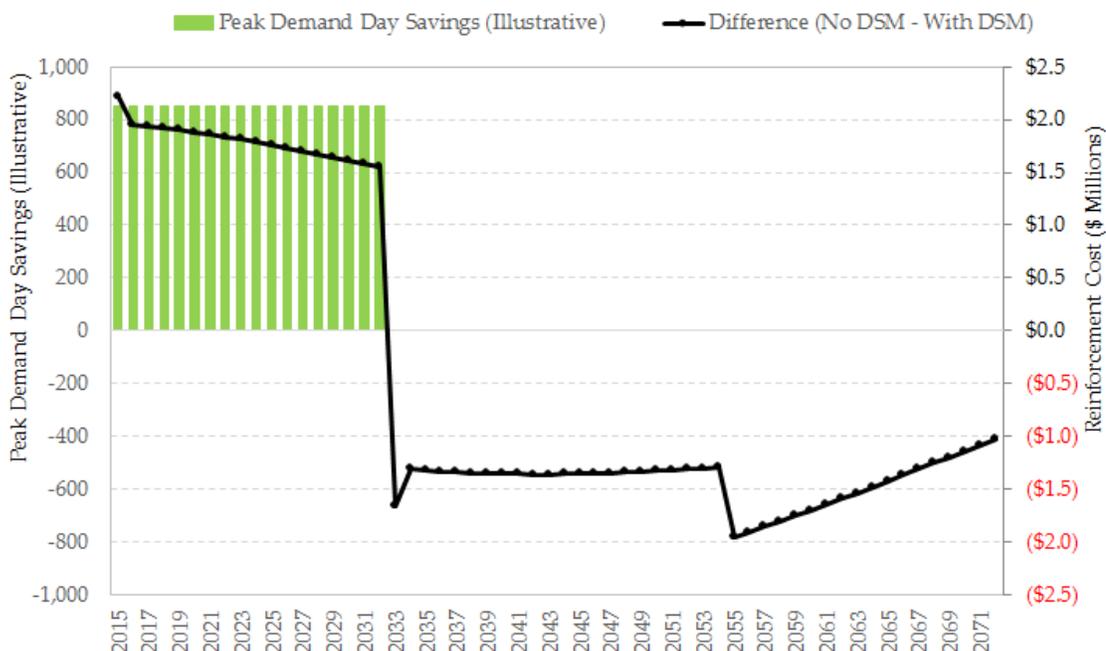
Recall that as a result of the DSM program, the annual peak day demand is lower in each year over the DSM program’s EUL. The peak day demand savings allow the avoided reinforcement costs to be expressed as a per unit metric. Figure 9 below, illustrates the two components of the avoided distribution cost calculation:

- peak demand day savings over the EUL of the assumed DSM program, and;
- revenue requirement difference between the “With DSM” and “No DSM” scenarios

When examining the two components, it becomes clear that the timeframe of the values is not equivalent. The revenue requirement difference between the “With DSM” and “No DSM” scenarios is valued from 2015 to 2071 and the peak demand day savings are included from 2015 to 2032.



Figure 9 – Components of Avoided Reinforcement Cost Calculation



To develop a $\$/10^3\text{m}^3$ metric for each year of the DSM programs EUL, both the avoided reinforcement costs and the peak day demand savings must be expressed for an equivalent time period. In order to correct for this difference, the annual revenue requirements for the years beyond the EUL of the DSM program (i.e. 2033 to 2071) have been present valued and then amortized over the 18 year EUL (i.e. 2015 to 2032). It should be noted that on a present value basis the two cash flows are equivalent.

3.5 DSM Load Shapes

As discussed previously, the avoided distribution costs must be expressed on a volumetric basis ($\$/10^3\text{m}^3$) to allow the avoided distribution costs to be added to the avoided transmission costs and multiplied by the annual gas DSM savings (10^3m^3). To complete this conversion, load profiles are required to determine the ratio of peak day demand volume to annual volume. The avoided transmission costs are calculated for four “load shapes. The avoided distribution costs are calculated using the same four load shapes, allowing the two metrics (avoided transmission and avoided distribution costs) to be additive.

- Space heating;
- Water heating;
- Space and water heating; and,
- Industrial load.



Daily gas consumption for each load shape is gathered. The total annual consumption for the year is calculated and the gas consumption for the peak day demand (January 15) is determined. The consumption for the peak day demand is divided by the total annual consumption. The ratio for each of the four DSM load shapes is used to convert the peak day demand distribution avoided cost (\$/10³m³ annual peak day demand) to a volumetric avoided cost. The result is a cost per annual volume metric (\$/10³m³) for each of the four load shapes representing avoided distribution costs that can be multiplied by the annual volume of gas savings from a DSM program in a given year.

In addition to the annual avoided distribution cost values, the avoided distribution costs have also been calculated on a “levelized” basis with a single avoided distribution cost. This levelized value can be used as an alternative to the annual avoided costs for the EUL of the DSM program, and produces an equivalent result on a net present value basis.



4 RESULTS

4.1 Summary of Results

The avoided distribution costs in terms of $\$/10^3\text{m}^3$ for each of the four load shapes are summarized in Table 6, below.

Table 6 – Avoided Distribution Costs ($\$/10^3\text{m}^3$)

Year	Industrial Processing	Space Heating	Water Heating	Space and Water Heating
2015	\$5.14	\$17.95	\$4.88	\$16.51
2016	\$4.32	\$15.10	\$4.11	\$13.89
2017	\$4.27	\$14.93	\$4.06	\$13.73
2018	\$4.22	\$14.74	\$4.01	\$13.55
2019	\$4.16	\$14.53	\$3.95	\$13.36
2020	\$4.09	\$14.30	\$3.89	\$13.15
2021	\$4.02	\$14.06	\$3.82	\$12.93
2022	\$3.95	\$13.81	\$3.75	\$12.70
2023	\$3.87	\$13.54	\$3.68	\$12.45
2024	\$3.79	\$13.26	\$3.60	\$12.20
2025	\$3.71	\$12.97	\$3.53	\$11.93
2026	\$3.62	\$12.67	\$3.44	\$11.65
2027	\$3.54	\$12.36	\$3.36	\$11.36
2028	\$3.44	\$12.04	\$3.27	\$11.07
2029	\$3.35	\$11.71	\$3.18	\$10.77
2030	\$3.25	\$11.37	\$3.09	\$10.45
2031	\$3.15	\$11.02	\$3.00	\$10.14
2032	\$3.05	\$10.67	\$2.90	\$9.81

In addition to the annual avoided distribution cost values, the results have also been calculated on a “levelized” basis with a single avoided distribution cost per unit of peak day demand ($\$/10^3\text{m}^3$). These levelized values, shown in Table 7, can be used as an alternative to the annual avoided costs for the EUL of the DSM program, and produces an equivalent result on a net present value basis.



Table 7 – Annual Avoided Distribution Costs (nominal \$/10³m³)

Decrement Scenario	\$/10 ³ m ³
Industrial Processing	\$3.99
Space Heating	\$13.96
Water Heating	\$3.79
Space and Water Heating	\$12.84



APPENDIX A: ENBRIDGE REVENUE REQUIREMENT ASSUMPTIONS

To calculate the value of the deferred reinforcement costs, the cost of the average annual reinforcement project was calculated in terms of an annual revenue requirement over the asset life. The following Enbridge-specific assumptions were used in the calculation.

Table 8 - Enbridge-Specific Revenue Requirement Assumptions

Metric	Assumption
Tax Rate	26.5%
CCA Depreciation Rate	6%
O&M (%)*	0%
Asset Life	40 years
Weighted Cost of Capital (before tax)	6.8%
Reinforcement Cost Deferral Period (EUL)	18 years

* The O&M percentage used is derived based on an investigation of various costs for reinforcement mains and the following was identified:

1. In Line Inspection (i.e. inspection of the internal walls of the pipe) – this would apply to major reinforcement mains, but not all projects, and would be required every 7 years. The cost is relatively minor compared to the capital invested, and on a PV basis is not considered significant.
2. Leak Survey – leak survey conducted by vehicle or having an inspector walk the pipeline route, the cost is not considered significant
3. Cathodic Protection – would use a small electric load over a year, the cost would not be material.

The annual impact on revenue requirement is calculated using a financial model which reflects the incremental cash flows associated with the reinforcement project. This includes the capital investment and return on rate base, depreciation expense, debt service and taxes payable.

Error! Reference source not found. summarizes the revenue requirement and avoided distribution cost calculations.



Figure 10 – Avoided Distribution Cost Calculation

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Revenue Requirement: No DSM	\$2,218,464	\$1,955,880	\$1,939,681	\$1,921,853	\$1,902,495	\$1,881,697	\$1,859,546	\$1,836,123	\$1,811,505 ...	
Revenue Requirement: with DSM	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0 ...	
Difference (No DSM - with DSM)	\$2,218,464	\$1,955,880	\$1,939,681	\$1,921,853	\$1,902,495	\$1,881,697	\$1,859,546	\$1,836,123	\$1,811,505 ...	
Peak Day Demand Growth (103m3)	1047	1047	1047	1047	1047	1047	1047	1047	1047 ...	
\$/103m3	\$2,120	\$1,869	\$1,853	\$1,836	\$1,818	\$1,798	\$1,777	\$1,755	\$1,731 ...	
A: \$/103m3 over the 40 year revenue requirement of both scenarios (2015 to 2072)										
Industrial Processing	0.32%	\$6.88	\$6.07	\$6.02	\$5.96	\$5.90	\$5.84	\$5.77	\$5.70	\$5.62 ...
Space Heating	1.13%	\$24.06	\$21.21	\$21.03	\$20.84	\$20.63	\$20.41	\$20.16	\$19.91	\$19.64 ...
Water Heating	0.31%	\$6.54	\$5.76	\$5.72	\$5.66	\$5.61	\$5.55	\$5.48	\$5.41	\$5.34 ...
Space and Water Heating	1.04%	\$22.13	\$19.51	\$19.35	\$19.17	\$18.97	\$18.77	\$18.55	\$18.31	\$18.07 ...
B: \$/103m3 condensed into 18 year EUL of DSM program										
Industrial Processing	0.32%	\$5.14	\$4.32	\$4.27	\$4.22	\$4.16	\$4.09	\$4.02	\$3.95	\$3.87 ...
Space Heating	1.13%	\$17.95	\$15.10	\$14.93	\$14.74	\$14.53	\$14.30	\$14.06	\$13.81	\$13.54 ...
Water Heating	0.31%	\$4.88	\$4.11	\$4.06	\$4.01	\$3.95	\$3.89	\$3.82	\$3.75	\$3.68 ...
Space and Water Heating	1.04%	\$16.51	\$13.89	\$13.73	\$13.55	\$13.36	\$13.15	\$12.93	\$12.70	\$12.45 ...



APPENDIX B: DSM LOAD SHAPES

To express the results on a volumetric basis, four DSM load shapes capture the percent of total load coincident with the peak demand day. Figure 11 to Figure 14 below, illustrate the load shapes, and the ratio of peak day demand to annual volume is summarized in Table 9.

Figure 11 – Residential Space Heating DSM Load Shape

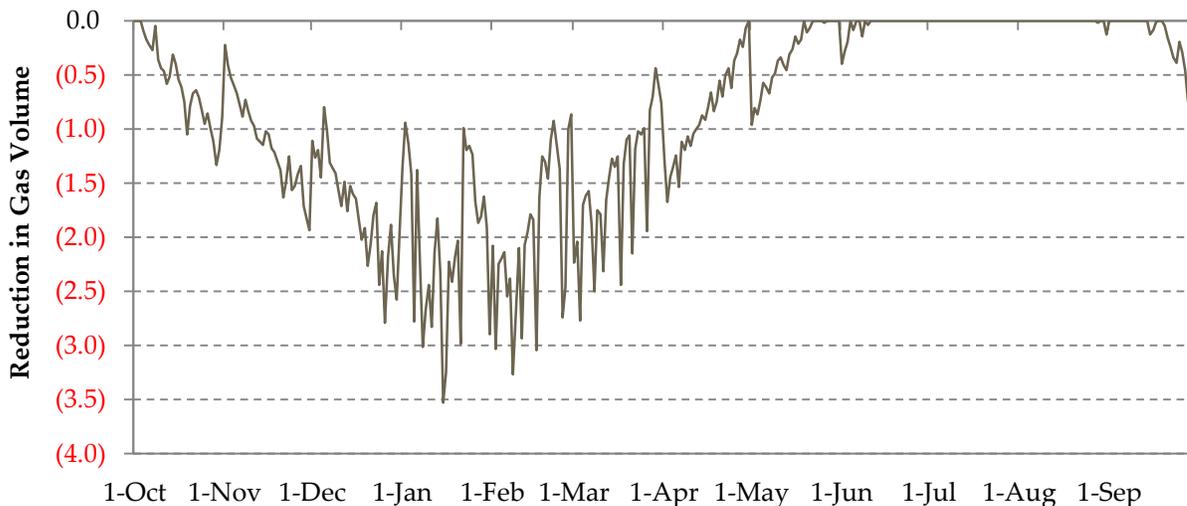


Figure 12 – Residential Water Heating DSM Load Shape

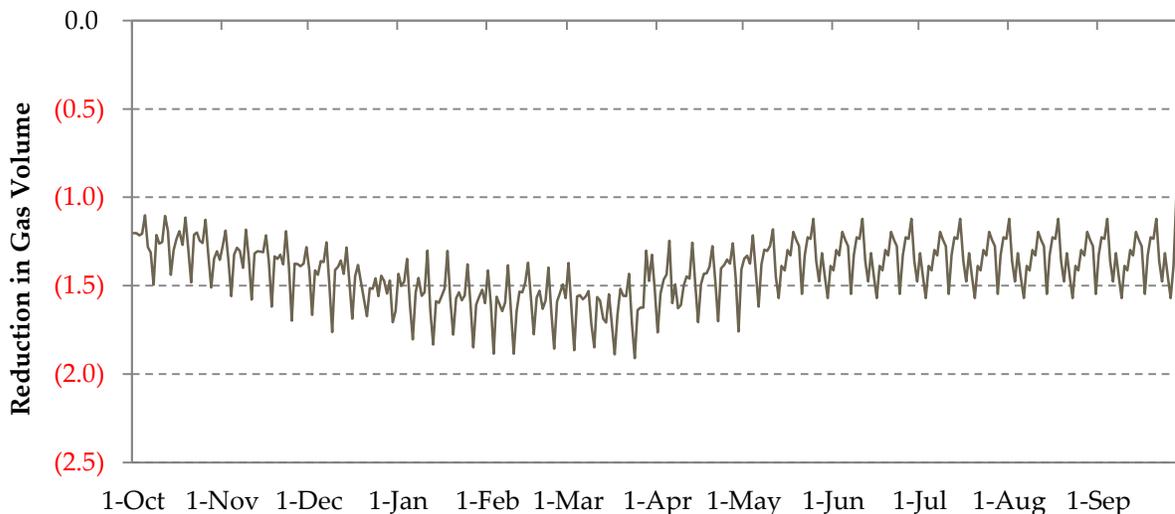




Figure 13 – Space and Water Heating DSM Load Shape

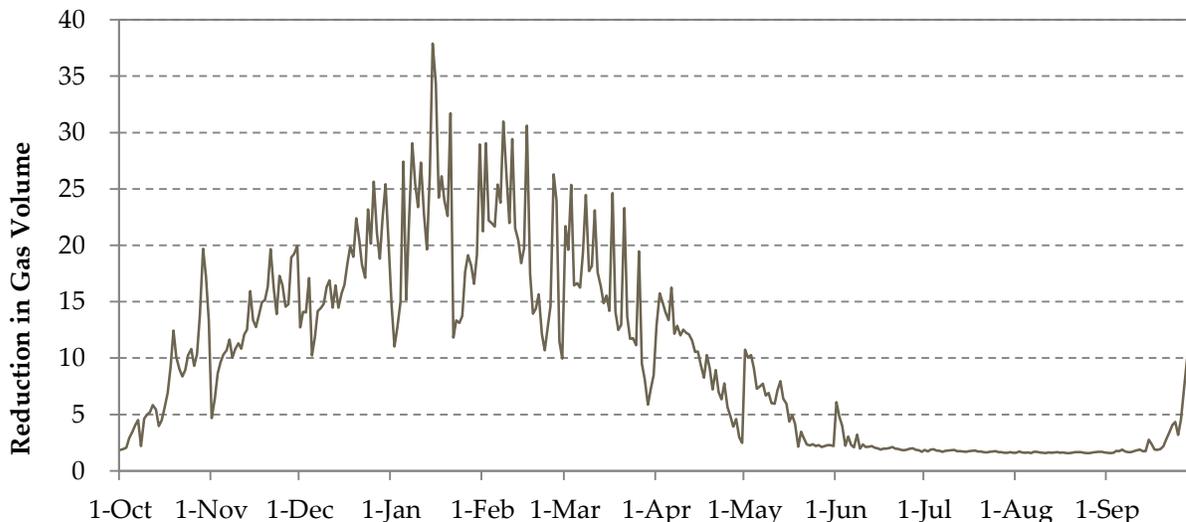
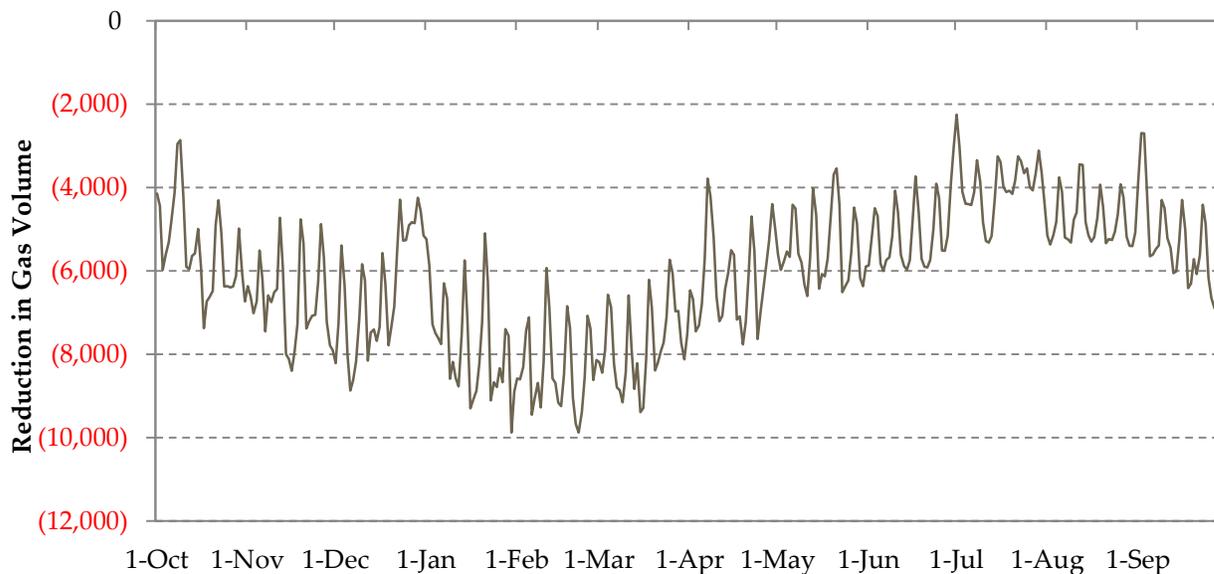


Figure 14 - Industrial Processes DSM Load Shape



To calculate the ratios used to convert the deferred reinforcement cost to a volumetric rate, the daily load shapes were examined. The total load for a one year period was calculated and the load on the peak demand day was isolated and compared to the total load. This calculation results in the peak day load as a percentage of annual volume for each load shape. The calculated ratios for each of the four load shapes are shown in Table 9 below.



Table 9 - Ratios for each Load Shape

Load Shape	Ratio of Peak Day Demand to Annual Volume
Space Heating	1.13%
Water Heating	0.31%
Space and Water Heating	1.04%
Industrial Load	0.32%



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Assessment of Union Gas Avoided Local Distribution System Infrastructure Costs

June 29, 2018

Submitted to:
Union Gas

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ICF

Table of Contents

Table of Contents	i
1. Introduction and Executive Summary	1
1.1 Overview of Distribution System Avoided Costs	1
1.2 Overview of Study Methodology	2
Avoided Cost Methodology Review	2
Review of Union Distribution Facility Investments and Costs	3
2. Avoided Cost Methodology Review	4
2.1 Distribution System Avoided Cost Methodologies in Other Jurisdictions	4
Retail Margin Approach	5
System Reinforcement Cost Approach	8
Range of Avoided Distribution Costs	11
2.2 Union Gas’s Supply Avoided Cost Methodology	13
2.3 Enbridge’s Avoided Distribution Facility Cost Methodology	15
Methodology Concept	15
Ratepayer Perspective	16
Per Unit Costs	17
2.4 Differences Between Union Gas and Enbridge Gas Systems	18
Union Gas	18
Enbridge Gas Distribution	20
Avoided Distribution Cost Differences	20
2.5 Recommended Revisions to Enbridge’s Distribution Avoided Cost Methodology	21
3. Review of Union Distribution Facility Investments and Costs	23
3.1. Union Gas Future System Facility Expansion Costs	23
3.2. Dawn Parkway Transportation Costs	24
4. Assessment of DSM Program Impacts	25
4.1. Load Shapes	25
5. Calculation of Distribution Avoided Cost	28
5.1. Model Inputs	28
5.2 Distribution System Avoided Facilities Costs for the Total Resource Cost (TRC) Test	28
Dawn Parkway Transportation Costs	30
Total Avoided Facilities Costs for the TRC Test	30
5.3 Distribution System Avoided Facilities Costs for the Rate Impact (RIM) Test	31
Total Avoided Distribution System Facilities Costs for the RIM Test	33
Adding Avoided Distribution System Facilities Costs to Other Avoided Costs	34
Appendix: Review of Enbridge’s Avoided Distribution Cost Methodology by Other Parties ...	36



1. Introduction and Executive Summary

Union Gas Limited (Union Gas) commissioned ICF to produce a study to determine a reasonable value for avoided local distribution system infrastructure costs that result from the implementation of Demand Side Management (DSM) programs. These avoided costs are generated when DSM programs reduce future growth in gas demand, resulting in the avoidance or delay of future capital projects, and reduction in other distribution system costs. For Union Gas, these costs include:

- Costs related to system expansions required due to growth in demand, including local distribution and transmission system reinforcements.
- Costs related to expansion of major transmission systems to meet projected load growth, including future expansions of the Panhandle and Sarnia Industrial lines.
- Costs that could be reduced by reducing peak demand, including in-franchise allocation of the Dawn-Parkway system costs.

Distribution system costs related to system O&M expenditures and other expenditures that would not change with a change in throughput volume do not contribute to the avoided distribution system costs. These costs include:

- Facilities costs and other costs determined by the number of customers and service connections, rather than throughput.
- Costs related to the overall size of the distribution system, including miles of distribution and transmission pipe, rather than throughput.
- Costs related to connecting new customers to the system, including expansion costs to new communities.
- Costs related to replacing existing infrastructure, when needed for system reliability or safety reasons rather than system growth.

1.1 Overview of Distribution System Avoided Costs

Exhibit 1 and Exhibit 2 present the levelized results of the distribution avoided cost calculations for the TRC and RIM tests. These avoided costs are expressed in terms of dollars saved per thousand cubic meters of annual gas demand avoided. The results are presented separately for each load-type. In addition, avoided costs are broken out to show the avoided costs for the distribution and transmission segments, and the Dawn Parkway segment.

Exhibit 1. Total Avoided Distribution Costs by Load Type - TRC Test (C\$/10³ m³)

Load Type	Dist. & Trans.*	Dawn Parkway	Total
Residential/Commercial Weather-Sensitive	22.22	13.81	36.03
Residential/Commercial Baseload	4.81	3.80	8.61
Industrial Baseload	4.81	3.80	8.61

*Includes major transmission system assets except Dawn Parkway



Exhibit 2. Total Avoided Distribution Costs by Load Shape and Service Area (C\$/10³ m³)

Load Type	Dist. & Trans.*	Dawn Parkway	Total
Residential/Commercial Weather-Sensitive	36.02	13.81	49.83
Residential/Commercial Baseload	7.79	3.80	11.60
Industrial Baseload	7.79	3.80	11.60

*Includes major transmission system assets except Dawn Parkway

1.2 Overview of Study Methodology

This study is divided into four steps. Each of these steps and their primary finds are summarized below.

Avoided Cost Methodology Review

The first task in this project involved determining the appropriate methodology to be used to determine distribution system avoided costs. The Ontario Energy Board (OEB) has provided the following guidance on the appropriate methodology:

The OEB expects the utilities to provide a transparent calculation of the avoided costs and a list of the input assumptions that go into this calculation. Given the different geography, system and customers between Union and Enbridge, it is expected that the avoided cost calculation will be specific to each utility; however, the methodology, approach and presentation should be the same for both gas utilities.

Since Enbridge has already developed a methodology for determining avoided distribution system costs, ICF started from the Enbridge methodology, adjusting the methodology to reflect differences between the Union Gas and Enbridge Gas systems.

A part of this project, ICF did the following:

- Reviewed information on distribution system avoided costs provided by Enbridge Gas in the recent OEB proceeding regarding the applications for approval of the natural gas utility 2015-2020 DSM Plans (EB-2015-0029 / EB-2015-0049), as well as OEB and intervenor submissions and comments in this proceeding and in previous proceedings.
- Reviewed the methodology and approaches used in other jurisdictions to evaluate distribution system avoided costs, to determine the range of alternative approaches and to assess the range in the estimates of distribution system avoided costs.
- Assessed the differences between the Union Gas distribution system and the Enbridge distribution system in order to determine where extensions or revisions to the Enbridge methodology may be necessary to represent the Union Gas distribution system.

One of the key elements of defining the methodology was to ensure consistency with the existing Union Gas avoided cost analysis. This included ensuring that the definition of distribution system avoided costs corresponded and complemented the components of the avoided supply cost already calculated by Union Gas. In other words, Union Gas's supply avoided costs and distribution avoided costs should be additive, to allow for a full accounting of avoidable costs across all components of the company's infrastructure.

Review of Union Distribution Facility Investments and Costs

ICF reviewed and assessed Union Gas' distribution system expenditures to determine which costs are potentially avoidable due to changes in demand from DSM activity. Distribution facilities are those that extend from third-party transmission lines to serve individual homes and businesses throughout Union Gas' franchise area. Because of the unique structure of Union's distribution system, ICF included in its review Union-operated transmission lines located downstream of the utility citygate.¹ Distribution system infrastructure investments are divided into two distinct components; maintenance of the existing distribution system, including repair and replacement of existing facilities, and expansion of the distribution system to meet incremental requirements from existing customers, and new requirements from new customers.

In both the investments related to maintenance of the existing distribution system, and the expansion of system the meet new requirements, a significant majority of the costs are related to distribution services, meters, and regulators necessary to serve individual customers. For the vast majority of customers, these costs are necessary to connect the customer to the system, and are not avoidable unless the customer leaves the system entirely.

Avoidable distribution system costs are primarily related to reinforcement projects, which consist of pipeline mains and station projects driven by increases in annual peak demand (i.e., the highest volume of gas required in one hour of a given year) for existing gas lines. ICF calculated that avoidable costs for distribution and transmission system infrastructure would average C\$54.1 million per year across the Utility's service area.

Assessment of DSM Program Impacts

In this task, ICF assessed the potential impacts of DSM programs on Union's distribution system costs consistent with Union's current approach to estimating avoided costs at the gas supply level. This task involved developing "load shapes" to convert avoided distribution system costs from a peak day metric to an annual volume metric. The "load shape" is the ratio of the load-specific design day demand to the load-specific annual gas volumes for three load types: residential/commercial baseload demand (i.e., water heating and cooking), residential/commercial weather-sensitive demand (i.e., space heating), and industrial baseload demand.

Calculation of Distribution System Avoided Cost

After evaluating distribution system costs and determining the impact of DSM programs, ICF prepared calculations of distribution system avoided costs for use with the Total Resource Cost (TRC) and Rate Impact (RIM) tests.² These calculations were conducted consistent with and complementary to the calculation of supply avoided costs currently reported by Union Gas during the DSM planning process. In this task, ICF compared Union's expected distribution system expenditures and revenue requirements under two scenarios: 1) New DSM programs are implemented and distribution system expenditures are delayed or deferred until the DSM program expires; and 2) New DSM programs are not implemented and distribution system expenditures must be initiated as forecast.

¹ A citygate is a point or measuring station at which a distributing gas utility receives gas from a natural gas pipeline company or transmission system.

² Separate avoided distribution facilities costs inputs are needed for the TRC? True? and RIM tests due to the significant impact of taxes and depreciation schedules associated with capital investments on the RIM test that do not need to be considered as part of the TRC.

2. Avoided Cost Methodology Review

The Ontario Energy Board (OEB) has provided the following guidance on the appropriate methodology to be used to determine distribution system avoided costs:

The OEB expects the utilities to provide a transparent calculation of the avoided costs and a list of the input assumptions that go into this calculation. Given the different geography, system and customers between Union and Enbridge, it is expected that the avoided cost calculation will be specific to each utility; however, the methodology, approach and presentation should be the same for both gas utilities.

Since Enbridge has already developed a methodology for determining avoided distribution system costs, ICF started from the Enbridge methodology, and adjusted this methodology to reflect differences between the Union Gas and Enbridge Gas systems. A part of this task, ICF did the following:

- Reviewed the methodology and approaches used in other jurisdictions to evaluate distribution system avoided costs, to determine the range of alternative approaches and to assess the range in the estimates of distribution system avoided costs.
- Reviewed information on distribution system avoided costs provided by Enbridge Gas in the recent OEB proceeding regarding the applications for approval of the natural gas utility 2015-2020 DSM Plans (EB-2015-0029 / EB-2015-0049), as well as OEB and intervenor submissions and comments in this proceeding and in previous proceedings.
- Assessed the differences between the Union Gas distribution system and the Enbridge distribution system in order to determine where extensions or revisions to the Enbridge methodology may be necessary to represent the Union Gas distribution system.

ICF also worked to ensure consistency with the existing Union Gas avoided cost analysis. This included ensuring that the definition of distribution system avoided costs corresponded and complemented the components of the avoided supply cost already calculated by Union Gas. In other words, Union Gas's supply avoided costs and distribution avoided costs should be additive, to allow for a full accounting of avoidable costs across all components of the company's infrastructure.

2.1 Distribution System Avoided Cost Methodologies in Other Jurisdictions

ICF reviewed methodologies used in other jurisdictions to estimate distribution system avoided costs in order to determine the range of alternative approaches and to assess the range of avoided cost estimates used by other natural gas distribution companies. ICF reviewed six natural gas utilities that had distribution cost components in their avoided cost methodologies. These utilities primarily used one of two approaches to calculate avoided distribution costs:

- **Retail Margin Approach:** this approach values avoided distribution costs by calculating the average difference in cost for gas delivered to the citygate and the cost of gas delivered to the customer with and without the DSM program.
- **System Reinforcement Cost Approach:** this approach calculates avoided distribution costs based on estimates of the planned reinforcement costs during the planning period with and without the DSM program. Under this approach, the value created from a DSM program is derived from the utility's ability to defer or delay distribution system investments into future. Enbridge's avoided cost approach falls into this category.

Of the approaches that ICF examined, avoided costs were commonly calculated on an annual basis over the Effective Useful Life (EUL) of the DSM program and then levelized and expressed in present value terms. The following subsections summarize the avoided cost methodologies for utilities examined by ICF. These summaries are categorized by approach type.

Retail Margin Approach

New England³

A study prepared for the Avoided-Energy-Supply-Component (AESC) Study Group provides estimates of avoided costs to support program administrators in their internal decision-making and regulatory filings for energy efficiency program cost-effectiveness analysis. The study calculates natural gas distribution system avoided costs using a retail margin approach, which focuses on the avoidable Local Distribution Company (LDC) margin. The study notes that the portion of the LDC margin that is avoidable varies by utility and by customer sector (residential; and commercial and industrial (C&I)), with avoidable costs for heating (low load factor) loads higher than for non-heating (high load factor) loads. The study measures avoidable costs as a percentage of the LDC margin, which is represented as the difference between the citygate price of gas that the utility pays to acquire gas and the retail prices charged for gas delivered to each of the utility's different customer types. Exhibit 3, extracted from the AESC study, presents estimated avoidable LDC margins in New England in constant 2015 U.S. dollars per MMBtu.

³ This section summarizes portions of: Hornby, Rick et al. [Avoided Energy Supply Costs in New England](#). Prepared for the Avoided-Energy-Supply-Component (AESC) Study Group. March 27, 2015 (Revised April 3, 2015).

Exhibit 3. Estimated Avoidable LDC Margins in New England

	LDC Average Retail Margin + City-Gate Cost (a)	Avoidable LDC Margin (a)		
		Non-heating (High Load Factor)	Heating (Low Load Factor)	All
		%	%	
Avoidable Margin (percent) (b)				
Residential		8.0%	21.0%	20.4%
Commercial & Industrial		15.0%	28.0%	24.0%
All Retail				22.0%
Southern New England (c)		2015\$/MMBtu		
Average City Gate Price	6.975			
Residential	7.709	0.62	1.62	1.57
Commercial & Industrial (e)	4.082	0.61	1.14	0.98
All Retail (f)	5.805			1.28
Northern New England (d)				
Average City Gate Price	8.454			
Residential	6.590	0.53	1.38	1.34
Commercial & Industrial (e)	3.198	0.48	0.90	0.77
All Retail (f)	3.676			0.81
Vermont				
Average City Gate Price	8.010			
Residential	9.087	0.73	1.91	1.85
Commercial & Industrial (e)	3.740	0.56	1.05	0.90
All Retail (f)	4.349			0.96

(a) Average of Margins among states for 2009-2013 weighted by the delivered volumes in each state.
 (b) Based on LDC marginal cost studies from National Grid (MA).
 (c) Southern New England is Massachusetts, Connecticut, and Rhode Island.
 (d) Northern New England is New Hampshire and Maine.
 (e) An average of the margins weighted by the commercial and industrial use delivered volumes.
 (f) An average of residential, commercial and industrial margins weighted by associated volumes.

Avoided Energy Supply Costs in New England (2015)

It is important to note that the avoided distribution gas costs presented in Exhibit 3 are not independently estimated. That is, all of the costs presented are derived by taking the average retail margin in the geographic area and multiplying them a constant percentage that Synapse estimated as appropriate for all utilities in the region. These percentages are shown at the top of Exhibit 3: 21% of the residential retail margin and 28% of C&I retail margin are assumed to be avoidable by DSM programs targeting space heating (high load factor) demands, while 8% and 15% of the retail margins for residential and C&I customers, respectively, are assumed to be avoidable through DSM programs targeting non-heating (low load factor) demands. Synapse obtained these percentage estimates from marginal cost studies conducted by National Grid Massachusetts. Because each utility’s distribution system differs, it may not be appropriate to apply National Grid’s avoidable cost estimates to all utilities in New England, or for utilities outside of New England.

NW Natural (Oregon and Washington)⁴

Northwest Natural (NW Natural), a natural gas utility in the U.S. Pacific Northwest calculates distribution system avoided costs using a retail margin approach in Oregon and a system reinforcement cost approach in Clark County, Washington. In Oregon, avoided distribution costs are derived from the long-run incremental cost of the distribution system in Oregon, which is based on NW Natural’s last general rate case in Oregon. In Washington, avoided distribution costs are determined by the planned distribution system reinforcement projects in Clark County over the planning IRP horizon. NW Natural

⁴ This section summarizes portions of: NW Natural. [2016 Integrated Resource Plan](#). LC-64. UG-151776. July 2015. Draft for Public Comment.

currently assumes that the entire costs of these projects can be avoided by DSM savings. NW Natural’s avoided distribution cost methodology in Washington produces a measure of \$ per unit of avoided design-peak capacity (reported in dekatherms). NW Natural converts this measure to a \$ per unit of annual gas volume using the ratio of peak day to normal annual usage. Exhibit 4 presents NW Natural’s avoided cost results by State, customer load type, and cost component. Distribution system capacity values are presented in the sixth column from the left.

Exhibit 4. NW Natural 2016 IRP DSM Avoided Cost Results by Component and Load Type

20 Year Levelized Avoided Cost Breakdown* (2015\$/Dth)							
	Carbon Inclusive Gas and Gas Transport Costs	Hedge Value of DSM	Base Case Incremental Carbon Policy Adder	Supply Resource Capacity Value	Distribution System Capacity Value	10% Conservation Adder**	Total Levelized Avoided Costs
OR- Residential Space Heat	\$3.19	\$0.07	\$0.67	\$1.28	\$0.28	\$0.48	\$5.98
OR- Commercial Space Heat	\$3.19	\$0.07	\$0.67	\$1.14	\$0.25	\$0.46	\$5.80
OR- Base Load	\$3.19	\$0.07	\$0.67	\$0.17	\$0.04	\$0.34	\$4.49
OR- Interruptible or Recall	\$3.19	\$0.07	\$0.67	X	X	\$0.32	\$4.26
WA- Residential Space Heat	\$3.19	\$0.07	\$1.07	\$1.28	\$0.81	\$0.53	\$6.95
WA- Commercial Space Heat	\$3.19	\$0.07	\$1.07	\$1.14	\$0.72	\$0.51	\$6.71
WA- Base Load	\$3.19	\$0.07	\$1.07	\$0.17	\$0.11	\$0.35	\$4.96
WA- Interruptible or Recall	\$3.19	\$0.07	\$1.07	X	X	\$0.32	\$4.66
2016 IRP Values, 2014	\$3.19	X	X	X	X	\$0.32	\$3.51
2014 IRP	\$4.13	X	X	X	X	\$0.41	\$4.54

*Values do not incorporate measure lives; ** 10% Conservation adder not applied to hedge value or Carbon Policy Adder

Source: NW Natural 2016 IRP

Exhibit 4 shows that NW Natural’s avoided distribution costs for residential space heating customers varies significantly by State, with avoided distribution costs of 2015 US\$0.28/Dth in Oregon, or approximately 5% of total avoided costs, to 2015 US\$0.81/Dth in Washington, or about 12% of total avoided costs. The wide variance in these estimates is likely due to the application of different calculation methodologies for each State but may also reflect differing system characteristics.

Avista (Idaho)⁵

Avista, an electric and natural gas utility in the U.S. Pacific Northwest, estimates avoided distribution costs using a retail margin approach. Under this approach, Avista calculates avoided distribution costs by taking the demand portion of Avista’s purchase gas cost adjustment (Schedule 150). This value is listed as 11.389 US cents per therm in the company’s latest Schedule 150.⁶ This equates to US\$1.14/Dth, or approximately 45% of Avista’s total avoided costs, which are estimated to be about US\$2.50 in 2017.⁷

Xcel Energy (Colorado)⁸

⁵ This section summarizes portions of: Avista Utilities. *2016-2025 Ten-Year Achievable Conservation Potential and 2016-2017 Biennial Conservation Target Report*. UE-152076.

⁶ Avista Utilities. *I.P.U.C. No. 27*. Twenty-Third Revision Sheet 150. Issued January 3, 2017. Effective February 3, 2017.

⁷ Avista Utilities. 2016 Natural Gas IRP. Appendix.

⁸ This section summarizes portions of: Xcel Energy. *2015/2016 Demand-Side Management Plan: Electric and National Gas*. Public Service Company of Colorado. Proceeding No. 14A-1057EG. August 20, 2015.



Xcel Energy only considers variable O&M costs when valuing avoided distribution system costs. In its 2015, DSM plan, the utility noted that the company’s Pricing and Planning department provided a value of US\$0.05/Dth for avoided O&M costs associated with reductions in gas usage.

Maryland⁹

Exeter, a consulting company, calculated avoided natural gas distribution costs for Maryland in 2014 using a retail margin approach. Under this approach, transmission and distribution (T&D) cost projections were based on historical T&D costs for Maryland residential, commercial, and industrial customers. Exeter isolates T&D costs by subtracting Henry Hub natural gas prices from retail prices for each sector. Note, this approach would capture not only the retail margin, but also pipeline capacity costs from the supply source. These baseline T&D values are adjusted using regional growth rates derived from the U.S. Energy Information Administration’s (EIA’s) Annual Energy Outlook (AEO) Reference Case. Exeter then took annual regional growth rates for T&D and then calculated and applied them to the 2011 Maryland T&D costs to create a set of Maryland-specific T&D cost projections. Exhibit 5 presents a summary of Exeter’s estimated avoided costs by cost component in 2012 US\$/MMBtu. Note, that the Exeter methodology assumes that 100% of the retail margin is avoidable.

Exhibit 5. Maryland Natural Gas Avoided Cost Components (2012 US\$/MMBtu)

Year	Henry Hub	Transmission	Distribution Costs		
			Residential	Commercial	Industrial
2013	\$3.56	\$2.01	\$6.20	\$4.41	\$1.30
2014	3.89	1.99	6.19	4.29	1.29
2015	3.92	1.99	6.03	4.14	1.32
2016	3.91	1.99	6.02	4.06	1.19
2017	4.14	1.98	6.12	4.10	1.19
2018	4.37	1.97	6.21	4.13	1.18
2019	4.61	1.96	6.29	4.16	1.19
2020	4.75	1.95	6.36	4.18	1.20
2021	4.91	1.94	6.36	4.12	1.10
2022	5.11	1.93	6.38	4.08	1.04
2023	5.26	1.92	6.39	4.03	0.98
2024	5.40	1.92	6.43	4.02	0.96
2025	5.48	1.91	6.47	4.00	0.93
2026	5.57	1.91	6.60	4.10	1.03
2027	5.63	1.91	6.60	4.04	0.96
2028	5.69	1.90	6.63	4.01	0.92
2029	5.72	1.90	6.69	4.02	0.92
2030	5.76	1.90	6.73	4.00	0.89

Source: Avoided Energy Costs in Maryland (April 2014)

System Reinforcement Cost Approach

Puget Sound Energy (Washington)¹⁰

⁹ This section summarizes portions of: Exeter Associates, Inc. *Avoided Energy Costs in Maryland: Assessment of the Costs Avoided through Energy Efficiency and Conservation Measures in Maryland*. Prepared for Maryland Department of Natural Resources. Final Report. April 2014.

¹⁰ This section summarizes portions of: Wilhelm, Bobette. *Avoided Cost Calculations of Energy Efficiency Programs*. Puget Sound Energy. August 2012. (UG-121207)



The avoided natural gas distribution cost methodology that Navigant developed for Enbridge was based on a similar system reinforcement cost approach used by Puget Sound Energy (PSE), an electric and natural gas utility in the Seattle area. PSE’s approach accounts for the deferred cost of distribution system reinforcements (pipeline capacity expansions driven by peak demand increases). In as much as DSM programs reduce peak demand, PSE may defer pipeline reinforcement projects. Because the reinforcement costs on a pipeline are a one-time cost and those costs are simply deferred (not necessarily avoided by DSM programs) the yearly avoided costs of pipeline distribution capacity costs are represented as an avoided payment, or the yearly value of a levelized cost.

National Grid (New York)^{11 12}

National Grid has three operating companies in New York: Brooklyn Union Gas Company and KeySpan Gas East Corporation in downstate New York, and Niagara Mohawk in upstate New York. As part of its rate case filing, National Grid files marginal cost studies for each of these utilities with the New York Public Service Commission. The studies examines the cost of serving incremental increases in gas demand and is used to inform rate setting, however, the study’s approach could also be adapted to evaluate avoided costs.

National Grid’s approach for its downstate utilities take into account three categories of distribution system costs—transmission, distribution, and customer costs. These categories include investments in transmission assets downstream of the citygate, distribution system reinforcement mains, regulation projects, LNG storage/peak shaving facilities, and customer-level facilities, including meters, services, and the customer component of distribution mains. The study focuses on the costs of growth-related infrastructure over a five-year planning period. For larger projects that may serve multiple purposes, National Grid makes appropriate adjustments to capture the growth-related portion of the project.

National Grid converts all capital investment costs to annual revenue requirements using economic carrying charge rates that correspond to each plant type. These revenue requirements represent the costs that would be reflected in rates on a levelized basis over the life of the plant. For each of the three infrastructure categories, National Grid examines capital costs and O&M cost, and applies appropriate general plant, Administrative and General (A&G) expense, and working capital loading factors. In addition, National Grid makes adjustments to account for lost and unaccounted for (LAUF) gas and to account for uncollectible expenses.

Exhibit 6 summarizes marginal cost estimates for National Grid’s two downstate operating companies. The costs in are expressed in 2016 US dollars, and transmission and distribution costs are expressed on a per-unit (dekatherm) of design day demand. The per-unit conversions are calculated by applying a loading factor for each customer class.

Exhibit 6. Summary of KeySpan Gas East Corp. Marginal Costs (2016 US\$)

KeySpan Gas East Corp

Brooklyn Union Gas

¹¹ This section summarizes portions of: DeCicco, Phillip A. *Case 16-G-0059 - Proceeding On Motion of the Commission as to the Rates, Charges, Rules and Regulations of The Brooklyn Union Gas Company d/b/a National Grid NY for Gas Service*. National Grid. February 8, 2017.

¹² This section summarizes portions of: Niagara Mohawk Power Corporation. *Proceeding on Motion on the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation for Electric and Gas Service – Testimony and Exhibits of: Gas Rate Design Panel Exhibit (G-RDP-1) through Exhibit (G-RDP-9)*. Book 24. Submitted to New York State Public Service Commission. April 2012.



Service Classification	Transmission Marginal Costs Per Dth	Distribution Marginal Costs Per Dth	Customer Marginal Costs Per Month Per Customer
SC 1A – Res. Non-Heat	\$0.5311	\$1.0604	\$25.05
SC 1B – Res. Heat	\$0.7924	\$1.5819	\$31.63
SC 1 DG – Res. DG	\$0.7321	\$1.4615	\$31.14
SC 2A – GS Non-Heat	\$0.2860	\$0.5711	\$63.68
SC 2B – GS Heat	\$0.8686	\$1.7341	\$63.46
SC 3A – MF Non-Heat	\$0.5231	\$1.0443	\$121.44
SC 3B – MF Heat	\$0.6846	\$1.3668	\$202.03
SC 4 – Int. Sales	\$0.1661	\$0.3316	\$263.84
SC 7 – Int. Transp.	\$0.1657	\$0.3309	\$443.63
SC 7 – Sm. Electric Gen.	\$0.1657	\$0.3309	\$630.48
SC 9 – Wholesale NGV	\$0.1657	\$0.3309	\$378.15
SC 12 – Temp. Control	\$0.1734	\$0.3463	\$464.26
SC 14 – Lg. Electric Gen.	\$0.1657	\$0.3309	\$10,353.30
SC 15 – High Load Factor	\$0.1657	\$0.3309	\$263.25
SC 16 – Space Cond.	\$0.2928	\$0.5846	\$443.63
SC 17 – Baseload DG	\$0.1657	\$0.3309	\$173.05

Service Classification	Transmission Marginal Costs Per Dth	Distribution Marginal Costs Per Dth	Customer Marginal Costs Per Month Per Customer
SC 1A – Res. Non-Heat	\$0.2212	\$0.8663	\$15.14
SC 1B – Res. Heat	\$0.4769	\$1.8675	\$29.47
SC 1 DG – Res. DG	\$0.5695	\$2.2299	\$46.67
SC 2-1 – GS Non-Heat	\$0.1873	\$0.7333	\$60.72
SC 2-2 – GS Heat	\$0.5323	\$2.0845	\$61.52
SC 3 – Multi-Family	\$0.4262	\$1.6690	\$96.11
SC 4A – High Load Factor	\$0.1164	\$0.4560	\$439.86
SC 4A CNG – HLF CNG	\$0.1318	\$0.5162	\$439.86
SC 4B – Year Round A.C.	\$0.3442	\$1.3480	\$197.61
SC 5A – Large Vol. Sales	\$0.1012	\$0.3964	\$351.23
SC 6C – TC C&I	\$0.1020	\$0.3995	\$443.33
SC 6G – TC Gov’t	\$0.1012	\$0.3964	\$439.86
SC 6M – TC Multi-Family	\$0.1013	\$0.3965	\$351.30
SC 7 – Seasonal Off-Peak	\$0.1012	\$0.3964	\$58.46
SC 18 – Sm. Electric Gen.	\$0.1012	\$0.3964	\$638.94
SC 20 – Electric Gen.	\$0.1012	\$0.3964	\$11,036.68

Source: National Grid

In addition, National Grid filed a marginal cost study in 2012 for Niagara Mohawk in upstate New York. The major difference between the downstate and upstate studies are that a) the upstate study does not include transmission assets because the utility did not have any recent transmission investments related to load growth, and b) the per-unit costs were not annualized and adjusted for customer specific load factors. The Niagara study arrived at an annual cost of 2012 US\$109.13/Dth of design day demand. Adjusting this value using customer-specific load factors from the studies for downstate utilities, ICF estimates annualized costs of 2012 US\$1.38/Dth for residential heating customers and 2012 US\$0.34/Dth for high load factor customers.

FortisBC (FBC)¹³

FBC, an electric and natural gas utility in British Columbia, uses an avoided electricity cost methodology that considers both energy savings, valued at the marginal cost of the electricity, and demand savings, valued as a deferred upgrade cost. Both the components include the avoided transmission and distribution energy losses. In its regulatory filings, FBC acknowledges that “the calculation of distribution avoided cost is particularly complicated because the distribution grid has been built for all existing customers and the main purpose is to provide reliability to customers. As a result, the maximum avoided cost may only be realized in areas of grid expansion due to load growth. Even in areas of growth, distribution system costs can be avoided only when the DSM programs are included in the design process.” FBC’s deferred upgrade cost approach for the distribution component takes into account forecasted capital investments over the planning horizon, and involves the following steps.

1. Determine analysis period.
2. Determine expected peak growth over the analysis period.
3. Determine the forecasted distribution system investments due to growth over the analysis period.
4. Exclude capital investments needed to support current load.
5. Exclude capital investments needed to repair or replace current equipment.

¹³ This section summarizes portions of: FortisBC, Inc. [Application for Approval of Demand Side Management Expenditures for 2015 and 2016](#). Submitted to British Columbia Utilities Commission. August 18, 2016.



6. Exclude new connection capital costs.
7. Calculate the annualized \$/kW-yr avoided distribution cost as the avoided investment divided by load growth times a real carrying charge.
8. If applicable add avoidable general plant and O&M adders.

Range of Avoided Distribution Costs

Each utility reports and categorizes costs differently with respect to customer types and load types. Cost metrics are also reported for different years, in different currencies, and in different units of volume. ICF converted these metrics into a common unit—2017 Canadian dollars per thousand cubic meters (2017 C\$/10³m³)—and lists them in Exhibit 7 for four commonly reported customer load categories: residential space heating, residential water heating, industrial non-heating, and all sectors & loads.¹⁴

¹⁴ Reported costs for U.S. geographies were converted to 2017 dollars using the U.S. Consumer Price Index and then converted to Canadian dollars using a constant exchange rate of 1.3 Canadian dollar per U.S. dollar. Enbridge costs were converted to 2017 dollars using the Canadian inflation rate.

Exhibit 7. Avoided Distribution Costs by Customer/Load Type, Company, and Geography (2017 C\$/10³m³)

Utility/Study	Geography	Space Heating (Low Load Factor)		Industrial Non Heating (High Load Factor)	All Sectors & Loads
		Resid.	C&I		
Enbridge	Ontario	14.40		4.12	
NW Natural	Oregon	13.75	12.28	1.96	
	Washington	39.78	35.36	5.40	
Xcel Energy ^A	Colorado				2.46
National Grid (NY)	KeySpan Gas East	114.83		24.39	
	Brooklyn Union	115.15		28.11	
	Niagara Mohawk	70.15		17.42	
AESC ^B	Northern N. England	67.78	44.21	23.58	39.78
	Southern N. England	79.57	55.99	29.96	62.87
	Vermont	93.81	51.57	27.51	47.15
Avista	Idaho				55.99

^A cost based on variable O&M only

^B costs estimated for each region based National Grid Marginal Cost study.

Source: ICF research and conversions

Exhibit 7 shows that companies report a wide range of avoided distribution facility costs. Avoided distribution system infrastructure costs from Enbridge’s 2015 avoided cost study are similar to NW Natural’s avoided cost estimates in Oregon, but are significantly lower than the AESC Study Group’s estimates for utilities in New England. It should be noted that aside from Enbridge, all of the other estimates presented in Exhibit 7 were arrived at using a marginal cost approach.

As previously noted, avoided distribution gas costs reported by the AESC Study are not independently estimated. Instead, Synapse applies a set of constant sector-specific percentages to average retail margins for different geographic areas in New England. Synapse obtained these percentage estimates from marginal cost studies conducted by National Grid Massachusetts. It is important to note that the cost structure for National Grid (and for other utilities in New England) may differ significantly from utilities in other regions. For instance, National Grid’s distribution system in Massachusetts relies heavily on the use of peak shaving facilities to provide incremental gas during peak demand periods, and these costs are included in their customers’ cost of service.

Similarly, the estimates of marginal distribution costs for National Grid in downstate New York are high because they include significant costs for the local transmission system serving New York City (investments in the New York Facility Group) and for LNG peak shaving facilities.

The utilities in New England and the Northeast US also have significant customer growth potential given the significant number of residential homes currently heated with fuel oil. As a result, these utilities are generally expanding the distribution system into new territories in order to meet growth in load. The costs of these expansion opportunities would be quite different than the costs associated with serving incremental growth in existing service territories.

Utilities in other regions, such as Ontario, have access to large underground storage facilities to provide peak day gas supply and these facilities typically are less expensive to consumers on a per-unit basis.



2.2 Union Gas's Supply Avoided Cost Methodology¹⁵

Union Gas uses the SENDOUT© supply planning model to estimate supply avoided gas costs. The SENDOUT© model is an industry standard natural gas supply portfolio model, and is widely used in supply planning and avoided cost estimation throughout the natural gas industry.

The SENDOUT© model as used by Union Gas calculates the incremental cost of serving natural gas load, including the following cost components:

- **Natural gas commodity costs.** The reduction in demand associated with DSM programs leads to a direct reduction in purchases of the most expensive source of incremental supply in a utility's supply portfolio. The cost of the natural gas commodity represents the largest component of avoided costs for most natural gas distribution companies, including Union Gas.
- **Pipeline capacity requirements and costs.** Reduction in gas demand associated with DSM programs can reduce upstream pipeline capacity requirements, allowing a utility to reduce capacity purchases at the expiration of existing pipeline capacity contracts. However, a reduction in pipeline capacity into any supply market would lead to an increase in average commodity prices, offsetting some of the cost savings associated with holding less pipeline capacity.
- **Seasonal storage requirements.** Weather-sensitive DSM programs targeted at the residential and commercial sectors can have a relatively significant impact on the required levels of storage. Union Gas owns storage capacity located in the Dawn area, which is reserved to serve in-franchise demand requirements. In addition to reducing required capacity costs, weather-sensitive DSM programs also affect variable injection, withdrawal, and storage fuel costs.

Union uses the SENDOUT© model to determine total gas supply costs at the citygate required to meet the Union Gas forecast of natural gas demand under two different demand scenarios. The two demand scenarios are:

1. **"With DSM"** - the Union Gas Base Case forecast of natural gas demand, which considers the impacts of a portfolio of DSM programs.
2. **"No DSM"** - a forecast of natural gas demand excluding the impacts of a portfolio of DSM programs.

Union then uses the difference in supply costs between the two scenarios to estimate avoided gas supply costs. Union runs different "No DSM" scenarios that change the portfolio of DSM programs removed from the demand forecast in order to estimate avoided gas costs for DSM programs targeting different types of load. The difference between the total supply costs with and without the DSM program impacts are used to calculate the total avoided cost associated with the change in demand caused by the specific set of DSM programs being evaluated. For example, removing the impacts of a specific set of DSM programs may increase demand by 50,000 10^3 m^3 and increase supply costs by \$10,000,000. In this case, the avoided cost would be \$200 per 10^3 m^3 .

¹⁵ This section summarizes portions of: ICF. *Evaluation of Union Gas Avoided Costs*. Prepared for Union Gas Limited. December 18, 2014.

Distribution System Costs¹⁶

Distribution costs represent all the costs of delivering gas on the local distribution company's (LDC's) distribution system downstream of the citygate. Utilities may be able to avoid investments in new distribution facilities, and are likely to avoid some variable cost components including fuel and gas losses associated with gas distribution activities due to DSM programs. Avoided local distribution system infrastructure costs are achieved when reduced natural gas demand enables delays in the timing of new projects, or reductions in the size of these projects. The avoided transmission and distribution costs vary by utility service territory, but are typically driven by the level of gas demand in the winter heating season. In the recent past, Union Gas's existing avoided cost methodology has not included an independently estimated avoided distribution system cost. Instead, Union Gas has relied on an adjusted version of the Enbridge Gas Distribution values.

Avoidable Distribution Infrastructure Costs

Distribution infrastructure costs include the capital and financing costs planned for future transmission and distribution system expansions or reinforcements where demand is forecasted to grow over time beyond current system capacity thresholds. These facility projects are associated with a specific geographical part of the distribution system infrastructure, and, due to the transaction cost of individual projects, typically include expansion beyond short-term demand increase requirements to also account for longer-term system planning needs.

As a result, reductions in future infrastructure costs can reasonably contribute to the overall avoided cost calculation when these facility expansion or reinforcement projects can be delayed, reduced in size, or eliminated entirely as a result of planned DSM activities taking place in those areas affected by the facility project. To the degree that they can be reasonably quantified, incremental operating and maintenance costs associated with the capital improvement projects can also be included in this component of the avoided costs.

Variable Distribution System Costs

Natural gas variable distribution system costs typically include distribution system fuel usage, gas losses, and other distribution system costs that vary with volume. Distribution system fuel usage and gas losses are estimated to be relatively minor; in its 2013 rate filing, Union reported an unaccounted for gas percentage of 0.153% of in-franchise system throughput.¹⁷ While this represents a very small percentage of total costs, it is an avoidable cost that is easily accounted for in the avoided cost estimation process. Other variable distribution costs are largely driven by the number of customers and miles of distribution system, rather than throughput, hence would not be affected by DSM programs that target volumetric demand reductions.

¹⁶ This section summarizes portions of: ICF. *Evaluation of Union Gas Avoided Costs*. Prepared for Union Gas Limited. December 18, 2014.

¹⁷ Union Gas Limited. *Rebasing Application Rate Order – Appendix B. Rate M12 Schedule C; M12-X Easterly Fuel Ratio: EB-2011-0210*.

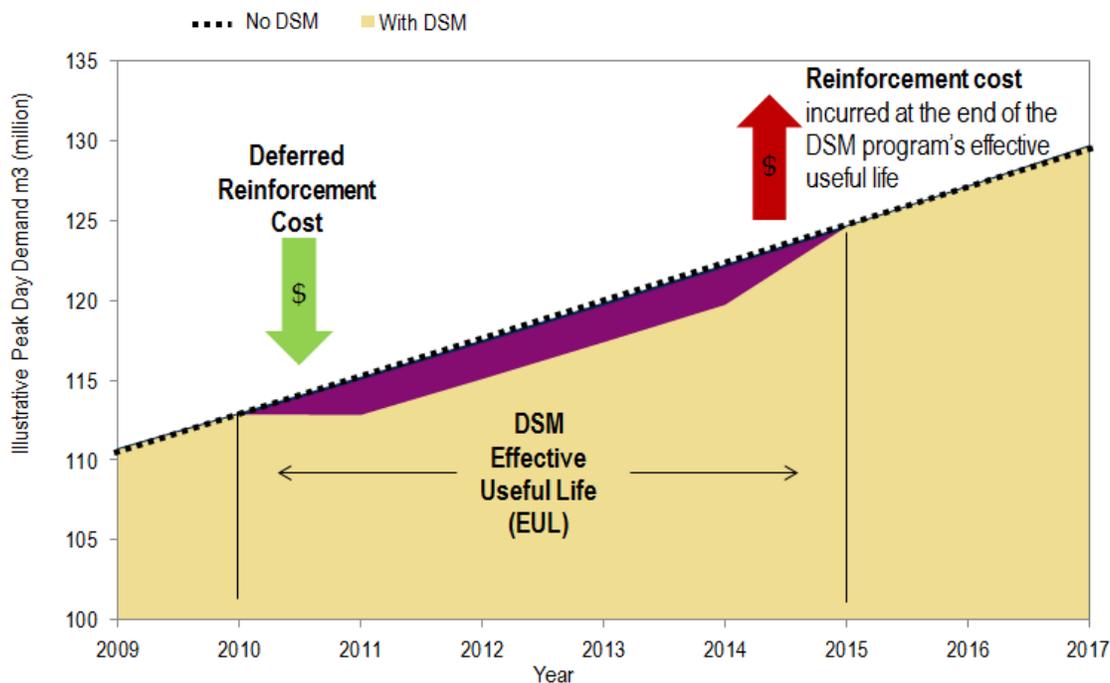
2.3 Enbridge’s Avoided Distribution Facility Cost Methodology¹⁸

ICF reviewed the distribution facility avoided cost methodology used by Enbridge. This methodology relies on a deferred cost approach, which measures the “time value of money” that is generated when a DSM program delays expenditures for projects to reinforce the distribution system to meet peak demands. The methodology focuses only on projects to construct reinforcement mains (pipelines built to accommodate increases in annual peak demand) because DSM programs have been found to have a marginal impact on expenditures for other distribution system components (sales, replacement, and relocation mains) as investments in those components are not driven by peak demands.

Methodology Concept

The Enbridge methodology makes the assumption that a DSM program would eliminate one year of peak demand growth over the “Effective Useful Life” (EUL) of the program. This avoids one year of costs related to distribution system reinforcement. Annual reinforcement costs were estimated to be \$21.5 million (real 2015 dollars) based on an average of Enbridge’s actual reinforcement costs from 2010 to 2013, and its projected costs from 2014 to 2019. It is assumed that one year of these costs is deferred for 18 years, which is the average EUL of Enbridge’s portfolio of existing DSM programs. At the end of the EUL, it is assumed that the DSM program will expire and that Enbridge will need to construct the reinforcement project that was avoided at the start of the program. This methodology is conceptually illustrated in Exhibit 8.

Exhibit 8. Illustrative Enbridge Avoided Distribution Cost Methodology



Source: Navigant Consulting

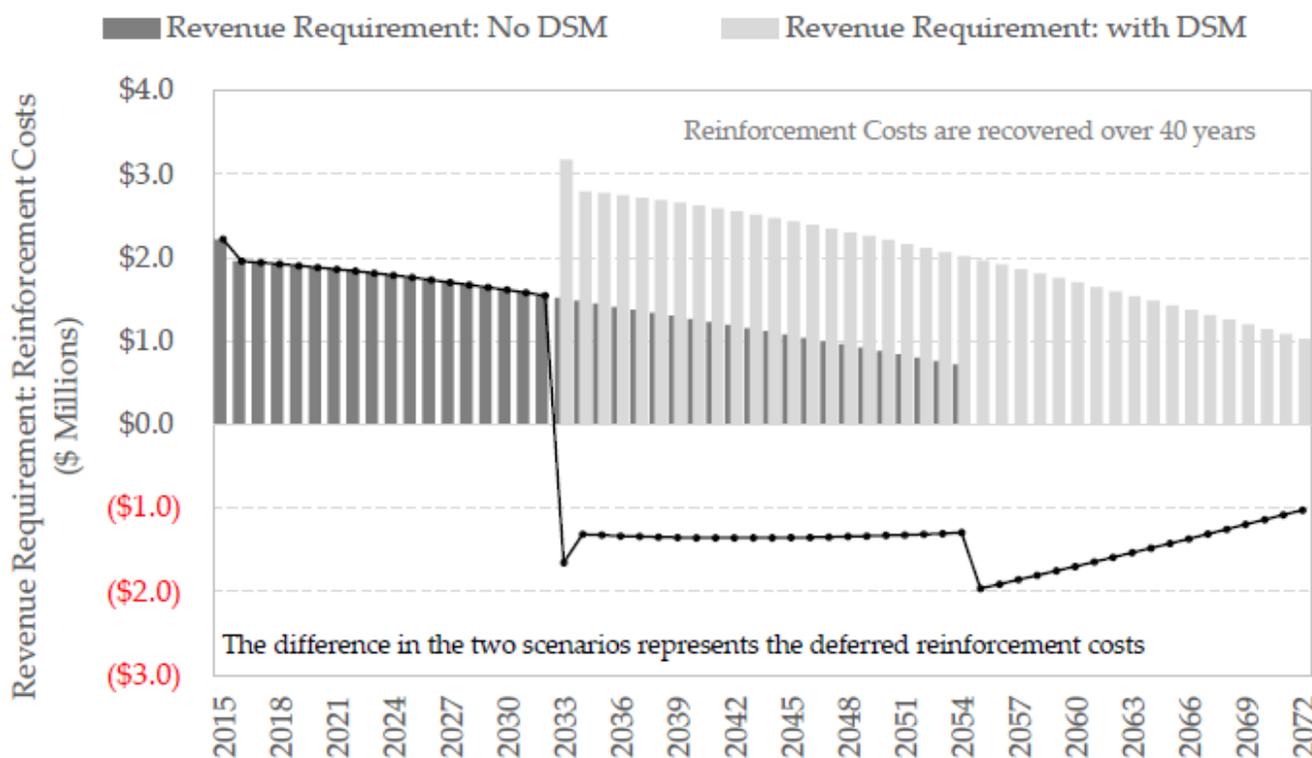
¹⁸ This section summarizes portions of: Navigant Consulting. *Avoided Distribution Costs*. Prepared for Enbridge Gas Distribution. December 2015.

In Exhibit 8 the purple shaded area below the dotted black line (the “No DSM” scenario) and above the beige shaded area (the “With DSM” scenario) represents the impact of the DSM program on peak day demand. The methodology assumes that the reinforcement costs are incurred at end of the EUL of the DSM program, and these costs would be expected to be higher than current project costs due to the effect of inflation. However, the deferral of the project cost generates a present value benefit due to the time value of money. In other words, the present value of the project cost is lower because it is discounted by the utility’s cost of capital over the EUL of the DSM program. For example, a project that costs \$10 million today might cost \$17 million if built 18 years in the future assuming a cost inflation rate of 3%. However, because that expenditure takes place in the future, it would be discounted by Enbridge’s cost of capital. Assuming a 7% cost of capital, \$17 million discounted over 18 years yields a present value of approximately \$5 million. The difference between the avoided project’s current cost (\$10 million) and the present value of future project cost (\$5 million) represents the value of the DSM program.

Ratepayer Perspective

In order for the avoided distribution cost analysis to reflect the ratepayer perspective, the Enbridge methodology estimates the annual change in revenue requirement brought about by the deferral of reinforcement costs. Exhibit 9 illustrates revenue requirements both with and without a DSM program. In the exhibit, the DSM program avoids a potential reinforcement project in 2015, which would instead be constructed at a higher nominal cost in 2033. Under each scenario, project costs are recovered from ratepayers over a 40-year period from the start of the project. In Exhibit 9, the difference between the two scenarios (with and without DSM) is represented by the black line.

Exhibit 9. Illustration of the Difference in Revenue Requirement With and Without DSM Program



Source: Navigant Consulting

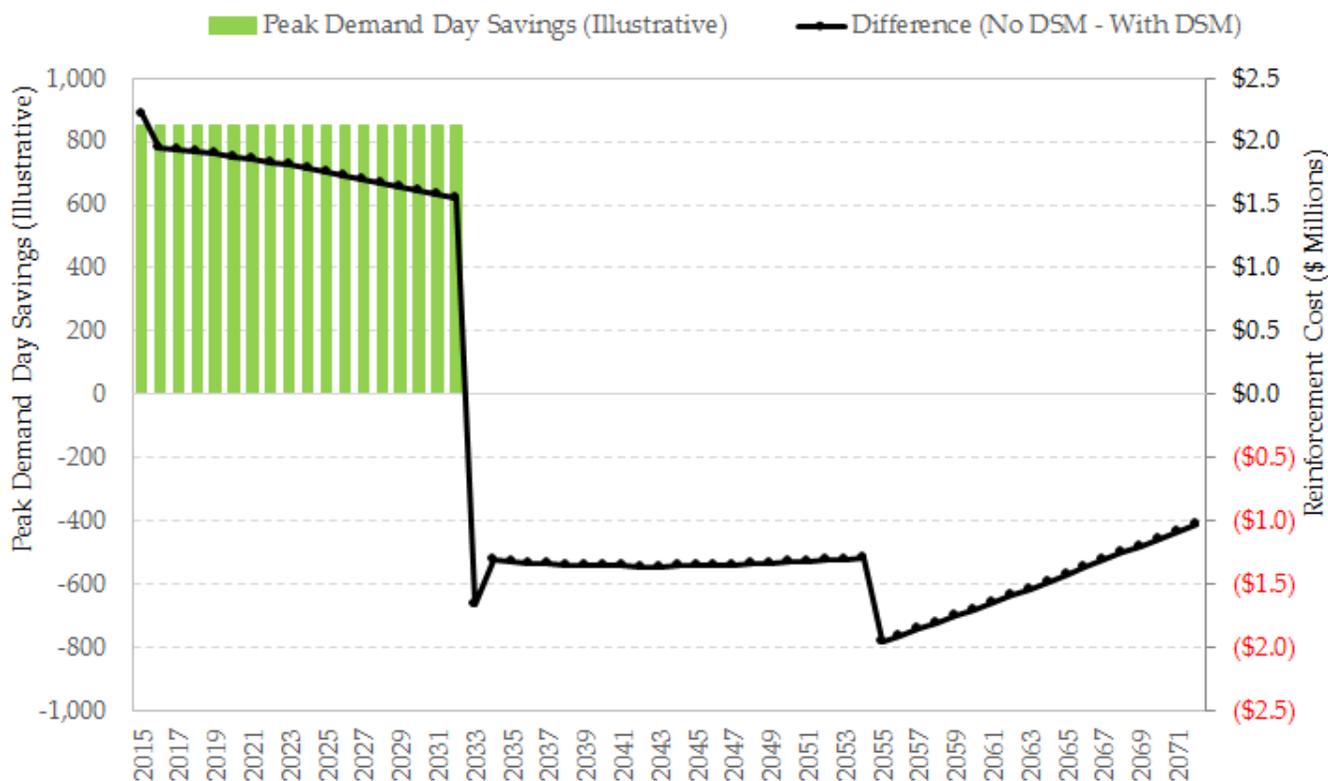


Per Unit Costs

To calculate the avoided distribution costs of the DSM program on a per unit basis, the estimated change in the revenue requirement is divided by the change in peak day demand. This produces a metric that is expressed in \$ per 10³m³ of peak day demand. Exhibit 10 compares the two components of the avoided reinforcement cost methodology:

- The difference in revenue requirements between the “With DSM” and “No DSM” scenarios over a 58-year period (the black line derived in Exhibit 9), and;
- The peak demand day savings over the 18-year EUL of the DSM program.

Exhibit 10. Components of Avoided Reinforcement Cost Calculation



Source: Navigant Consulting

As illustrated in Exhibit 10, the DSM program’s reinforcement cost savings and peak day demand savings are expressed over different timeframes. In order to correct this difference, the Enbridge methodology takes the present value of the annual revenue requirements beyond the EUL of the DSM program and amortizes those requirements over the 18-year EUL. This generates a DSM program value expressed in \$ per 10³ m³ of annual peak day demand.

The avoided distribution cost peak day metric (\$ per 10³ m³ of annual peak day demand) is next converted to an annual volume metric (per 10³ m³ of annual volume) so that it can be added to avoided transmission costs, which are expressed on an annual volume basis. This conversion is achieved by calculating “load shapes”—the ratio of peak day demand to annual demand—for four consumer types:

- Space heating



- Water heating
- Space and water heating
- Industrial load

To calculate the load shape ratio, peak day gas demand for each consumer type is divided by total annual gas demand for each consumer type. The ratio for each of the load shapes are then used to convert the peak day demand metric to the annual volume metric.

2.4 Differences Between Union Gas and Enbridge Gas Systems

The OEB has directed natural gas utilities in Ontario to calculate all avoided costs to reflect their specific cost structure as well as the characteristics of their franchise area. ICF assessed the differences between the Union Gas distribution system and the Enbridge Gas Distribution (EGD) system in order to determine where extensions or revisions to the Enbridge methodology may be necessary to represent the Union Gas distribution system. Exhibit 11 presents a high-level comparison of operating statistics for the two utilities.

Exhibit 11. Union Gas vs. Enbridge Gas Operating Statistics Comparison

	Union Gas	Enbridge Gas Distribution
Number of Customers	1.459 million	2.158 million
Revenue	\$1.8 billion	
Net Income	\$205 million	\$201 million*
Total Assets	\$8.2 billion	\$10.2 billion**
Pipelines		
Distribution Main/Service	65,390 km (40,630 miles)	82,600 km (51,325 miles)***
Transmission	4,850 km (3,015 miles)	
Services	Distribution Transmission Storage	Distribution
System Throughput		
Distribution	13.4 bcm (472 Bcf)	11.7 bcm (414 Bcf)
Transmission	20.8 bcm (732 Bcf)	
Service Area Geography	Northern and southern Ontario	Central and eastern Ontario

*Adjusted earnings (EGD only)

**Includes EGD and non-EGD gas distribution assets owned by Enbridge Inc. Sources: Enbridge 2016 Annual Report, Union Gas 2016 Annual Report, Enbridge [About Us](#)

Union Gas

In 2016, Union Gas Distribution delivered 472 Bcf of natural gas to 1.459 million residential, commercial and industrial customers in more than 400 communities in Ontario. The Union Gas distribution system is integrated with a major storage and transmission system that serves in-franchise customers as well as markets outside of the Union Gas distribution service territory. The Union Gas storage and transmission assets include about 166 Bcf of underground natural gas storage at the Dawn Hub, as well as the Dawn to Parkway transmission system (“Dawn Parkway System”), which is a major natural gas transmission asset that connects the Dawn Hub to consuming markets in Ontario, Quebec, and the U.S. Northeast. Exhibit 12 presents a map of Union’s infrastructure, including its distribution service territory, and transmission and storage assets.



Exhibit 12. Union Gas Distribution System Map



Source: Union Gas

The Union Gas system consists of two generally distinct distribution systems. Customers in the Southern Ontario region in the area from Windsor through Parkway account for about 75% of Union’s distribution system volumes. The gas supply for these customers is sourced from a variety of locations, including the Western Canadian Sedimentary Basin (WCSB), Chicago, the U.S. Midcontinent, and the U.S. Appalachian Basin. Union also purchases a portion of the gas supply needed to serve customers in the southern end of their system at Dawn.

The remaining distribution customers are located in Northern Ontario. Customers in Union North West (MDA, WDA, SSMDA) are served from the TransCanada Ontario Mainline, primarily relying on natural gas purchased from Western Canada. Union North East customers (NDA, NCDA, EDA) utilize capacity on multiple upstream pipelines providing access to supplies in Western Canada, Appalachia as well as being served through Dawn purchases.

Both systems rely on Union natural gas storage at Dawn to support peak period loads. The use of storage allows Union to purchase gas on a year-round basis in order to minimize gas purchase costs and reduce the amount of pipeline capacity held to meet peak period demands.

The majority of Union South customers located east of Dawn rely on transmission capacity on the Dawn Parkway System to meet distribution requirements. Union also uses its Dawn Parkway System (and also TransCanada services from Parkway) to ship natural gas from Dawn to Union North.

Enbridge Gas Distribution

Enbridge Gas Distribution (EGD) is Canada's largest gas distribution company. In 2016, EGD delivered 414 Bcf of natural gas to 2.158 million residential, commercial and industrial customers in central and eastern Ontario, and in northern New York. EGD utilizes Union's Dawn Parkway System for some of its gas supply.

EGD's Greater Toronto Area (GTA) project, which was completed in March 2016, is a key component of EGD's gas supply strategy and provides new transmission services that enable access to U.S. Midcontinent gas supplies for the utility and its customers. The GTA project upgraded the existing distribution system that delivers natural gas to Brampton, Mississauga, Vaughan, Richmond Hill, Markham, and Toronto.

Exhibit 13. Exhibit 6. Enbridge Gas Distribution Service Territory



Avoided Distribution Cost Differences

Union Gas and EGD are both large LDCs serving customers in Ontario with most sales concentrated in Southern Ontario. However, there are several significant differences between the two LDCs that impact the avoided distribution cost methodology.

Transmission

The Union Gas distribution system differs from Enbridge in that it includes a major natural gas transmission line, the Dawn Parkway system, that serves both in-franchise and ex-franchise customers. The Dawn Parkway system is downstream of the Union Gas gate stations, so is not included in the upstream transportation capacity included in the supply planning process used to estimate avoided supply costs for the Union Gas South system.

Enbridge also relies on the Dawn Parkway system. However, the Dawn Parkway System is upstream of EGD's citygate and EGD treats transmission services on the system as an upstream pipeline capacity cost in its avoided supply cost analysis. Although EGD has major transmission portions of its system, they aren't analogous to the Dawn Parkway System because they do not offer third-party transmission services and are clearly defined as part of the company's distribution system assets.

Union is also expanding major transmission lines within its service territory to meet growth in demand. These investments include the Panhandle system, including the Kingsville expansion and the Sarnia Industrial Line.

Storage

Union Gas is also unique in that it utilizes natural gas storage capacity that it owns at Dawn, downstream of the citygate, to serve in-franchise load. These storage costs are considered part of the company's distribution system and are not included in the company's avoided gas supply cost calculations. All EGD storage capacity, by contrast, is located upstream of the EGD citygate, and the costs of storage capacity are included in EGD's avoided supply cost analysis. Based on reported Union Gas load calculations, a DSM program targeting weather-sensitive load will reduce Union's need for storage capacity by about 3 m³ for every 10 m³ of demand reduction. At an estimated storage cost of \$0.0071 per m³, any reduction in demand attributed to a weather-sensitive DSM program would save

\$0.0016 per m³.¹⁹ This cost represents approximately 0.7% of the total estimated avoided cost for a weather-sensitive DSM program.

Other Distribution Costs

Union Gas includes a variable distribution system cost of 0.153% of in-franchise system throughput in its calculation of avoided costs, reflecting natural gas system losses and fuel consumption. EGD does not appear to include an estimate of variable distribution system costs in its avoided costs. This difference represents a difference in the two utilities methodologies rather than a difference in their system structures.

DSM Effective Useful Life (EUL)

Union and Enbridge may differ in the EUL of their DSM programs. Navigant used an 18-year EUL based on the average EUL of DSM programs in EGD's portfolio. In its 2016 Natural Gas Conservation Study for Union, ICF estimated DSM avoided costs for 30 years in order to capture the long-term impacts of the DSM programs.

2.5 Recommended Revisions to Enbridge's Distribution Avoided Cost Methodology

Based on the research presented in the previous sections of this memo, and critiques of Enbridge's methodology from intervenors (See Appendix A: Review of the Enbridge Avoided Distribution Cost Methodology), ICF developed a set of revisions and extensions to the Enbridge/Navigant avoided distribution cost methodology to adapt the methodology for Union Gas's use. These recommendations are listed below:

- **Include avoided costs for Union's Dawn Parkway transmission-level assets.** Currently the costs of the Union Gas Dawn Parkway System allocated to Union Gas in-franchise customers are not considered in Union's avoided supply costs. Expenditures on these assets should be considered in Union's avoided distribution cost analysis. Because the assets are used partially to support Union's own loads, and partially to provide transportation services to Union's transmission system customers, Union should value only the portion of its Dawn Parkway System reinforcement costs related to serving its own loads. In addition, since Dawn Parkway expansion typically is not driven by in-franchise load growth, the avoided cost of Dawn Parkway capacity should be related to the costs of using the system allocated to Union Gas in-franchise customers.
- **Use design-peak day loads when converting from peak day to normal average usage.** The review of Enbridge's methodology during the 2015-2020 DSM Plan proceeding included comments indicating that the Enbridge methodology, which used normal-peak day loads, instead of design-peak day loads when converting from peak day to normal average usage should have used design day loads as the distribution system is designed for the design-peak day (or the design-peak hour). ICF agrees with this recommendation, and used design-day peak loads in the Union calculations.

¹⁹ Union Gas Limited. (2013). *Rebasing Application Rate Order - Appendix B. Storage Charge from Rate M1 Rate Schedule: EB-2011-0210.*

ICF reviewed other critiques of the Enbridge methodology (See Appendix A) but we do not believe they warrant changes to the methodology for Union Gas. Generally, these critiques focused on items that were specific to Enbridge's treatment of individual projects, or focused on points that were unlikely to make a large difference on overall results (e.g., including a portion of annual maintenance costs in the avoided cost calculations).

3. Review of Union Distribution Facility Investments and Costs

ICF reviewed Union Gas costs related to its distribution system as well as costs related to transmission and storage assets located downstream of the utility citygate in order to assess the potential distribution system costs that could be avoided by DSM.

3.1. Union Gas Future System Facility Expansion Costs

ICF reviewed Union Gas's 2018 Asset Management Plan and other internal planning documents to obtain design day load growth estimates and reinforcement cost estimates. The data reviewed by ICF are summarized in Exhibit 14. The exhibit presents annual average in-franchise design day load growth over a 10-year forecast period (2017/18 to 2027/28), expressed in thousand cubic meters per day ($10^3\text{m}^3/\text{day}$) and annual average reinforcement costs, expressed in millions of constant 2018 Canadian dollars (\$2018C million). Reinforcement costs are broken out by segment:

- **Distribution:** systems used to distribute natural gas to current and new customers.
- **Transmission:** local transmission assets, such as pipelines, compressor equipment, measurement, and regulation.
- **System:** major transmission systems (Panhandle System, Kingsville System, and the Sarnia Industrial Line System) that move natural gas from receipt points to delivery locations along the pipeline to meet the volumetric demands and pressure requirements of Union's in-franchise. Even though these systems may serve some ex-franchise customers, all forecast spending in this category is designed to support in-franchise load growth. Costs for the Dawn Parkway system are not included in this category.

Exhibit 14. Annual Average Design Day Load Growth and Reinforcement Costs, 2018-2027

Reinforcement Costs (Constant 2018C\$)	
Distribution (2018C\$ million)	6.90
Transmission (2018C\$ million)	9.20
System (2018C\$ million)	34.56
Total Reinforcement (2018C\$ million)	50.66
In-Franchise Design Day Load Growth ($10^3\text{m}^3/\text{day}$)	843.6
Reinforcement Cost per Unit of Load Growth (2018C\$/$\text{m}^3/\text{day}$)	60.05

Sources: Union Gas Asset Management Plan 2018-2027. Union and ICF estimates and calculations.

Exhibit 14 shows that Reinforcement costs for the Distribution, Transmission, and System segments are forecast to average C\$50.66 million per year over the next 10 years (in constant 2018 dollars). This compares with Union's in-franchise design day load growth forecast of 843.6 $10^3\text{m}^3/\text{day}$ per year over the next 10 years. Thus, the reinforcement cost per m^3/day of peak distribution system load growth is C\$60.05. The estimates of annual reinforcement costs (in C\$ million) are used as inputs to model the avoided distribution and transmission system costs in section 4 of this report.

3.2. Dawn Parkway Transportation Costs

Union Gas currently reserves a significant amount of capacity on the Dawn Parkway system to meet in-franchise loads. Reductions in in-franchise loads have the potential to reduce the amount of Dawn Parkway capacity that must be held for in-franchise customers, potentially making additional capacity available to ex-franchise customers and reducing costs to in-franchise customers. ICF used the existing Dawn Parkway tariff structure to estimate the potential avoided facility costs that would be associated with a reduction in demand by Union Gas in-franchise customers. The Dawn Parkway tariff has three main components: a capacity charge; a fuel and commodity component; and a cap-and-trade charge. As of April 1, 2018, the annual demand charge for firm transportation from Dawn to Parkway was approximately C\$1,658 per 10³m³ of daily contract demand and total volumetric costs were approximately C\$1.45 per 10³m³ of gas transported.

The Dawn Parkway system serves only a portion of the total South and North system loads. Hence for determining avoided costs, ICF used existing Dawn Parkway tolls, discounted to reflect the percent of total in-franchise load served by Dawn Parkway. Union requires 57,951 10³m³/day of Dawn Parkway capacity to meet the design day requirements of 95,306 10³m³/day. Hence Union in-franchise customers hold capacity on Dawn Parkway equivalent to 61% of total design day requirements. This factor was used to allocate the Dawn Parkway capacity charge across the Utility's customer base. Volumetric charges were allocated across the customer base using the ratio of OEB's 2013 approved delivery volumes to in-franchise customers east of Dawn to Union's total 2017/18 demand forecast. The resulting avoided costs for Dawn Parkway services are summarized in Exhibit 17.

Exhibit 15. Avoidable Dawn Parkway Costs for Union In-Franchise Customers

Dawn-Parkway Firm Transportation Service Rates	Unit	Value
<u>Capacity Charges</u>		
a) Capacity Charges (applied to daily contract demand)	C\$/GJ/day	0.122
b) Capacity Charges (applied to daily contract demand) (a ÷ 26.85 x 1000)	C\$/10 ³ m ³ /day	4.54
c) Annual Capacity Charges (b x 365)	C\$/10 ³ m ³ /day	1,658
d) Union Gas Design Day Demand (2017/18)	10 ³ m ³ /day	95,306
e) In-franchise Dawn Parkway Design Day Demand (2017/18)	10 ³ m ³ /day	57,951
f) % In-franchise Design Day Demand via Dawn-Parkway (e ÷ d)		61%
g) Annual Demand Charges Allocated Across In-Franchise Area (b x e)	C\$/10 ³ m ³ /day	1,008
<u>Volumetric Charges</u>		
h) Union Supplied Fuel and Commodity Charge (Nov. 1-Mar. 1)	C\$/GJ	0.033
i) Cap-and-Trade Facility-Related Charges	C\$/GJ	0.006
j) Total Volumetric Costs (h + i)	C\$/GJ	0.039
k) Total Volumetric Costs (j ÷ 26.85 x 1000)	C\$/10 ³ m ³	1.45
l) Union Gas Annual In-franchise Gas Volumes (2017/18)	10 ³ m ³	7,166,609
m) Union Gas In-franchise Volumes via Dawn-Parkway (2013)	10 ³ m ³	5,135,803
n) % In-franchise Volumes via Dawn-Parkway (l ÷ k)		72%
o) Total Volumetric Costs Allocated Across In-Franchise Area (i x l)	C\$/10 ³ m ³	1.04

Sources: a/h/i- Union Gas Cross Franchise Transportation Rates, Rate C1, Effective April 1, 2018. Dawn to Parkway Firm Transportation capacity. Divide by 26.85 to go from GJ to m³, then divide by 30.5 days/month to get daily rate.

d - EB-2017-0087, Union Gas 2017/18 Gas Supply Plan Memorandum, Figure 5 and Figure 6

e - Union Gas estimates

l - EB-2017-0087, Union Gas 2017/18 Gas Supply Plan Memorandum, Figure 7 (TJ to m³: x 26,853)

m - EB-2017-0087, Rate Order, Working Papers, Schedule 20 (column c)

4. Assessment of DSM Program Impacts

ICF assessed the potential impacts of DSM programs on Union Gas distribution system costs consistent with Union Gas’ current approach to estimating avoided costs for gas supply. DSM programs are traditionally evaluated based on an avoided cost per GJ or cubic meter of annual natural gas demand reduction attributed to the DSM programs. However, potential avoided facility costs are generally determined based on peak day impacts for large scale transmission projects, and peak hour impacts for distribution system. This task involves developing “load shapes” in order to convert avoided distribution system costs from a peak day metric (\$ per 10³ m³ of annual avoided peak day demand growth) to an annual volume metric (\$ per 10³ m³ of annual avoided gas demand).

4.1. Load Shapes

Union Gas currently estimates separate avoided costs for three different types of DSM programs, differentiating between customer type and targeted load segment. Avoided costs are also calculated in the following three categories:

- Residential/Commercial Weather-Sensitive (i.e., space heating)
- Residential/Commercial Baseload (i.e., water heating and cooking)
- Industrial Baseload

ICF calculated load shapes (peak day-to-annual volume ratios) consistent with these load-type categories. To do this, ICF obtained annual demand, design day demand, and baseload demand broken out by customer type for General Service customers. To estimate baseload demand, ICF analyzed actual gas demands by customer type in July 2016 when weather-sensitive (i.e., space heating) loads were assumed to be zero.²⁰ Exhibit 16 presents this data.

Exhibit 16. 2016 General Service Forecast Annual Demand by Customer Type (10³m³)

Customer Type	Annual Demand	Design Day	Daily Baseload
Residential	2,816,130	32,005	1,985
Commercial	1,924,496	15,845	1,376
Industrial	464,833	5,264	537
Total	5,205,459	53,113	3,899

Source: Union Gas and ICF estimates

Peak day residential/commercial weather-sensitive demand was estimated by subtracting estimated residential/commercial baseload demand from the residential/commercial design day demand. Exhibit 17 presents these results, including the estimated load-specific design day demand, the estimated load-specific annual gas demand, and the resulting “load shape”, which is the ratio of the design day demand to the annual demand.

²⁰ “Monthly % distribution of DSM volumes for Residential, Commercial, and Industrial rate classes” Obtained from Union Gas Forecasting.



Exhibit 17. DSM Load Shapes by Load Category

Load Category	Design Day (10 ³ m ³)	Annual (10 ³ m ³)	Ratio (%)
Residential/Commercial Weather-Sensitive	44,487	3,513,536	1.27%
Residential/Commercial Baseload	3,362	1,227,089	0.27%
Industrial Baseload	537	196,007	0.27%

Source: ICF analysis of Union-provided design day and annual demand data

Exhibit 17 shows that design day weather-sensitive demand from residential and commercial customers is equal to approximately 1.27% of total 2018 forecast weather-sensitive demand. The exhibit also shows that baseload demands for the residential/commercial and industrial sectors are equal to 0.27% of annual demand. The ratios for baseload load types are the same regardless of area or customer type because baseload demands are, by definition, always equal 1 divided by 365.

5. Calculation of Distribution Avoided Cost

After evaluating distribution system costs and determining the impact of DSM programs, ICF prepared calculations of distribution system avoided costs consistent with and complementary to the calculation of supply avoided costs currently reported by Union Gas during the DSM planning process. This task consisted of two elements:

- 1) Estimation of Avoided Costs for the Total Resource Cost (TRC) Test
- 2) Estimation of Avoided Costs for the Rate Impact (RIM) Test

Unlike the Avoided Gas Supply Costs, the RIM test and TRC test require different sets of inputs to evaluate distribution system avoided costs. The RIM test is significantly impacted by tax, depreciation and rate structure issues that are not relevant to the TRC test.

For both tests, ICF developed the avoided cost inputs by comparing Union's expected distribution system expenditures and revenue requirements under two scenarios: 1) DSM programs are implemented and distribution system expenditures are delayed or deferred; and 2) DSM programs are not implemented and distribution system expenditures must be initiated as forecast. The methodology was previously discussed in Section 2 of this report

5.1. Model Inputs

A number of inputs were needed to apply the avoided cost methodology, including the following:

- **Cost Inputs:** projections of expenditures related to reinforcing the distribution system and in-franchise transmission system.
- **Demand Inputs:** projections of increases in distribution system and in-franchise transmission system peak day demand.
- **DSM Inputs:** general parameters related to Union's DSM programs, primarily the average Effective Useful Life (EUL) of the company's programs. This value is 15 years.

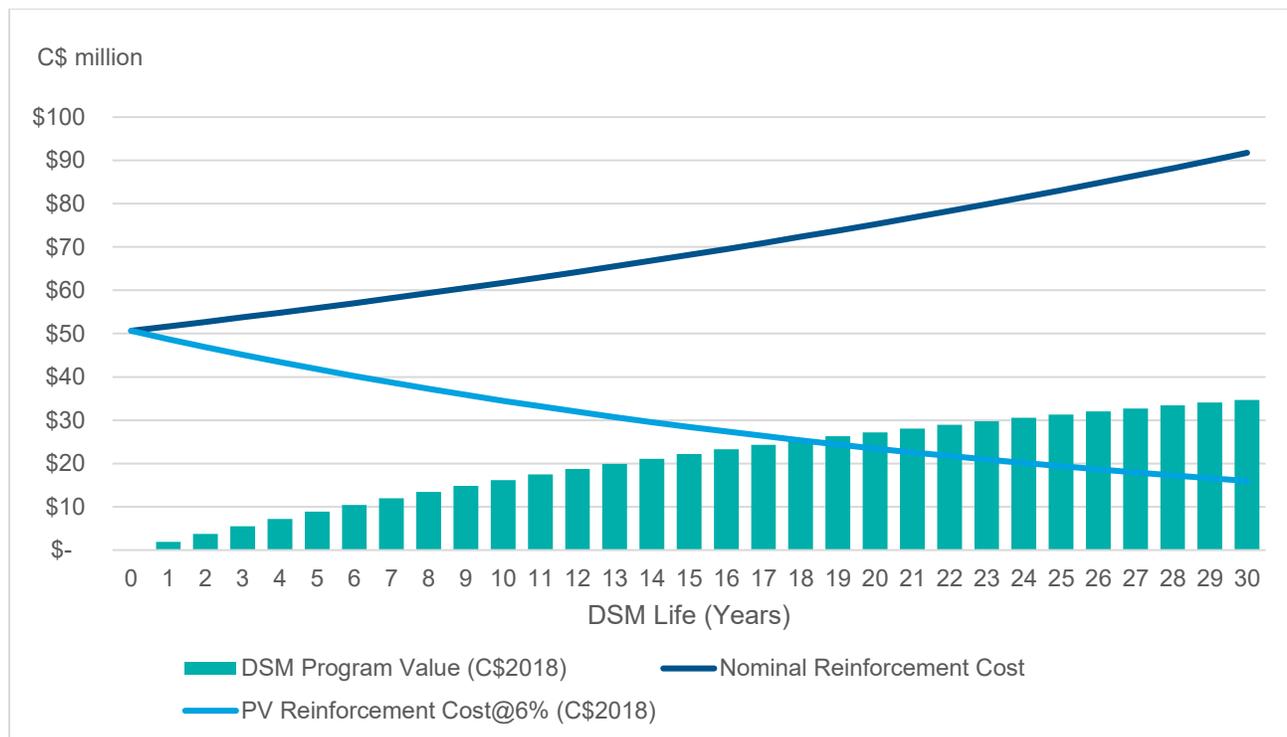
In section 3, distribution and transmission system reinforcement costs from Union's Asset Management Plan were presented. These costs were then averaged over the 10-year planning period to calculate annual reinforcement costs. The DSM methodology compares the cost of undertaking one year of reinforcement costs in the present (2018) versus the cost of undertaking one year of reinforcement costs in the future (i.e., after the expiration of the DSM program). Future reinforcement projects are more expensive in nominal terms due to inflation but are less expensive in present value terms when discounting using Union's weighted average cost of capital (WACC).

5.2 Distribution System Avoided Facilities Costs for the Total Resource Cost (TRC) Test

The Total Resource Cost (TRC) test assesses cost-efficiency of DSM programs from the point of view of all program participants and society. Exhibit 18 shows annual reinforcement costs for the Union Gas. In the initial year (2018 or year 0), costs are approximately C\$50.7 million. Depending on the length of the DSM program, future costs of deferred reinforcement projects will be nominally more expensive. The exhibit shows that one year of reinforcement costs in year 15 would be approximately C\$68.2 million, assuming an inflation rate of 2% per year. After discounting using a nominal 6% discount rate (4% real + 2% inflation), however, this cost has a present value of just C\$28.5million in constant 2018

dollars. The value of a 15-year DSM program is the difference between the PV of reinforcement costs in year 0 (C\$50.7 million) minus the PV of reinforcement costs in year 15 (C\$28.5 million), or approximately C\$22.2 million (in constant 2018 dollars). This is the value of the DSM program from a Total Resource Cost (TRC) perspective. Exhibit 18 shows that DSM program value increases in value in a straight-line fashion with the DSM program life.

Exhibit 18. Union South Reinforcement Costs vs. DSM Program Life



Per-Unit Distribution Facilities Avoided Costs by Load Type

For a 15-year DSM program, the annual PV of DSM savings is the total DSM savings (C\$22.2 million) divided by 15 years, or approximately C\$1.48 million in constant 2018 dollars. The annual DSM savings are then divided by the annual increase in Union’s distribution system peak day volume (844 10³ m³/day) to yield a per-unit DSM savings of C\$1,812 per 10³ m³/day in constant 2018 dollars. This value is then multiplied by the appropriate load shape ratios to convert them into savings per unit of annual volume (C\$/10³ m³) and to generate load-specific DSM savings for residential/commercial weather-sensitive load, residential/commercial baseload, and industrial baseload. Exhibit 19 presents these calculations.

Exhibit 19. TRC Avoided Cost Calculation

Item	Value
a) Initial Year 0 Cost	\$50,656,014
b) Nominal Year 15 Cost (Inflation = 2%)	\$68,176,325
c) PV Year 15 Cost (Nominal Discount Rate = 6%)	\$28,447,599
d) DSM Program Value (a - c)	\$22,208,415
e) Annual DSM Program Value (d / 15)	\$1,480,561
f) Annual Design Day Load Growth ($10^3 \text{ m}^3/\text{day}$)	844
g) Annual DSM Program Value per Unit of Load Growth ($\text{C}\$/10^3 \text{ m}^3/\text{day}$) (e / f)	\$1,755
h) Residential/Commercial Weather-Sensitive ($\text{C}\$/10^3 \text{ m}^3$) (g x 1.27%)	\$22.22
i) Residential/Commercial Baseload ($\text{C}\$/10^3 \text{ m}^3$) (g x 0.27%)	\$4.81
j) Industrial Baseload ($\text{C}\$/10^3 \text{ m}^3$) (g x 0.27%)	\$4.81

Dawn Parkway Transportation Costs

In-franchise transportation costs on the Dawn Parkway system were reviewed in Section 3.2. These costs indicated annual capacity costs of C\$1,008 per 10^3 m^3 of daily contract demand and total volumetric costs of C\$1.04/ 10^3 m^3 of volume transported. The annual capacity cost is multiplied by the appropriate load shape ratios in order to convert it into a cost per unit of annual volume. The results of this calculation are presented in Exhibit 20.

Exhibit 20. Dawn Parkway Transportation Costs by Load Type

Load Type	Load-Factor (%)	Capacity Cost ($\text{C}\$/10^3 \text{ m}^3$)	Volumetric Cost ($\text{C}\$/10^3 \text{ m}^3$)	Total Cost ($\text{C}\$/10^3 \text{ m}^3$)
Residential/Commercial Weather-Sensitive	1.27%	12.77	1.04	13.81
Residential/Commercial Baseload	0.27%	2.76	1.04	3.80
Industrial Baseload	0.27%	2.76	1.04	3.80

Total Avoided Facilities Costs for the TRC Test

Total costs are the sum of the distribution and transmission avoided costs, per the TRC test, and the Dawn Parkway transportation costs. These summed costs, in units of annual volume (10^3 m^3), are presented by load type and region in Exhibit 21.

Exhibit 21. Total Avoided Distribution Costs by Load Shape and Service Area ($\text{C}\$/10^3 \text{ m}^3$)

Load Type	Dist. & Trans.*	Dawn Parkway	Total
Residential/Commercial Weather-Sensitive	22.22	13.81	36.03
Residential/Commercial Baseload	4.81	3.80	8.61
Industrial Baseload	4.81	3.80	8.61

*Includes major transmission system assets except Dawn Parkway

5.3 Distribution System Avoided Facilities Costs for the Rate Impact (RIM) Test

The Rate Impact (RIM) test assesses the cost-efficiency of DSM programs from the viewpoint of a utility’s ratepayers. To calculate avoided distribution costs for the RIM test, ICF modeled revenue requirements with and without DSM programs using area-specific capital costs for the transmission and distribution systems. The capital costs were input into a simple utility revenue impact model, along with the basic financial drivers of the Utility’s cost of service, including discount rates, cost of capital, tax, depreciation, and asset life. The financial assumptions used to model the change in revenue requirements associated with a delay in infrastructure investment for the RIM test analysis are shown below.

Exhibit 22. Financial Inputs for Avoided Cost Calculation

Input	Value
WACC (pre-tax)	5.775%
LT Debt / Equity Ratio	64.00%
Cost of Debt	4.00%
O&M	0.00%
Tax Rate	26.50%
Project Cost Inflation Rate	2.00%
CCA Depreciation – Distribution	6.00%
CCA Depreciation – Transmission	8.00%
Distribution Economic Asset Life, years	40
Transmission Economic Asset Life, years	50

Source: Union Gas

The results of these modeling efforts are presented in Exhibit 23. In Exhibit 23, the two revenue requirements streams “step down” as costs for different infrastructure types (distribution and transmission) are depreciated and recouped over varying asset life durations. The exhibit shows that overall capital costs are higher in the With DSM scenario because the deferred cost of the system investments is higher in the future due to inflation. The revenue requirement for the No DSM scenario is higher than the With DSM scenario over the first 15 years (from 2018 through 2033) but lower for the years beyond 2033.

Exhibit 23. Revenue Requirements With and Without DSM Program

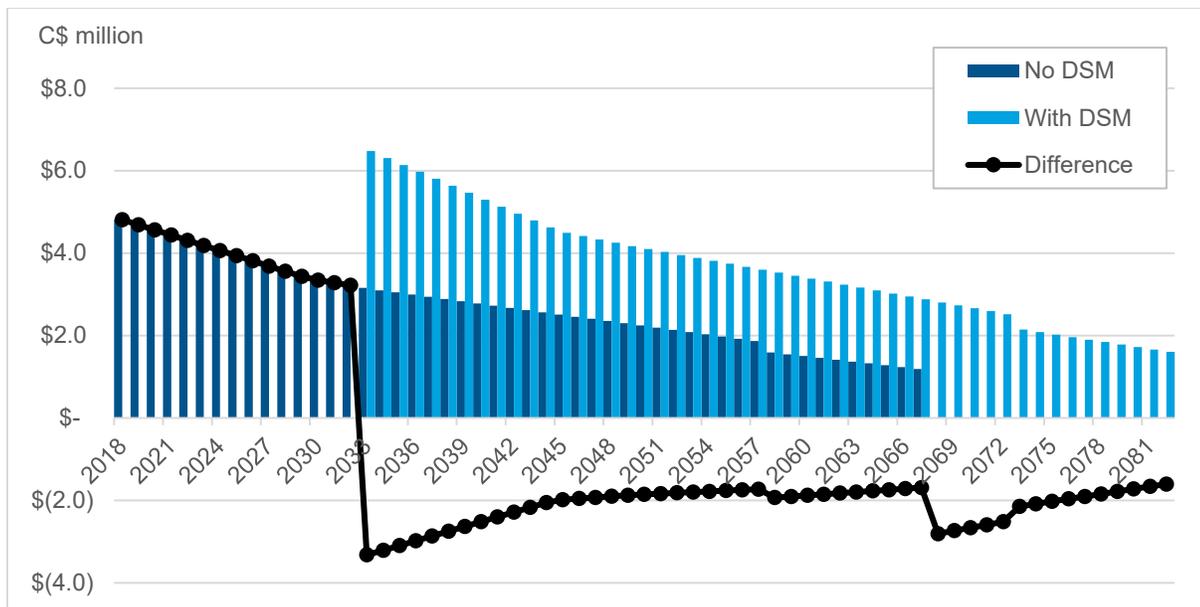


Exhibit 23 compares annual revenue requirements both with and without DSM programs. The exhibit shows that revenue requirements in 2018 are approximately C\$4.8 million higher in the No DSM scenario than the With DSM scenario (which is zero). The No DSM scenario revenue requirements trend down but remain higher than the With DSM scenario until 2033 when the DSM program expires. At this point, the initial system costs that were deferred in the With DSM scenario must be expended at a higher expense due to inflation. In 2033, the revenue requirement under the With DSM scenario is approximately C\$3.3 million higher than the No DSM scenario. Thereafter, the difference between the two scenarios narrows over time but the With DSM scenario revenue requirement remains higher until 2083. The value of the DSM programs lies in the difference between the present values of the two revenue requirement streams. The present value is C\$56.2 million in constant 2018 dollars under the No DSM scenario and C\$32.6 million in constant 2018 dollars under the With DSM scenario. The present value of the difference in the two revenue requirement streams is C\$23.7 million. This is the lifetime value of a DSM program that avoids one year of peak day demand growth.

Per-Unit Distribution Facilities Avoided Costs by Load Type

The differences in the revenue requirements (With DSM minus No DSM) for each year presented in Exhibit 23 were divided by the annual increase in distribution system peak day volumes of $844 \times 10^3 \text{ m}^3/\text{day}$. This generates annual estimates of DSM savings per unit of peak day volume—C\$/ $10^3 \text{ m}^3/\text{day}$. The savings per peak day volume were then multiplied by the appropriate load shape ratios in order to convert them into savings per unit of annual volume (C\$/ 10^3 m^3) and to generate load-specific DSM savings for residential/commercial weather-sensitive load, residential/commercial baseload, and industrial baseload. Converting avoided distribution costs per unit of annual volume allows for a full accounting of avoidable costs across all components of the company’s infrastructure.

Exhibit 24 presents the avoided distribution costs for each load type broken out by infrastructure type (distribution vs. transmission). These costs are presented over the 15-year EUL of the DSM program (2018-2032). Costs beyond 2032 have been present valued and amortized over the 15-year EUL.

Exhibit 24. Avoided Distribution Cost by Load Shape and Infrastructure Type (C\$/10³ m³)

	Residential/Commercial Weather-Sensitive			Residential/Commercial Baseload			Industrial Baseload		
	Dist.	Trans.*	Total	Dist.	Trans.*	Total	Dist.	Trans.*	Total
2018	6.56	40.48	47.04	1.42	8.76	10.18	1.42	8.76	10.18
2019	6.32	38.85	45.16	1.37	8.41	9.77	1.37	8.41	9.77
2020	6.07	37.21	43.28	1.31	8.05	9.37	1.31	8.05	9.37
2021	5.82	35.58	41.40	1.26	7.70	8.96	1.26	7.70	8.96
2022	5.58	33.94	39.52	1.21	7.34	8.55	1.21	7.34	8.55
2023	5.33	32.31	37.64	1.15	6.99	8.14	1.15	6.99	8.14
2024	5.09	30.67	35.76	1.10	6.64	7.74	1.10	6.64	7.74
2025	4.84	29.04	33.88	1.05	6.28	7.33	1.05	6.28	7.33
2026	4.59	27.40	32.00	0.99	5.93	6.92	0.99	5.93	6.92
2027	4.35	25.77	30.11	0.94	5.58	6.52	0.94	5.58	6.52
2028	4.10	24.13	28.23	0.89	5.22	6.11	0.89	5.22	6.11
2029	3.85	22.50	26.35	0.83	4.87	5.70	0.83	4.87	5.70
2030	3.61	21.35	24.95	0.78	4.62	5.40	0.78	4.62	5.40
2031	3.36	20.68	24.04	0.73	4.47	5.20	0.73	4.47	5.20
2032	3.12	20.01	23.12	0.67	4.33	5.00	0.67	4.33	5.00

*Includes major transmission system assets except Dawn Parkway

Exhibit 25 presents “levelized” avoided cost for each load- and infrastructure-type. These costs can be used as an alternative to the annual avoided costs presented in the previous exhibits and produces an equivalent result on a net present value basis.

Exhibit 25. Levelized Avoided Distribution Costs by Load Shape and Service Area (C\$/10³ m³)

Load Type	Dist.	Trans.*	Total
Residential/Commercial Weather-Sensitive	5.09	30.93	36.02
Residential/Commercial Baseload	1.10	6.69	7.79
Industrial Baseload	1.10	6.69	7.79

*Includes major transmission system assets except Dawn Parkway

Total Avoided Distribution System Facilities Costs for the RIM Test

Total costs are the sum of the levelized distribution and transmission avoided costs, and the Dawn Parkway transportation costs²¹. These summed costs, in units of annual volume (10³ m³), are presented by load type and region in Exhibit 26.

Exhibit 26. Total Avoided Distribution Costs by Load Shape and Service Area (C\$/10³ m³)

Load Type	Dist. & Trans.*	Dawn Parkway	Total
Residential/Commercial Weather-Sensitive	36.02	13.81	49.83
Residential/Commercial Baseload	7.79	3.80	11.60
Industrial Baseload	7.79	3.80	11.60

*Includes major transmission system assets except Dawn Parkway

²¹ Costs to in-franchise customers of the Dawn Parkway system are used for both the TRC and RIM tests. See section 5.2 for the derivation of the Dawn Parkway Transmission costs.



Adding Avoided Distribution System Facilities Costs to Other Avoided Costs

The levelized avoided distribution costs in Exhibit 25 can be applied ratably across a 15-year time frame to value the length of a DSM measure that has an effective useful life (EUL) of 15 years, which is the average EUL of Union’s portfolio of DSM measures. The levelized avoided distribution costs increase with the EUL of the DSM measure because the value of the avoided distribution costs is driven by the time value of money, however, these values only increase minimally with the EUL. For instance, increasing the DSM EUL from 15 to 25 years adds approximately 4% to the levelized avoided distribution costs, while decreasing the EUL from 15 to 5 years subtracts approximately 4%. Because these changes are minimal, the 15-year DSM levelized avoided distribution costs can be reasonably used to estimate the value of DSM measures of varying EULs in Union’s portfolio.

In order to create a nominal schedule of avoided distribution costs across a 30-year planning period, the 15-year DSM avoided distribution costs were levelized over 15 years using the real weighted average cost of capital (WACC). This operation is similar to the operation used to generate the values in Exhibit 25 except the values are levelized using the real WACC, which is equal to the nominal WACC (5.775%) minus the inflation assumption (2%). Next, this real levelized cost was escalated by inflation (2%) for each year over the 30-year period to create a schedule of future nominal avoided distribution costs. These results are presented in Exhibit 27 on the next page. This 30-year schedule of nominal avoided distribution costs can be paired with schedules of Union’s nominal gas supply avoided costs to create a full accounting of supply and distribution avoided costs across the planning period.

Exhibit 27. Schedule of Levelized Avoided Distribution Costs by Type Escalating with Inflation Across a 30-Year Planning Period

	Res./Comm. Weather-Sensitive				Res./Comm. Baseload				Industrial Baseload			
	Dist.	Trans.	DP	Total	Dist.	Trans.	DP	Total	Dist.	Trans.	DP	Total
2018	\$4.45	\$26.99	\$13.81	\$45.24	\$0.96	\$5.84	\$3.80	\$10.60	\$0.96	\$5.84	\$3.80	\$10.60
2019	\$4.53	\$27.53	\$14.08	\$46.15	\$0.98	\$5.96	\$3.88	\$10.82	\$0.98	\$5.96	\$3.88	\$10.82
2020	\$4.62	\$28.08	\$14.37	\$47.07	\$1.00	\$6.08	\$3.96	\$11.03	\$1.00	\$6.08	\$3.96	\$11.03
2021	\$4.72	\$28.64	\$14.65	\$48.01	\$1.02	\$6.20	\$4.04	\$11.25	\$1.02	\$6.20	\$4.04	\$11.25
2022	\$4.81	\$29.21	\$14.95	\$48.97	\$1.04	\$6.32	\$4.12	\$11.48	\$1.04	\$6.32	\$4.12	\$11.48
2023	\$4.91	\$29.80	\$15.25	\$49.95	\$1.06	\$6.45	\$4.20	\$11.71	\$1.06	\$6.45	\$4.20	\$11.71
2024	\$5.01	\$30.39	\$15.55	\$50.95	\$1.08	\$6.58	\$4.28	\$11.94	\$1.08	\$6.58	\$4.28	\$11.94
2025	\$5.11	\$31.00	\$15.86	\$51.97	\$1.10	\$6.71	\$4.37	\$12.18	\$1.10	\$6.71	\$4.37	\$12.18
2026	\$5.21	\$31.62	\$16.18	\$53.01	\$1.13	\$6.84	\$4.46	\$12.43	\$1.13	\$6.84	\$4.46	\$12.43
2027	\$5.31	\$32.25	\$16.50	\$54.07	\$1.15	\$6.98	\$4.55	\$12.67	\$1.15	\$6.98	\$4.55	\$12.67
2028	\$5.42	\$32.90	\$16.83	\$55.15	\$1.17	\$7.12	\$4.64	\$12.93	\$1.17	\$7.12	\$4.64	\$12.93
2029	\$5.53	\$33.56	\$17.17	\$56.25	\$1.20	\$7.26	\$4.73	\$13.19	\$1.20	\$7.26	\$4.73	\$13.19
2030	\$5.64	\$34.23	\$17.51	\$57.38	\$1.22	\$7.41	\$4.82	\$13.45	\$1.22	\$7.41	\$4.82	\$13.45
2031	\$5.75	\$34.91	\$17.86	\$58.52	\$1.24	\$7.55	\$4.92	\$13.72	\$1.24	\$7.55	\$4.92	\$13.72
2032	\$5.87	\$35.61	\$18.22	\$59.69	\$1.27	\$7.71	\$5.02	\$13.99	\$1.27	\$7.71	\$5.02	\$13.99
2033	\$5.98	\$36.32	\$18.58	\$60.89	\$1.29	\$7.86	\$5.12	\$14.27	\$1.29	\$7.86	\$5.12	\$14.27
2034	\$6.10	\$37.05	\$18.96	\$62.11	\$1.32	\$8.02	\$5.22	\$14.56	\$1.32	\$8.02	\$5.22	\$14.56
2035	\$6.22	\$37.79	\$19.33	\$63.35	\$1.35	\$8.18	\$5.33	\$14.85	\$1.35	\$8.18	\$5.33	\$14.85
2036	\$6.35	\$38.54	\$19.72	\$64.61	\$1.37	\$8.34	\$5.43	\$15.15	\$1.37	\$8.34	\$5.43	\$15.15
2037	\$6.48	\$39.32	\$20.12	\$65.91	\$1.40	\$8.51	\$5.54	\$15.45	\$1.40	\$8.51	\$5.54	\$15.45
2038	\$6.61	\$40.10	\$20.52	\$67.23	\$1.43	\$8.68	\$5.65	\$15.76	\$1.43	\$8.68	\$5.65	\$15.76
2039	\$6.74	\$40.90	\$20.93	\$68.57	\$1.46	\$8.85	\$5.76	\$16.07	\$1.46	\$8.85	\$5.76	\$16.07
2040	\$6.87	\$41.72	\$21.35	\$69.94	\$1.49	\$9.03	\$5.88	\$16.39	\$1.49	\$9.03	\$5.88	\$16.39
2041	\$7.01	\$42.56	\$21.77	\$71.34	\$1.52	\$9.21	\$6.00	\$16.72	\$1.52	\$9.21	\$6.00	\$16.72
2042	\$7.15	\$43.41	\$22.21	\$72.77	\$1.55	\$9.39	\$6.12	\$17.06	\$1.55	\$9.39	\$6.12	\$17.06
2043	\$7.29	\$44.28	\$22.65	\$74.22	\$1.58	\$9.58	\$6.24	\$17.40	\$1.58	\$9.58	\$6.24	\$17.40
2044	\$7.44	\$45.16	\$23.11	\$75.71	\$1.61	\$9.77	\$6.36	\$17.75	\$1.61	\$9.77	\$6.36	\$17.75
2045	\$7.59	\$46.06	\$23.57	\$77.22	\$1.64	\$9.97	\$6.49	\$18.10	\$1.64	\$9.97	\$6.49	\$18.10
2046	\$7.74	\$46.99	\$24.04	\$78.76	\$1.67	\$10.17	\$6.62	\$18.46	\$1.67	\$10.17	\$6.62	\$18.46
2047	\$7.89	\$47.93	\$24.52	\$80.34	\$1.71	\$10.37	\$6.75	\$18.83	\$1.71	\$10.37	\$6.75	\$18.83

Appendix: Review of Enbridge’s Avoided Distribution Cost Methodology by Other Parties

The methodology used by ICF to estimate Union Gas Avoided distribution costs is based on the methodology used by Enbridge Gas in the 2015-2020 DSM Plan. This approach was reviewed during the proceeding, and intervenors provided comments on the Enbridge avoided distribution cost study. These comments were filed as intervenor arguments and direct testimonies to the proceeding. In its review of the proceedings, ICF found that while several parties commented on Enbridge’s DSM plan and overall avoided cost methodology, only one party—Green Energy Council (GEC)—specifically criticized Enbridge’s avoided distribution cost methodology. GEC questioned both the design of the Navigant methodology and the application/choice of inputs into the methodology, and suggested that the study potentially understated actual avoidable facility costs.

A summary of GEC’s main arguments are presented below.²² Where relevant reply arguments submitted by Enbridge are also presented.

- a) **Load-related distribution investment.** GEC argues that the list of distribution projects that Enbridge provided Navigant was inconsistent and excluded costs for several large investments that were (at least partially) designed to meet growth in distribution load. GEC notes that the distribution portion of costs associated with Enbridge’s Greater Toronto Area (GTA) project were omitted from calculations used to derive Enbridge’s 10-year forecast.

GEC also questions Enbridge’s exclusion of sales, replacement, and relocation mains from its load-related investment analysis. GEC notes that the size (and cost) of new sales mains may be a function of the efficiency of the new customers, and possibly existing customers on the same lines. GEC notes that replacement and relocation mains may also similarly be affected by load levels.

Enbridge, in its reply, argues that the GEC expert is not in a position to know whether a specific project was or wasn’t required to meet new load and notes that the GTA project was not designed for load growth but instead to remove a bottleneck to allow Enbridge greater flexibility to source supply from different sources, thereby giving it the opportunity to choose the lower cost supply option.

- b) **Design-Peak Load Growth, 2010-2019.** GEC argues that the design-peak load growth used by Navigant to derive the per-unit distribution avoided cost metric should be adjusted downward to remove the part of the growth that is accommodated by sales projects and upgrades of replacement mains. GEC argues that the cost of reinforcements should be divided by the growth requiring the reinforcements, excluding growth from other projects. This would lower the growth denominator in the per-unit cost ratio (See *Per Unit Costs*), thus increasing the per-unit value of DSM programs.

²² Resource Insight, Inc. *Direct Testimony of Paul Chernik on Behalf of The Green Energy Coalition*. July 31, 2015 (Corrected August 12, 2015). 2015-2020 DSM Plans of Enbridge Gas Distribution and Union Gas (EB-2015-0029/0049).

- c) **Annualizing the Avoided Distribution Cost.** GEC alleges that Navigant used a nominal 5.9% carrying charge for distribution investments. GEC suggests that a *real-levelized* carrying charge of 6% should be used.
- d) **Converting from Peak Day to Normal Average Usage.** GEC suggests that design peak day loads rather than normal peak day loads should be used when calculating avoided cost savings. Because design peak exceeds normal peak, this would result in load shapes that have higher peak day-to-annual consumption ratios.
- e) **Operating and Maintenance Costs.** GEC suggests that some distribution operations and maintenance (O&M) costs might be significant, citing incremental O&M of \$13 million in the Enbridge's GTA application, which is an annual cost equal to 1.5% to 2% of the project cost.

ICF considered the suggestions made by the GEC to determine if any should be included in the analysis of distribution system avoided costs for Union Gas. ICF adopted one suggestion, found certain suggestions to be specific to the Enbridge distribution system, hence not relevant to Union Gas, and disagreed with others. A brief review of ICF's conclusions is presented below:

- a) The first issue related to inclusion of the GTA project costs is an Enbridge specific question and is not relevant to this analysis, although ICF agrees with Enbridge that the utilities are the only entities capable of determining the need and rationale for facilities investments, and the likelihood that similar facilities might be needed in the future.
- b) ICF disagrees with the suggestion that the peak load growth used in the analysis should be adjusted downward to remove the part of the growth that is accommodated by sales projects and upgrades of replacement mains. DSM programs will impact all customers and all loads, including loads that will not be located in areas where new facilities are necessary. As a result, excluding load growth from areas where no new facilities are necessary will lead to an overstatement of avoided costs.
- c) The discount rate being used should be consistent with standard utility and Board practice, and we have used the discount rate requested by Union Gas in this analysis.
- d) For the Union Gas system ICF agrees with the suggestion that the use of design day rather than normal peak day loads should be used when converting facilities cost into avoided cost savings, and has incorporated this philosophy in the Union Gas facilities avoided costs.
- e) Generally, ICF is of the view that O&M costs are driven primarily by the number of customers connected to the system, and not by throughput volumes. Where new facilities are added to the system that replace existing facilities, ICF expects overall O&M costs on the system to decline rather than to increase. While new facilities will incur O&M costs over their life, and the avoidance or delay in installing new facilities might reduce O&M expenses in certain instances, the impact is expected to be minimal, and ICF has not included incremental facilities O&M cost in the analysis.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 48

Question(s):

- (a) Please provide a table showing for 2023 to 3035: (i) the avoided gas cost figures underlying Enbridge's application and (ii) Enbridge's best forecast of future gas prices. Please express both in \$/m³.
- (b) Please provide gas conversions rates for:
- BTU to m³
 - GJ to m³
 - \$/GJ to \$/m³
 - \$/BTU to m³
 - tonnes CO₂e per m³
 - kWh per m³

Response

- a) i) Please see response to Exhibit I.5.EGI.ED.16a.
ii) Enbridge Gas uses ICF's Q3 2020 Natural Gas Strategic Gas Prices for adjusting long-term future gas price forecasts for the purpose of avoided costs. However, Enbridge Gas is not authorized by ICF to share the price forecast publicly. Please see the "SENDOUT Report" tabs in Exhibit I.5.EGI.ED.16 Attachment 1 and Attachment 2 for the gas forecast information that is available.
- b) Assuming the heat value is 38.53 the gas conversion rates would be:
- 1 million BTUs (MMBtu) = 1.055056 GJ and 1 GJ = 25.95 m³, therefore
1 million BTUs = 27.38 m³
 - 1 GJ = 25.95 m³
 - \$1 / GJ = \$0.039 / m³
 - \$1 / MMBtu = \$0.037 / m³
 - 0.001874 tonnes CO₂e/ m³
 - 1 m³ = 10.70 kWh

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 48

Preamble:

Enbridge states:

“In some cases, avoided cost estimates are required to extend beyond their forecasted periods. If necessary, a four-quarter moving inflation rate based on the Gross Domestic Product Implicit Price Index for Final Domestic Demand will be used, based on the most recently available information at the time avoided costs are updated.”

Question:

(a) Please provide a table with the above-noted figures underlying Enbridge’s application. Please indicate when these were calculated (i.e. when the avoided costs were updated).

Response

As per Exhibit E, Tab 5, Schedule 1, Attachment 3, pages 1 and 3 the figure used was 2.0% which was determined in September 2020 for the 2021 avoided costs. This was included in the “Summary Updates” tab at Exhibit I.5.EGI.ED.16 Attachment 1 and 2.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, Page 49

Preamble:

Enbridge states:

“For the purpose of the cost-effectiveness test (i.e. TRC-Plus), the total avoided costs resulting over the life of the DSM measures need to be discounted to a present value. Consistent with the 2015-2020 DSM Framework, the discount rate used to determine the net present value of avoided costs over the lifetime of DSM measures is 4% (real).”

Tim Woolf, Synapse Energy, *Benefit-Cost Analysis for Distributed Energy Resources*, Prepared for the Advanced Energy Economy Institute, September 22, 2014, p. 61 ([link](#)):

“We recommend that the DER BCA framework use a societal discount rate. The societal discount rate is best able to reflect the value of short-versus long-term costs and benefits to all utility customers, as well as to society in general. The societal discount rate is best able to reflect the time preference associated with the state’s energy policy goals, many of which are related to societal impacts. In addition, the societal discount rate is consistent with the use of the Societal Cost Test, which we recommend using in the DER BCA framework (see Chapter 2). We also recommend that the societal discount rate chosen for the DER BCA framework be somewhere in the range of zero to three percent real. This range is frequently used for societal discount rates, and is also very close to the current values of risk-free discount rates.”

Question(s):

(a) Please confirm that the OEB has the jurisdiction to set the discount rate that is used in the post-2021 DSM framework.

- (b) Would Enbridge oppose using a societal discount rate in the range of zero to three percent as recommended by Synapse Energy (either for this DSM plan or on a going forward basis)?
- (c) Please discuss each of the rationales for using a societal discount rate in the Synapse Energy report ([link](#)) and whether they would apply in the context of DSM in Ontario.
- (d) Please provide a live excel spreadsheet underlying the cost-effectiveness calculations for one of Enbridge's programs to more clearly illustrate how Enbridge applies the 4% discount rate in its TRC NPV calculations. Please simply pick one of the existing underlying spreadsheets and file it. If that is not possible, please prepare an example.
- (e) Does Enbridge apply an inflation adjustment in addition to the discount rate (seeing as the 4% is a real figure)? Please explain. If yes, what rate is used and how is it applied?

Response

- a) Confirmed.
- b) Enbridge Gas will apply a discount rate that is approved by the OEB as part of the DSM Framework.
- c) Enbridge Gas notes that the referenced report is over 7 years old, was commissioned for another jurisdiction, relates to electric system planning in that jurisdiction, not the gas system, and explicitly states the benefit cost analysis ("BCA") is in regard to distributed energy resources ("DER" or "DER's") and achieving specified policy goals in that jurisdiction.

The report states:

Regulated utilities have a variety of different goals and responsibilities to consider when planning their system...The purpose of the DER BCA framework is to identify those distributed energy resources that will meet a set of regulatory goals, including: reduce electricity costs, increase electricity system efficiency, maintain reliability, reduce risk, and achieve the other energy policy goals...¹

Enbridge Gas does not believe this is relevant to apply in the current context of natural gas DSM in the province of Ontario.

¹ Woolf, et al., Benefit-Cost Analysis for Distributed Energy Resources, Synapse Energy Economics (September 22, 2014), p. 7. <https://www.synapse-energy.com/sites/default/files/Final%20Report.pdf>

- d) The 4% real discount rate is converted into a nominal rate of 6.08%. Please see response to Exhibit I.13.EGI.EP.21c. This calculation and how the nominal discount rate is applied to avoided costs can be seen in the NPV columns of the 'Rate Zone Avoided Costs 2021' tabs within Exhibit I.5.EGI.ED.16 Attachment 1 and Attachment 2 for the EGD and Union Rate Zones respectively.
- e) Confirmed. Please see response to Exhibit I.13.EGI.EP.21c.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Energy Probe Research Foundation (EP)

Interrogatory

Issue 5

Reference:

Exhibit B Tab 1 Schedule 1 Page 13 Table 1: 2023-2027 Five-Year DSM Budget Envelope; Exhibit F Tab 1 Schedule 2

Preamble:

Report of the Board Demand Side Management Framework for Natural Gas Distributors (2015-2020), December 22, 2014 Page 17 states as follows:

“Based on a \$2.00/month cost impact to a typical residential customer and considering the general historic program mix and the relative size of each utility, the Board has estimated total annual DSM amounts of \$85M for Enbridge and \$70M for Union (these amounts are inclusive of the maximum annual shareholder incentive).”

Question(s):

- (a) Please describe how Enbridge calculated the bill impact figures that it included in the notice of hearing for this matter.
- (b) Please provide the proposed 2023 budgets based on the ~\$2.00/ month for typical residential customer, with the other classes prorated based on average consumption
- (c) Please complete the following Table for the residential sector -one for EGI Rate 1 and one for Union South Rate M1.

Average Annual Residential Gas Bill and DSM Costs EGD (Union South) Rate Zone			
	2020	2023	2027
1. Variable rate (\$/m3)			
2. Variable costs (\$)			
3. Fixed costs			
4. Annual carbon Cost			
5. Total bill			
6. # of customers			
7.Total annual residential gas costs (5*6)			
Allocated DSM Budget \$/yr			
% DSM allocation			

(d) Please complete the following table.

TOTAL Annual Gas Consumption and Estimated Costs			
	2020	2023	2027
Total Ontario gas consumption (m3)			
Estimated Annual Cost \$m			

Response:

- a) The notice of hearing included the average monthly bill amount for natural gas conservation programs in 2022 for typical residential customers of \$1.69, \$1.53, and \$1.04 in the EGD, Union South, and Union North rate zones, respectively.

The average monthly bill amount was derived by dividing the 2022 proposed DSM budget by rate class by the 2021 annual forecast to calculate an average DSM budget unit rate and applying the unit rate to the monthly consumption of a typical residential customer. Table 1 provides the specific calculations.

Table 1
 Derivation of Average Monthly Natural Gas Conservation Costs
 for a Typical Residential Customer

	2022 Proposed DSM Budget (\$000s)	2021 Billing Units (10 ³ m ³) (1)	2022 Proposed DSM Unit Rate (cents/m ³)	Typical Residential Customer Average Monthly Consumption (m ³) (2)	2022 Average Monthly Natural Gas Conservation Costs (\$/mo)
	(a)	(b)	(c)	(d)	(e)
EGD Rate 1	43,183	5,118,240	0.8437	200.0	1.69
Union South Rate M1	26,153	3,142,868	0.8321	183.3	1.53
Union North Rate 01	5,796	1,023,451	0.5663	183.3	1.04

Notes:

- (1) At the time of the application, 2021 billing units were the current approved billing units.
 (2) Average monthly consumption based on annual consumption of 2,400 m³ for the EGD rate zone and 2,200 m³ for the Union rate zones.

The derivation of the average monthly bill amount was provided at Exhibit F, Tab 1, Schedule 3, column (i) of the original application filed on May 3, 2021. Note, Enbridge Gas filed an update to the original application on September 29, 2021 to

reflect the 2023 proposed DSM budget. The updated average monthly bill amount for natural gas conservation programs in 2023 is not materially different than 2022.¹

- b) Please see the response at Exhibit I.5.EGI.ED.12a.
- c) Please see response at Exhibit I.5.EGI.ED.12f for the monthly details of a typical customer residential bill in 2020. Monthly details can be multiplied by 12 for annual details. Please see Table 2 for the Allocated DSM Budget per year and % Allocation for 2020. Enbridge Gas does not forecast typical customer bill amounts for future years.

Table 2
Allocated DSM Budget for Residential Customers

Line No.	Particulars	2020
	Total Residential Gas Charges (\$/yr) (1)	
1	Rate 1 - EGD rate zone	\$1,918,683,530
2	Rate M1 - Union South rate zone	\$834,406,769
3	Rate 01 - Union North rate zone	\$330,968,816
	Allocated DSM Budget (\$/yr) (2)	
4	Rate 1 - EGD rate zone	\$39,405,864
5	Rate M1 - Union South rate zone	\$27,446,431
6	Rate 01 - Union North rate zone	\$6,624,724
	% DSM Allocation (3)	
7	Rate 1 – EGD rate zone	2.05%
8	Rate M1 – Union South rate zone	3.29%
9	Rate 01 – Union North rate zone	2.00%

Notes:

- (1) Calculated as monthly residential gas charges per Exhibit I.5.EGI.ED.12, Attachment 1, lines 19-21, multiplied by 12.
- (2) Please note that Union rate zones Rate M1 and Rate 01 are not exclusive to residential customers.
- (3) Allocated DSM budget (lines 4-6) / total monthly residential gas costs, (lines 1-3).

- d) Please see response at Exhibit I.5.EGI.ED.12h.

¹ The average monthly bill amount for natural gas conservation programs in 2023 for typical residential customers of \$1.76, \$1.60, and \$1.08 in the EGD, Union South, and Union North rate zones, respectively.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-Housing Providers of Ontario (FRPO)

Interrogatory

Issue 5

Reference:

Exhibit B, Tab 1, Schedule 1, page 9 and Exhibit D

Preamble:

EGI evidence states: "*The Proposed Framework builds on the 2015-2020 DSM Framework...*"

To understand EGI's proposed Framework going forward, it is our view, that the Board and stakeholders would benefit from seeing the context of the program budgets and results in the previous Framework. We understand that with the evolution of programs there may not be a precise fit for the purposes of allocations so that we ask that EGI provide the best fit and highlight any outliers.

Question(s):

For each of the program areas costs forecasted in Exhibit D, Schedule 1, Tables 4-8, please provide the actual annual spending for the 2015-2020 period, categorized by Incentive, Promotion, Delivery, Administration and Total.

Response

Please see response to Exhibit I.6.EGI.STAFF.13f.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-Housing Providers of Ontario (FRPO)

Interrogatory

Issue 5

Reference:

Exhibit B, Tab 1, Schedule 1, page 9 and Exhibit D

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To understand EGI's proposed Framework going forward, it is our view, that the Board and stakeholders would benefit from seeing the context of the program budgets and results in the previous Framework. We understand that with the evolution of programs there may not be a precise fit for the purposes of allocations so that we ask that EGI provide the best fit and highlight any outliers.

Question(s):

For each of the program areas Scorecards proposed in Exhibit D, Schedule 1, Tables 5-9, please provide the results obtained for the 2015-2020 period, categorized by Metric, Weight and DSMI Allocation, Score and Resulting Incentive.

Response

For the components requested in the interrogatory please refer to Attachment 1 for the EGD rate zone and Attachment 2 for the Union rates zones. Note that 2020 results are draft audit.

EGD Rate Zone

2015 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band	100% Target	Upper Band	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Run it Right and Energy Compass Home Efficiency Conservation	Cumulative Natural Gas Savings (m ³)	92%	758,900,000	1,011,900,000	1,264,900,000	58.5%	\$0	\$2,593,097	\$6,482,744	734,128,834	152.32%	\$6,482,744
	Home Efficiency Conservation	Deep Savings Participants	8%	571	762	952					5,646		
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	50%	18,100,000	24,100,000	30,200,000					28,067,263		
	Multi-Residential (Part 3)	Cumulative Natural Gas Savings (m ³)	45%	51,600,000	68,700,000	86,000,000	22.5%	\$0	\$998,288	\$2,495,721	63,969,353	116.21%	\$1,483,792
Market Transformation - Residential Savings by Design	Low Income Building Performance Management (LEPM)	Participants Enrolled (%)	5%	30%	40%	50%					64.71%		
	Residential Savings by Design	Builders Enrolled Completed Units	60%/40%	13/833	18/1,111	22/1,389	9.7%	\$0	\$430,597	\$1,076,493	19/1,987	170.52%	\$1,076,493
Market Transformation - Commercial Savings by Design	Commercial Savings by Design	New Developments Enrolled	100%	11	18	24	3.8%	\$0	\$167,308	\$418,269	24	150.00%	\$418,269
Market Transformation - Home Labelling Scorecard	Home Labelling	Realtor Commitments Ratings performed	50%	N/A/2,250	5,001/4,500	10,001/6,750	5.6%	\$0	\$246,559	\$616,397	41,650/333	236.95%	\$616,397

2016 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Energy Conservation Residential Adaptive Thermostats	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	249,142,962	332,190,616	498,285,924						328,747,651		
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	224,198,225	296,930,967	448,396,450	65.0%	\$0	\$2,715,177	\$6,787,943		394,823,056	123.86%	\$4,658,886
	Home Energy Conservation	Participants	20%	6,194	8,259	12,389						12,986		
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	23,842,500	31,790,000	47,685,000						28,814,754		
	Multi-Residential (Part 3)	Cumulative Natural Gas Savings (m ³)	45%	48,675,000	64,900,000	97,350,000	22.6%	\$0	\$944,585	\$2,361,462		84,728,581	109.54%	\$1,214,842
Market Transformation	Affordable Housing New Construction	Participants	10%	5	6	9						6		
	Residential Savings by Design	Builders Enrolled Homes Built	10%/15%	25/2,063	33/2,751	50/4,127						31/2,206		
	Commercial Savings by Design	New Developments Enrolled	25%	25	33	50	12.4%	\$0	\$520,238	\$1,300,595		43	98.64%	\$492,023
	School Energy Competition	Schools	10%	41	55	83						25		
	Run it Right	Participants	20%	62	83	124						84		
	Comprehensive Energy Management	Participants	20%	5	7	11						7		

2017 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target	
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Energy Conservation Residential Adaptive Thermostats	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	327,070,149	436,093,532	654,140,298						401,225,450		No	
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	277,781,543	370,375,390	555,563,086	67.2%	\$0	\$2,810,352	\$7,025,881		296,983,748	93.86%	\$2,120,130	No
	Home Energy Conservation	Participants	20%	6,837	9,116	13,674						11,390		No	
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	30,517,630	40,690,173	61,035,260						19,598,364	50.33%	\$0	No
	Multi-Residential (Part 3)	Cumulative Natural Gas Savings (m ³)	45%	94,799,664	126,399,552	189,599,328	21.3%	\$0	\$891,558	\$2,228,894		69,363,767		No	
Market Transformation	Affordable Housing New Construction	Participants	10%	21	28	42						11		No	
	Residential Savings by Design	Builders Enrolled Homes Built	10%/15%	24/1,705	32/2,273	48/3,410						24/2,570		Yes	
	Commercial Savings by Design	New Developments Enrolled	25%	24	32	48	11.4%	\$0	\$478,090	\$1,195,225		30		Yes	
	School Energy Competition	Schools	10%	43	57	86						65		No	
	Run it Right	Participants	20%	88	117	176						29		No	
	Comprehensive Energy Management	Participants	20%	41	55	83						5		No	

2018 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target	
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Energy Conservation Residential Adaptive Thermostats	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	381,344,724	508,459,632	762,689,448						377,787,734		No	
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	222,815,738	297,087,651	445,631,477	68.1%	\$0	\$2,847,789	\$7,119,472		299,539,337	101.26%	\$2,955,435	Yes
	Home Energy Conservation	Participants	20%	6,926	9,235	13,853						14,413		No	
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	21,392,830	28,523,773	42,785,650						15,978,389	87.02%	\$422,199	Yes
	Multi-Residential (Part 3)	Cumulative Natural Gas Savings (m ³)	45%	73,159,199	97,545,599	146,318,399	21.0%	\$0	\$878,118	\$2,195,295		114,168,897		Yes	
Market Transformation	Affordable Housing New Construction	Participants	10%	11	14	21						13		Yes	
	Residential Savings by Design	Builders Enrolled Homes Built	10%/15%	15/1,634	20/2,179	30/3,269						35/2,956		Yes	
	Commercial Savings by Design	New Developments Enrolled	25%	21	28	42	10.9%	\$0	\$454,093	\$1,135,233		31		Yes	
	School Energy Competition	Schools	10%	59	78	117						14		No	
	Run it Right	Participants	20%	18	24	36						62		Yes	
	Comprehensive Energy Management	Participants	20%	16	21	32						5		Yes	

2019 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target	
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Efficiency Rebate Residential Adaptive Thermostats	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	326,798,345	435,731,127	653,596,690						502,499,656		Yes	
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	223,954,472	298,605,963	447,908,944	67.1%	\$0	\$2,805,388	\$7,013,471		369,469,772	124.02%	\$4,827,040	No
	Home Efficiency Rebate	Participants	20%	8,705	11,606	17,409						16,480		No	
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	15,454,405	20,605,874	30,908,811						27,618,723		Yes	
	Multi-Residential (Part 3)	Cumulative Natural Gas Savings (m ³)	45%	76,908,576	102,544,768	153,817,153	21.7%	\$0	\$905,651	\$2,264,127		88,957,000	109.35%	\$1,159,746	No
Market Transformation	Affordable Housing New Construction	Participants	10%	8	11	17						11		Yes	
	Residential Savings by Design	Builders Enrolled Homes Built	10%/15%	23/1,902	30/2,536	45/3,804						39/2,989		No	
	Commercial Savings by Design	New Developments Enrolled	25%	23	30	45	11.2%	\$0	\$468,961	\$1,172,401		35		No	
	School Energy Competition	Schools	10%	24	32	48						32		Yes	
	Run it Right	Participants	20%	27	36	54						84		No	
	Comprehensive Energy Management	Participants	20%	12	16	24						7		Yes	

2020 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target	
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Efficiency Rebate	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	377,258,906	503,011,875	754,517,813						408,463,368		No	
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	189,386,289	252,515,052	378,772,578	67.1%	\$0	\$2,805,115	\$7,012,787		268,306,798	101.18%	\$2,904,033	Yes
	Home Efficiency Rebate	Participants	20%	8,025	10,700	16,050						14,013		Yes	
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	19,930,077	26,573,437	39,860,155						26,642,997		No	
	Multi-Residential (Part 3)	Cumulative Natural Gas Savings (m ³)	45%	82,350,715	109,800,953	164,701,430	21.7%	\$0	\$905,424	\$2,263,561		67,637,303	88.84%	\$501,162	No
Market Transformation	Affordable Housing New Construction	Participants	10%	7	9	14						15		Yes	
	Residential Savings by Design	Builders Enrolled Homes Built	10%/15%	26/2,002	35/2,669	52/4,004						35/2,763		No	
	Commercial Savings by Design	New Developments Enrolled	25%	22	29	43	11.2%	\$0	\$469,461	\$1,173,652		36		Yes	
	School Energy Competition	Schools	10%	54	72	108						7		No	
	Run it Right	Participants	20%	43	58	86						65		No	
	Comprehensive Energy Management	Participants	20%	24	32	49						7		No	

2021 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Forecasted Achievement ¹	Forecasted Score Achievement ¹	Forecasted DSM Incentive Achievement ¹	Forecasted Decreasing Target ²
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Efficiency Rebate Residential Adaptive Thermostats	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	381,230,911	508,307,882	762,461,823	67.1%	\$0	\$2,805,115	\$7,012,787	372,360,000	111.73%	\$3,792,618	No
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	179,362,258	239,149,677	358,724,516					317,453,495			Yes
	Home Efficiency Rebate	20%	7,541	10,054	15,081	14,747					Yes			
	Participants	20%	21,577,192	28,769,589	43,154,383	27,800,000					No			
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	21,577,192	28,769,589	43,154,383	21.7%	\$0	\$905,424	\$2,263,561	27,800,000	87.41%	\$449,353	No
		Cumulative Natural Gas Savings (m ³)	45%	69,641,327	92,855,103	139,282,654					70,000,000			Yes
	Affordable Housing New Construction	10%	10	13	19	13					No			
Market Transformation	Residential Savings by Design	Builders Enrolled	10%	29	39	59	11.2%	\$0	\$469,461	\$1,173,652	24	47.24%	\$0	No
		Homes Built	15%	2,329	3,105	4,658					2,500			No
	Commercial Savings by Design	25%	28	37	56	17					No			
	School Energy Competition	10%	44	58	87	0					Yes			
	Run it Right	20%	87	116	175	94					No			
	Comprehensive Energy Management	20%	22	29	44	2					Yes			
	Participants	10%	10	13	19	13					No			

2022 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%) ²	100% Target ²	Upper Band (150%) ²	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Forecasted Achievement ³	Forecasted Score Achievement ³	Forecasted DSM Incentive Achievement ³
Resource Acquisition	Commercial & Industrial Custom Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Run it Right Comprehensive Energy Management Energy Leaders Small Commercial New Construction Home Efficiency Rebate	Large Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	316,668,827	422,225,103	633,337,654	67.1%	\$0	\$2,805,115	\$7,012,787	422,225,103	100.00%	\$2,805,115
		Small Volume Customers - Cumulative Natural Gas Savings (m ³)	40%	187,400,343	249,867,124	374,800,686					249,867,124		
	Home Efficiency Rebate	20%	7,323	9,763	14,645	9,763							
	Participants	20%	20,461,840	27,282,453	40,923,680	27,282,453							
Low Income	Home Winterproofing - Single Family (Part 9)	Cumulative Natural Gas Savings (m ³)	45%	20,461,840	27,282,453	40,923,680	21.7%	\$0	\$905,424	\$2,263,561	27,282,453	100.00%	\$905,424
		Cumulative Natural Gas Savings (m ³)	45%	57,453,958	76,605,278	114,907,917					76,605,278		
	Affordable Housing New Construction	10%	9	12	18	12							
Market Transformation	Residential Savings by Design	Builders Enrolled	10%	18	23	35	11.2%	\$0	\$469,461	\$1,173,652	23	100.00%	\$469,461
		Homes Built	15%	1,830	2,439	3,659					2,439		
	Commercial Savings by Design	25%	25	34	50	34							
	School Energy Competition	10%	44	58	87	58							
	Run it Right	20%	66	88	133	88							
	Comprehensive Energy Management	20%	9	12	18	12							

Footnotes:

- 2021 forecast of results and spend are as detailed in interrogatory response to I.6.EGI.STAFF.13 a, Attachment 1. However the numbers may vary due to rounding adjustments
- Calculated based on 2021 forecast of results and spend, as detailed in interrogatory response to I.6.EGI.STAFF.13 a, Attachment 1. However the numbers may vary due to rounding adjustments
- Assumed 100% target is achieved
- Given no forecasted results in 2021, School Energy Challenge target is calculated using 2019 achievement

Union Rate Zones

2015 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (125%)	DSMI Allocation	DSMI below 50% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Custom Home Reno Rebate Energy Savings Kit	Cumulative Natural Gas Savings (m ³)	90%	612,421,364	816,561,818	1,020,702,273	52.4%	\$0	\$2,304,733	\$5,761,833	919,157,080	130.93%	\$4,443,225
		Residential Deep Savings Participants	5%	934	1,245	1,556					2,529		
		CI Deep Savings (%)	5%	7.88%	8.88%	9.88%					9.08%		
Low Income	Home Weatherization (Single Family)	Cumulative Natural Gas Savings (m ³)	60%	19,500,000	26,000,000	32,500,000	25.5%	\$0	\$1,124,052	\$2,810,129	35,847,426	139.69%	\$2,462,534
		Affordable Housing Conservation (Multi-Family)	Cumulative Natural Gas Savings (m ³)	40%	13,200,000	17,600,000					22,000,000		
Market Transformation	Optimum Home	Homes Built (>20% above OBC 2012) by Participating Builders	100%	24.73%	29.73%	34.73%	5.2%	\$0	\$226,689	\$566,721	50.30%	305.70%	\$566,721
Large Volume	Large Volume Program for T2/R100 Customers	Cumulative Natural Gas Savings (m ³)	40%	772,381,040	1,029,841,387	1,287,301,734	16.9%	\$0	\$745,151	\$1,862,877	658,010,847	21.76%	\$0
		Large Volume Program for T1 Customers	Cumulative Natural Gas Savings (m ³)	60%	154,692,013	206,256,017					257,820,021		

2016 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Reno Rebate	Cumulative Natural Gas Savings (m ³)	75%	840,194,699	1,120,259,599	1,680,389,398	61.3%	\$0	\$2,560,817	\$6,402,042	814,757,886	104.51%	\$2,907,230
		Participants	25%	2,475	3,300	4,950					6,595		
		Home Reno Rebate	Participants	25%	2,475	3,300					4,950		
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Cumulative Natural Gas Savings (m ³)	60%	28,339,761	37,786,348	56,679,522	25.0%	\$0	\$1,045,997	\$2,614,993	45,783,307	103.37%	\$1,151,656
		Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	13,636,358	18,448,477	27,672,716					10,894,573		
		Multi-Family Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	2,252,430	3,003,240	4,504,860					8,151,190		
Market Transformation	Optimum Home	Homes Built (>20% above OBC 2012) by Participating Builders	50%	53%	70%	100%	3.7%	\$0	\$156,161	\$390,404	70.09%	50.08%	\$0
		Commercial New Construction	New Developments Enrolled	50%	6	8					12		
Performance-Based	RunSmart	Participants	50%	21	28	41	1.2%	\$0	\$50,248	\$125,621	32	107.69%	\$61,844
		Strategic Energy Management	Participants	50%	2	3					5		
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	668,168,041	890,890,721	1,336,336,082	8.8%	\$0	\$366,776	\$916,941	79,846,302	8.96%	\$0

2017 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Reno Rebate	Cumulative Natural Gas Savings (m ³)	75%	732,348,080	976,484,106	1,464,696,159	63.1%	\$0	\$2,638,097	\$6,595,243	999,091,347	126.73%	\$4,753,191	Yes
		Participants	25%	5,145	6,859	10,289					13,729			
		Home Reno Rebate	Participants	25%	5,145	6,859					10,289			
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Cumulative Natural Gas Savings from Single Family (m ³)	60%	33,770,520	45,027,360	67,541,041	23.3%	\$0	\$974,777	\$2,436,943	30,676,937	82.81%	\$304,325	No
		Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	14,512,897	19,350,530	29,025,795					22,426,926			
		Multi-Family Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	11,851,284	15,801,711	23,702,567					4,363,656			
Market Transformation	Optimum Home	Participating Builders (Regional Top 10)	20%	8	10	15	4.4%	\$0	\$184,649	\$461,623	60.00%	155.00%	\$461,623	N/A
		Prototype Homes Built	30%	22.50%	30.00%	45.00%					10			
		Commercial Savings by Design	New Developments Enrolled	50%	6	8					12			
Performance-Based	RunSmart	Participants	20%	57	78	113	1.6%	\$0	\$66,576	\$166,440	35	18.20%	\$0	No
		Savings (%)	60%	7.50%	10.00%	15.00%					1.49%			
		Strategic Energy Management	Participants	20%	24	32					48			
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	347,325,300	463,100,400	694,650,600	7.6%	\$0	\$315,900	\$789,751	125,804,115	27.20%	\$0	Yes

2018 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Reno Rebate	Cumulative Natural Gas Savings (m ³)	75%	613,750,123	818,345,497	1,227,518,245	63.6%	\$0	\$2,657,059	\$6,842,647	978,937,827	139.55%	\$5,809,659	Yes
		Participants	25%	8,007	8,010	12,014					16,118			
		Home Reno Rebate	Participants	25%	8,007	8,010					12,014			
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Single Family Cumulative Natural Gas Savings (m ³)	60%	30,755,897	41,007,862	61,511,794	23.5%	\$0	\$984,319	\$2,460,797	32,052,375	83.91%	\$350,811	No
		Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	17,418,195	23,224,260	34,836,389					19,718,214			
		Multi-Family Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	3,389,095	4,518,793	6,778,190					6,573,109			
Market Transformation	Optimum Home	Participating Builders (Regional Top 10)	10%	6	8	12	4.1%	\$0	\$169,583	\$423,958	8	107.11%	\$205,755	N/A
		Prototype Homes Built	30%	45%	60%	90%					83.33%			
		Commercial Savings by Design	Percentage of Homes Built (>15% above OBC 2017) by Participating Builders	10%	3.75%	5.00%					7.50%			
Performance-Based	RunSmart	Participants	10%	33	44	66	1.9%	\$0	\$78,914	\$197,285	18	59.03%	\$0	Yes
		Savings (%)	40%	1.47%	1.96%	2.93%					0.51%			
		Strategic Energy Management	Participants	10%	2	3					5			
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	146,795,956	196,727,941	293,591,911	6.9%	\$0	\$290,125	\$725,313	89,196,896	45.60%	\$0	Yes

2019 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Reno Rebate Residential Adaptive Thermostats	Cumulative Natural Gas Savings (m ³)	75%	598,938,485	798,585,979	1,197,878,969	63.9%	\$0	\$2,673,068	\$6,682,671	955,593,809	120.84%	\$4,344,389	Yes
		Participants	25%	6,231	8,308	12,462					10,958			
		Home Reno Rebate	Participants	25%	6,231	8,308					12,462			
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Single Family Cumulative Natural Gas Savings (m ³)	60%	32,841,561	43,788,748	65,683,123	23.9%	\$0	\$999,969	\$2,499,922	51,732,240	108.46%	\$1,253,615	Yes
		Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	17,349,279	23,132,372	34,698,558					22,803,825			
		Multi-Family Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	5,835,560	7,780,748	11,671,119					4,774,193			
Market Transformation	Optimum Home	Participating Builders (Regional Top 10)	10%	3	4	6	6.8%	\$0	\$165,291	\$413,228	4	137.73%	\$352,359	Yes
		Prototype Homes Built	10%	68%	90%	100%					95.45%			
		Commercial Savings by Design	Percentage of Homes Built (>15% above OBC 2017) by Participating Builders	30%	3.25%	4.34%					6.50%			
Performance-Based	RunSmart	Participants	50%	15	20	30	4.0%	\$0	\$58,889	\$147,223	22	30.28%	\$0	Yes
		Savings (%)	10%	42	56	84					58			
		Strategic Energy Management	Savings (%)	40%	0.53%	0.70%					1.05%			
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	103,250,094	137,666,792	206,500,188	1.4%	\$0	\$282,782	\$706,956	72,370,192	52.57%	\$0	Yes

2020 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (150%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Achievement	Score Achieved	DSM Incentive Achieved	Decreasing Target	
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Efficiency Rebate Residential Adaptive Thermostats	Cumulative Natural Gas Savings (m ³)	75%	543,286,032	724,381,376	1,086,572,065	62.8%	\$0	\$2,625,085	\$6,562,712	669,887,948	96.98%	\$2,307,872	Yes	
		Participants	25%	5,172	6,896	10,344					7,619				
		Home Efficiency Rebate	Participants	25%	5,172	6,896					10,344				7,619
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Single Family Cumulative Natural Gas Savings (m ³)	60%	40,022,417	53,363,223	80,044,835	24.9%	\$0	\$1,041,779	\$2,604,447	38,411,013	62.74%	\$0	No	
		Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	23,896,992	31,862,656	47,793,984					12,142,699				
		Multi-Family Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	5,021,527	6,695,369	10,043,054					8,316,698				
Market Transformation	Optimum Home	Percentage of Homes Built (>15% above OBC 2017) by Participating Builders	50%	24.24%	32.32%	48.48%	6.6%	\$0	\$162,324	\$405,810	39.19%	106.47%	\$193,812	Yes	
		Commercial Savings by Design	New Developments Enrolled	50%	20	26					39				24
		RunSmart	Participants	10%	52	69					104				0
Performance-Based	RunSmart	Participants	10%	52	69	104	3.9%	\$0	\$73,106	\$182,765	-1.52%	27.42%	\$0	No	
		Savings (%)	40%	0.33%	0.44%	0.67%					2.81%				
		Strategic Energy Management	Savings (%)	50%	3.56%	4.75%					7.13%				2.81%
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	99,762,897	133,017,196	199,525,794	1.7%	\$0	\$277,706	\$694,265	126,647,466	95.21%	\$224,513	Yes	

2021 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%)	100% Target	Upper Band (100%)	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Forecasted Achievement ¹	Forecasted Score Achievement ²	Forecasted DSM Incentive Achievement ³	Decreasing Target ⁴
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Efficiency Rebate Residential Adaptive Thermostats	Cumulative Natural Gas Savings (m ³)	75%	576,545,784	788,727,712	1,153,091,568	62.8%	\$0	\$2,625,085	\$6,562,712	785,576,741	105.51%	\$3,059,109	No
	Home Efficiency Rebate	Participants	25%	4,553	6,070	9,105					7,009			Yes
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Single Family Cumulative Natural Gas Savings (m ³)	60%	39,563,598	52,751,464	79,127,196	24.9%	\$0	\$1,041,779	\$2,604,447	43,625,000	83.06%	\$335,745	Yes
	Multi-Family	Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	13,085,632	17,447,510	26,171,264					15,000,000			Yes
		Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	8,962,526	11,950,034	17,925,052					8,000,000			No
Market Transformation	Optimum Home	Percentage of Homes Built (>15% above CBC 2017) by Participating Builders	50%	45.66%	60.88%	91.33%	6.6%	\$0	\$162,324	\$405,810	41.00%	85.60%	\$68,799	No
	Commercial Savings by Design	New Developments Enrolled	50%	19	25	38					26			Yes
Performance-Based	RunSmart	Participants	10%	52	69	104	3.9%	\$0	\$73,106	\$182,765	0	19.05%	\$0	No
	Strategic Energy Management	Savings (%)	40%	0.33%	0.45%	0.67%					0.00%			No
		Savings (%)	50%	5.91%	7.87%	11.81%					3.00%			No
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	87,077,474	116,103,299	174,154,948	1.7%	\$0	\$277,706	\$694,265	126,647,466	104.21%	\$312,815	Yes

2022 Annual Scorecards	Offering	Metric	Metric Weighting	Lower Band (75%) ²	100% Target ²	Upper Band (100%) ²	DSMI Allocation	DSMI below 75% Score	DSMI at 100% Score	DSMI at 150% Score	Forecasted Achievement ¹	Forecasted Score Achievement ²	Forecasted DSM Incentive Achievement ³
Resource Acquisition	Commercial & Industrial Prescriptive Commercial & Industrial Direct Install Commercial & Industrial Custom Home Efficiency Rebate Residential Adaptive Thermostats	Cumulative Natural Gas Savings (m ³)	75%	576,656,035	788,874,713	1,153,312,070	62.8%	\$0	\$2,625,085	\$6,562,712	788,874,713	100.00%	\$2,625,085
	Home Efficiency Rebate	Participants	25%	4,063	5,417	8,126					5,417		
Low Income	Home Weatherization Furnace End-of-Life Indigenous	Single Family Cumulative Natural Gas Savings (m ³)	60%	33,709,039	44,945,385	67,418,077	24.9%	\$0	\$1,041,779	\$2,604,447	44,945,385	100.00%	\$1,041,779
	Multi-Family	Social and Assisted Multi-Family Cumulative Natural Gas Savings (m ³)	35%	13,420,578	17,894,104	26,841,156					17,894,104		
		Market Rate Multi-Family Cumulative Natural Gas Savings (m ³)	5%	7,157,842	9,543,522	14,315,283					9,543,522		
Market Transformation	Optimum Home ⁴	Percentage of Homes Built (>15% above CBC 2017) by Participating Builders	50%	75.00%	100.00%	100.00%	6.6%	\$0	\$162,324	\$405,810	100.00%	100.00%	\$162,324
	Commercial Savings by Design	New Developments Enrolled	50%	22	29	43					29		
Performance-Based	RunSmart	Participants	10%	52	69	104	3.9%	\$0	\$73,106	\$182,765	69	100.00%	\$73,106
	Strategic Energy Management	Savings (%)	40%	0.33%	0.45%	0.67%					0.45%		
		Savings (%)	50%	7.91%	10.54%	15.82%					10.54%		
Large Volume	Direct Access	Cumulative Natural Gas Savings (m ³)	100%	87,331,508	116,442,010	174,663,015	1.7%	\$0	\$277,706	\$694,265	116,442,010	100.00%	\$277,706

Footnotes:
 1. 2021 forecast of results and spend are as detailed in interrogatory response to I.6.EGI.STAFF.13 a, Attachment 1. However the numbers may vary due to rounding adjustments
 2. Calculated based on 2021 forecast of results and spend, as detailed in interrogatory response to I.6.EGI.STAFF.13 a, Attachment 1. However the numbers may vary due to rounding adjustments
 3. Assumed 100% target is achieved
 4. Optimum Home 100% and 150% targets are maxed out at 100

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Please provide a table, both in PDF and Excel formats, with the following annual information regarding Enbridge's historic years (each year from 2015 through 2020) and forecast current and future years (each year from 2021 through 2027) gas throughput/sales by rate class, as well as in total for all rate classes combined:

- Annual m3 throughput/sales volumes
- Number of customers
- Description of the types of customers in the rate class
- Identification of which rate classes have been and are expected in the future to be covered by the Company's DSM programs.

For historic information, please include both Enbridge and Union information. To the extent that separate Enbridge and Union rate classes have been combined into a single rate class following the companies' merger, please indicate how historic rate classes would map onto current or future rate classes.

Note that this information could also be helpful in addressing issue #6 regarding rate impacts.

Response:

Attachment 1 includes Enbridge Gas's volumes and customer information detailed by current rate class for both legacy utilities for the historical years (2015-2020) and the forecast period of 2021-2027.

General Service rate classes include rates 1, 6, 9, M1, M2, 01, 10 are primarily comprised of residential customers, but include a mix of small to medium size commercial/industrial businesses.

Contract rate classes Rate 200, M9, M10, and T3 are comprised of wholesale customer with end use distribution to their own customer base. Contract rate 100, 110, 115, 135, 145, 170, M4, M5, M7, T1, 20, and 25 are primarily comprised of medium to large commercial/industrial customers from sectors including, but not limited to automotive, food & beverage, greenhouses, institutional, manufacturing, and mining. Contract rate 125, 300, 100 (Union North), and T2 are primarily comprised of large

commercial/industrial customers from sectors including, but not limited to chemical, institutional, mining, refinery, power, pulp/paper, and steel.

There has been no change to the Company's rate zones or rate classes as a result of the amalgamation of Enbridge Gas Distribution and Union Gas. The Company will assess rate harmonization as part of its 2024 rebasing application.

Please refer to Exhibit I.13.EGI.GEC.21a for identification of rate classes eligible for DSM programs and refer to Exhibit I.5.EGI.GEC.5 for historical participation by rate class.

Table 1: Enbridge Gas Volumes by Service type and Rate Classes (10³ m³)

	Actual 2015	Actual 2016	Actual 2017	Actual 2018	Actual 2019	Actual 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029	Forecast 2030
General Service																
EGD Rate 1	4,773,804	4,717,246	4,914,923	4,945,811	5,042,867	5,103,652	5,076,869	5,104,272	5,129,331	5,162,340	5,193,658	5,226,434	5,257,913	5,287,292	5,314,422	5,339,735
EGD Rate 6	4,797,680	4,688,243	4,884,068	4,921,840	4,978,779	4,869,543	4,660,199	4,724,179	4,765,429	4,785,268	4,809,154	4,837,878	4,866,432	4,894,345	4,921,712	4,948,816
EGD Rate 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union South M1	2,941,369	2,914,050	3,031,793	3,135,541	3,181,259	3,157,911	3,070,530	3,134,770	3,144,086	3,168,991	3,162,749	3,171,434	3,179,198	3,201,427	3,191,798	3,196,862
Union South M2	1,214,548	1,233,452	1,259,221	1,271,641	1,305,377	1,257,776	1,267,109	1,290,856	1,291,379	1,297,768	1,293,153	1,293,741	1,293,958	1,299,232	1,293,306	1,292,476
Union North R01	958,401	958,121	985,034	1,007,152	1,020,446	1,028,569	1,001,543	1,025,730	1,029,177	1,038,943	1,038,381	1,043,157	1,047,504	1,056,632	1,055,330	1,059,735
Union North R10	351,495	357,713	362,874	357,317	365,842	354,996	353,929	367,857	367,990	369,762	368,440	368,649	368,735	370,264	368,514	369,869
Total General Service	15,037,298	14,868,826	15,437,913	15,639,302	15,894,570	15,772,448	15,430,179	15,647,665	15,727,393	15,823,073	15,865,534	15,941,294	16,013,741	16,109,191	16,145,082	16,207,494
Contract																
EGD Rate 100	3,711	3,216	1,184	2,077	14,634	19,356	33,431	31,239	30,331	29,423	28,515	27,607	26,699	25,791	24,883	23,975
EGD Rate 110	667,950	827,584	798,167	845,858	872,032	966,784	961,577	1,088,282	1,142,179	1,138,577	1,134,974	1,131,371	1,127,769	1,124,166	1,120,563	1,116,961
EGD Rate 115	511,323	497,613	505,698	499,425	444,018	378,456	472,218	363,479	368,967	364,455	359,943	355,431	350,919	346,407	341,895	337,382
EGD Rate 125	726,900	617,490	227,478	507,609	591,623	526,029	560,000	558,826	558,826	558,826	558,826	558,826	558,826	558,826	558,826	558,826
EGD Rate 135	68,665	64,633	65,989	62,615	62,990	65,319	61,643	55,553	58,036	57,093	56,150	55,207	54,264	53,321	52,379	51,436
EGD Rate 145	77,496	45,699	46,105	43,306	30,721	23,645	27,157	17,614	25,939	25,939	25,939	25,939	25,939	25,939	25,939	25,939
EGD Rate 170	389,053	302,202	310,562	328,093	286,319	247,886	267,329	245,623	253,114	252,691	252,267	251,843	251,420	250,996	250,573	250,149
EGD Rate 200	176,403	169,647	173,932	186,081	187,869	195,190	181,853	188,317	188,317	188,317	188,317	188,317	188,317	188,317	188,317	188,317
EGD Rate 300	27,273	21,639	461	418	349	204	123	123	123	123	123	123	123	123	123	123
EGD Rate 315	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union North Rate_20	540,839	564,912	501,499	478,104	522,900	778,476	663,827	794,457	799,996	798,220	796,117	794,013	805,597	803,493	801,390	812,973
Union North Rate_25	144,313	116,847	106,997	156,126	119,200	92,838	79,886	91,136	91,136	89,180	89,180	89,180	89,180	89,180	89,180	89,180
Union North Rate_100	1,398,114	1,365,738	1,029,145	1,038,045	1,020,510	996,605	1,009,926	1,029,770	1,096,177	1,110,212	1,109,120	1,108,027	1,106,935	1,105,842	1,104,750	1,103,657
Union South Rate_M4	457,328	471,413	549,760	656,761	674,011	621,380	678,947	588,086	609,732	608,088	606,463	604,838	603,212	601,587	599,962	598,337
Union South Rate_M5	208,631	194,162	140,648	74,007	73,965	61,817	69,275	62,316	61,601	60,887	60,172	59,458	58,744	58,029	57,315	56,601
Union South Rate_M7	427,707	474,216	507,692	513,836	541,343	618,372	561,865	680,182	703,063	724,759	746,455	768,151	789,848	811,544	833,240	854,936
Union South Rate_M9	66,583	72,124	69,174	78,946	103,989	88,765	100,454	88,845	88,845	88,845	88,845	88,845	88,845	88,845	88,845	88,845
Union South Rate_M10	300	248	274	410	391	360	375	360	360	360	360	360	360	360	360	360
Union South Rate_T1	442,947	447,127	458,243	466,596	437,372	430,312	280,083	415,327	421,617	420,906	420,195	419,485	418,774	418,063	417,353	416,642
Union South Rate_T2	4,368,501	4,212,740	3,762,498	4,101,435	4,136,389	4,017,975	4,136,432	4,227,903	4,234,321	4,243,081	4,251,841	4,337,432	4,346,193	4,431,784	4,440,544	4,526,136
Union South Rate_T3	263,235	250,167	257,343	279,794	283,374	264,209	283,374	264,209	264,209	264,209	264,209	264,209	264,209	264,209	264,209	264,209
Total Contract	10,967,270	10,719,416	9,512,848	10,319,543	10,403,999	10,393,976	10,429,772	10,791,646	10,996,888	11,024,189	11,038,010	11,128,662	11,156,170	11,246,823	11,260,643	11,364,983
EGI Total Volumes	26,004,567	25,588,242	24,950,761	25,958,845	26,298,569	26,166,423	25,859,951	26,439,311	26,724,281	26,847,262	26,903,544	27,069,956	27,169,911	27,356,014	27,405,725	27,572,477

Table 1: Enbridge Gas Customers by Service type and Rate Classes

		Actual 2015	Actual 2016	Actual 2017	Actual 2018	Actual 2019	Actual 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029	Forecast 2030
General Service																	
EGD	Rate 1	1,930,657	1,959,569	1,990,032	2,017,128	2,042,127	2,064,531	2,089,012	2,112,540	2,135,757	2,159,018	2,181,481	2,204,076	2,225,923	2,246,685	2,266,346	2,285,101
EGD	Rate 6	163,634	164,692	166,224	167,216	168,190	169,084	169,421	170,526	171,254	171,922	172,546	173,110	173,596	174,003	174,340	174,619
EGD	Rate 9	6	6	3	2	2	2	-	-	-	-	-	-	-	-	-	-
Union South	M1	1,083,032	1,097,031	1,111,544	1,127,353	1,141,279	1,154,987	1,167,994	1,180,474	1,192,673	1,204,812	1,216,722	1,228,487	1,239,846	1,250,729	1,261,253	1,271,409
Union South	M2	7,437	7,730	7,553	7,469	7,783	7,863	7,898	7,942	7,982	8,021	8,061	8,101	8,140	8,180	8,220	8,259
Union North	R01	333,773	339,334	344,458	349,354	353,643	357,603	361,530	365,345	369,038	372,671	376,265	379,919	383,423	386,727	389,909	392,970
Union North	R10	2,152	2,219	2,192	2,118	2,144	2,201	2,198	2,207	2,210	2,214	2,217	2,220	2,223	2,226	2,229	2,232
Total General Service		3,520,692	3,570,581	3,622,006	3,670,639	3,715,168	3,756,270	3,798,052	3,839,034	3,878,914	3,918,658	3,957,291	3,995,913	4,033,151	4,068,550	4,102,297	4,134,591
Contract																	
EGD	Rate 100	2	2	3	3	4	9	13	13	13	13	13	13	13	13	13	13
EGD	Rate 110	227	269	263	274	282	335	369	380	380	380	380	380	380	380	380	380
EGD	Rate 115	25	27	27	26	22	20	19	22	22	22	22	22	22	22	22	22
EGD	Rate 125	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4
EGD	Rate 135	42	45	45	43	43	40	42	42	42	42	42	42	42	42	42	42
EGD	Rate 145	52	38	37	33	26	22	22	19	19	19	19	19	19	19	19	19
EGD	Rate 170	26	25	26	27	23	21	25	21	21	21	21	21	21	21	21	21
EGD	Rate 200	1	1	1	1	-	1	1	1	1	1	1	1	1	1	1	1
EGD	Rate 300	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1	1
EGD	Rate 315	2	2	1	1	-	-	1	1	1	1	1	1	1	1	1	1
Union North	Rate_20	50	47	46	44	54	57	54	58	58	58	58	58	58	58	58	58
Union North	Rate_25	80	78	79	78	55	52	22	18	18	17	17	17	17	17	17	17
Union North	Rate_100	10	11	11	11	12	12	12	12	13	13	13	13	13	13	13	13
Union South	Rate_M4	156	165	185	208	232	239	243	227	227	227	227	227	227	227	227	227
Union South	Rate_M5	80	72	59	38	42	38	38	40	40	40	40	40	40	40	40	40
Union South	Rate_M7	28	28	30	30	36	47	43	58	58	58	58	58	58	58	58	58
Union South	Rate_M9	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4
Union South	Rate_M10	2	2	2	3	2	2	3	2	2	2	2	2	2	2	2	2
Union South	Rate_T1	37	37	37	37	37	39	39	39	39	39	39	39	39	39	39	39
Union South	Rate_T2	22	22	23	24	25	25	25	25	25	25	25	25	25	25	25	25
Union South	Rate_T3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Contract		852	881	885	891	905	969	981	988	988	989						
EGI Total Customers		3,521,544	3,571,462	3,622,891	3,671,530	3,716,073	3,757,239	3,799,034	3,840,021	3,879,902	3,919,646	3,958,279	3,996,902	4,034,139	4,069,538	4,103,286	4,135,579

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Please provide a table, both in PDF and Excel formats, with the annual information regarding Enbridge's historic (each year from 2015 through 2020) and forecast current and future year (each year from 2021 through 2027) gas costs by rate class, as well as in total for all rate classes combined. By gas costs, we mean total expenditures for commodity, distribution system costs (variable and fixed), carbon taxes, other taxes and any other costs included in customer bills. To the extent that Enbridge does not have all such information, please provide the Company's best estimates for any component of gas bills for which it does not have direct information, including a description of how the estimates were developed.

Note that this information could also be helpful in addressing issue #6 regarding rate impacts.

Response:

Please see Attachment 1. The estimated gas costs for the period from 2021 to 2027 are calculated using the forecast volumes provided in the response to Exhibit I.1.EGI.SEC.1 and apply those forecast volumes with the 2022 rates filed in the 2022 Rate Application (EB-2021-0147). The estimated gas cost is calculated based on the current rates and rate class structures which may change as a result of the rate harmonization effort that is currently ongoing in anticipation of filing the Rebasing application at the end of 2022.

Enbridge Gas Inc.
EGI Costs by Rate Classes (\$000)

General Service/Rate Zone	Rate Class	Cost Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
			Actual						Forecast						
EGD	Rate 1	Commodity Cost	\$ 622,063	\$ 441,381	\$ 501,883	\$ 506,817	\$ 574,702	\$ 440,112	\$ 381,833	\$ 588,721	\$ 609,140	\$ 613,086	\$ 616,830	\$ 620,748	\$ 624,511
		Distribution Cost (Fixed & Variable)	\$ 795,040	\$ 798,099	\$ 838,073	\$ 932,348	\$ 950,311	\$ 933,965	\$ 958,751	\$ 986,970	\$ 997,817	\$ 1,008,684	\$ 1,019,179	\$ 1,029,735	\$ 1,039,942
		Other Costs	\$ 343,123	\$ 301,447	\$ 325,956	\$ 354,465	\$ 303,298	\$ 270,495	\$ 293,097	\$ 255,350	\$ 256,603	\$ 258,254	\$ 259,821	\$ 261,461	\$ 263,036
EGD	Rate 6	Commodity Cost	\$ 397,264	\$ 271,883	\$ 307,373	\$ 318,516	\$ 358,875	\$ 257,202	\$ 245,961	\$ 351,269	\$ 461,337	\$ 463,701	\$ 466,547	\$ 469,971	\$ 473,373
		Distribution Cost (Fixed & Variable)	\$ 359,506	\$ 350,324	\$ 368,277	\$ 415,017	\$ 420,405	\$ 392,738	\$ 414,132	\$ 421,480	\$ 423,280	\$ 424,929	\$ 426,471	\$ 427,867	\$ 429,067
		Other Costs	\$ 283,562	\$ 253,901	\$ 272,354	\$ 285,716	\$ 236,206	\$ 193,938	\$ 224,655	\$ 186,975	\$ 188,608	\$ 189,393	\$ 190,338	\$ 191,475	\$ 192,605
EGD	Rate 9	Commodity Cost	\$ 36	\$ 18	\$ 3	\$ 1	\$ 1	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 51	\$ 34	\$ 12	\$ 7	\$ 7	\$ 6	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Other Costs	\$ 17	\$ 10	\$ 1	\$ 1	\$ 0	\$ 0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Union South	Rate M1	Commodity Cost	\$ 374,693	\$ 272,994	\$ 411,262	\$ 390,416	\$ 415,078	\$ 324,277	\$ 299,492	\$ 398,567	\$ 399,913	\$ 403,358	\$ 402,606	\$ 403,864	\$ 404,996
		Distribution Cost (Fixed & Variable)	\$ 403,595	\$ 407,587	\$ 422,038	\$ 443,657	\$ 468,745	\$ 470,604	\$ 487,049	\$ 503,302	\$ 503,262	\$ 510,462	\$ 513,250	\$ 516,905	\$ 518,780
		Other Costs	\$ 99,579	\$ 98,832	\$ 7,689	\$ 8,362	\$ 8,697	\$ 7,952	\$ 8,283	\$ 8,350	\$ 8,378	\$ -	\$ -	\$ 8,461	\$ 8,484
Union South	Rate M2	Commodity Cost	\$ 81,564	\$ 61,142	\$ 92,605	\$ 83,336	\$ 88,656	\$ 65,806	\$ 68,033	\$ 86,492	\$ 87,004	\$ 88,297	\$ 88,111	\$ 88,617	\$ 89,070
		Distribution Cost (Fixed & Variable)	\$ 56,384	\$ 59,413	\$ 65,387	\$ 70,099	\$ 76,459	\$ 71,859	\$ 75,416	\$ 78,072	\$ 78,715	\$ 79,958	\$ 79,687	\$ 79,731	\$ 79,402
		Other Costs	\$ 22,186	\$ 22,535	\$ 1,331	\$ 1,787	\$ 1,877	\$ 1,613	\$ 1,882	\$ 1,812	\$ 1,823	\$ -	\$ -	\$ 1,856	\$ 1,866
Union North	Rate 01	Commodity Cost	\$ 116,437	\$ 87,554	\$ 126,098	\$ 118,736	\$ 128,513	\$ 102,784	\$ 93,604	\$ 127,363	\$ 127,845	\$ 129,170	\$ 129,117	\$ 129,776	\$ 130,378
		Distribution Cost (Fixed & Variable)	\$ 169,252	\$ 168,041	\$ 170,668	\$ 176,691	\$ 184,786	\$ 181,557	\$ 190,227	\$ 196,934	\$ 196,093	\$ 199,568	\$ 200,353	\$ 201,827	\$ 202,478
		Other Costs	\$ 104,499	\$ 103,935	\$ 94,954	\$ 99,207	\$ 91,602	\$ 75,068	\$ 78,762	\$ 85,333	\$ 83,735	\$ 81,466	\$ 81,274	\$ 86,003	\$ 85,688
Union North	Rate 10	Commodity Cost	\$ 23,891	\$ 17,668	\$ 26,209	\$ 23,324	\$ 24,587	\$ 17,566	\$ 16,375	\$ 22,368	\$ 22,446	\$ 22,742	\$ 22,712	\$ 22,782	
		Distribution Cost (Fixed & Variable)	\$ 20,465	\$ 21,603	\$ 21,725	\$ 21,408	\$ 23,389	\$ 23,422	\$ 23,420	\$ 24,724	\$ 24,779	\$ 25,555	\$ 25,455	\$ 25,447	
		Other Costs	\$ 32,385	\$ 32,390	\$ 27,664	\$ 27,373	\$ 24,972	\$ 20,674	\$ 21,324	\$ 23,268	\$ 23,327	\$ 22,743	\$ 22,638	\$ 24,053	\$ 24,041
Total			\$ 4,305,592	\$ 3,770,790	\$ 4,081,561	\$ 4,277,283	\$ 4,381,169	\$ 3,851,636	\$ 3,882,294	\$ 4,347,349	\$ 4,494,103	\$ 4,521,366	\$ 4,544,303	\$ 4,590,517	\$ 4,615,947

Enbridge Gas Inc.
 EGI Costs by Rate Classes (\$000)

Contract Market / Rate Zone	Rate Class	Cost Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
			Actual						Forecast						
EGD	Rate 100	Commodity Cost	\$ 425	\$ 147	\$ 110	\$ 245	\$ 1,156	\$ 888	\$ 1,074	\$ 1,578	\$ 1,469	\$ 1,360	\$ 1,251	\$ 1,143	\$ 1,034
		Distribution Cost (Fixed & Variable)	\$ 141	\$ 213	\$ 303	\$ 300	\$ 886	\$ 1,390	\$ 2,017	\$ 1,616	\$ 1,716	\$ 1,665	\$ 1,613	\$ 1,562	\$ 1,511
		Other Costs	\$ 248	\$ 219	\$ 93	\$ 180	\$ 635	\$ 724	\$ 1,213	\$ 1,017	\$ 987	\$ 958	\$ 928	\$ 899	\$ 869
EGD	Rate 110	Commodity Cost	\$ 5,803	\$ 4,834	\$ 6,081	\$ 5,409	\$ 7,064	\$ 6,151	\$ 5,132	\$ 8,371	\$ 15,631	\$ 15,202	\$ 14,772	\$ 14,343	\$ 13,914
		Distribution Cost (Fixed & Variable)	\$ 15,543	\$ 19,924	\$ 18,993	\$ 20,745	\$ 22,489	\$ 26,138	\$ 24,626	\$ 28,663	\$ 30,445	\$ 30,349	\$ 30,253	\$ 30,157	\$ 30,061
		Other Costs	\$ 17,270	\$ 19,706	\$ 21,114	\$ 16,687	\$ 12,724	\$ 12,752	\$ 13,961	\$ 14,745	\$ 15,476	\$ 15,427	\$ 15,378	\$ 15,329	\$ 15,280
EGD	Rate 115	Commodity Cost	\$ -	\$ 11	\$ -	\$ 28	\$ 79	\$ 66	\$ 514	\$ 75	\$ 87	\$ 87	\$ 87	\$ 87	\$ 87
		Distribution Cost (Fixed & Variable)	\$ 5,895	\$ 6,153	\$ 6,514	\$ 6,617	\$ 6,148	\$ 5,170	\$ 6,247	\$ 5,550	\$ 5,895	\$ 5,823	\$ 5,751	\$ 5,678	\$ 5,606
		Other Costs	\$ 3,521	\$ 1,733	\$ 3,704	\$ 3,359	\$ 2,769	\$ 2,432	\$ 2,968	\$ 2,721	\$ 2,762	\$ 2,728	\$ 2,694	\$ 2,660	\$ 2,627
EGD	Rate 125	Commodity Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 9,659	\$ 10,850	\$ 11,067	\$ 11,008	\$ 11,057	\$ 11,453	\$ 11,646	\$ 11,807	\$ 11,807	\$ 11,807	\$ 11,807	\$ 11,807	\$ 11,807
		Other Costs	\$ 5	\$ 5	\$ 4	\$ 4	\$ 4	\$ 4	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EGD	Rate 135	Commodity Cost	\$ 275	\$ 104	\$ 326	\$ 193	\$ 157	\$ 154	\$ 113	\$ 224	\$ 599	\$ 487	\$ 374	\$ 262	\$ 149
		Distribution Cost (Fixed & Variable)	\$ 1,085	\$ 1,219	\$ 1,282	\$ 1,289	\$ 1,282	\$ 1,298	\$ 1,269	\$ 1,198	\$ 1,198	\$ 1,198	\$ 1,198	\$ 1,198	\$ 1,198
		Other Costs	\$ 2,630	\$ 2,169	\$ 2,230	\$ 1,235	\$ 797	\$ 798	\$ 846	\$ 787	\$ 787	\$ 787	\$ 787	\$ 787	\$ 787
EGD	Rate 145	Commodity Cost	\$ 1,787	\$ 862	\$ 785	\$ 632	\$ 150	\$ 72	\$ 66	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 1,854	\$ 1,421	\$ 1,474	\$ 1,390	\$ 1,124	\$ 1,103	\$ 1,686	\$ 1,434	\$ 1,434	\$ 1,411	\$ 1,388	\$ 1,365	\$ 1,341
		Other Costs	\$ 1,604	\$ 1,023	\$ 1,083	\$ 1,053	\$ 517	\$ 347	\$ 458	\$ 249	\$ 260	\$ 256	\$ 252	\$ 248	\$ 244
EGD	Rate 170	Commodity Cost	\$ 4,540	\$ 3,394	\$ 3,591	\$ 2,814	\$ 2,116	\$ 436	\$ 250	\$ 372	\$ 632	\$ 632	\$ 632	\$ 632	\$ 632
		Distribution Cost (Fixed & Variable)	\$ 3,236	\$ 2,794	\$ 2,922	\$ 3,090	\$ 2,714	\$ 2,480	\$ 2,510	\$ 2,772	\$ 2,944	\$ 2,944	\$ 2,944	\$ 2,944	\$ 2,944
		Other Costs	\$ 8,252	\$ 6,555	\$ 5,722	\$ 3,941	\$ 2,684	\$ 1,608	\$ 2,054	\$ 2,009	\$ 2,959	\$ 2,959	\$ 2,959	\$ 2,959	\$ 2,959
EGD	Rate 200	Commodity Cost	\$ 17,854	\$ 13,570	\$ 14,542	\$ 13,877	\$ 16,639	\$ 12,853	\$ 10,691	\$ 17,105	\$ 17,105	\$ 17,105	\$ 17,105	\$ 17,105	\$ 17,105
		Distribution Cost (Fixed & Variable)	\$ 4,410	\$ 4,005	\$ 4,195	\$ 4,459	\$ 4,596	\$ 4,511	\$ 4,393	\$ 4,592	\$ 4,592	\$ 4,592	\$ 4,592	\$ 4,592	\$ 4,592
		Other Costs	\$ 17,879	\$ 12,566	\$ 10,836	\$ 11,839	\$ 9,042	\$ 8,138	\$ 8,701	\$ 7,981	\$ 7,981	\$ 7,981	\$ 7,981	\$ 7,981	\$ 7,981
EGD	Rate 300	Commodity Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 52	\$ 54	\$ 55	\$ 56	\$ 56	\$ 59	\$ 60	\$ 15	\$ 15	\$ 15	\$ 15	\$ 15	\$ 15
		Other Costs	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total			\$ 123,971	\$ 113,530	\$ 117,028	\$ 110,449	\$ 106,888	\$ 101,025	\$ 102,496	\$ 114,881	\$ 126,781	\$ 125,772	\$ 124,762	\$ 123,752	\$ 122,743

Enbridge Gas Inc.
 EGI Costs by Rate Classes (\$000)

Contract Market / Rate Zone	Rate Class	Cost Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
			Actual						Forecast						
Union North	Rate 20	Commodity Cost	\$ 1,423	\$ 1,435	\$ 1,811	\$ 1,519	\$ 1,387	\$ 975	\$ 2,009	\$ 1,004	\$ 999	\$ 993	\$ 988	\$ 982	\$ 977
		Distribution Cost (Fixed & Variable)	\$ 14,250	\$ 13,705	\$ 12,676	\$ 18,115	\$ 22,382	\$ 25,016	\$ 22,457	\$ 25,465	\$ 25,706	\$ 25,693	\$ 25,678	\$ 25,663	\$ 25,955
		Other Costs	\$ 9,972	\$ 10,464	\$ 8,332	\$ 8,250	\$ 7,554	\$ 7,610	\$ 7,603	\$ 8,314	\$ 8,303	\$ 7,776	\$ 7,766	\$ 8,277	\$ 8,266
Union North	Rate 25	Commodity Cost	\$ 17,482	\$ 7,564	\$ 6,951	\$ 10,808	\$ 6,641	\$ 4,015	\$ 2,319	\$ 367	\$ 367	\$ 354	\$ 354	\$ 361	\$ 361
		Distribution Cost (Fixed & Variable)	\$ 3,924	\$ 3,571	\$ 3,072	\$ 4,476	\$ 4,471	\$ 3,840	\$ 2,901	\$ 3,735	\$ 3,738	\$ 3,687	\$ 3,687	\$ 3,687	\$ 3,687
		Other Costs	\$ (0)	\$ (0)	\$ -	\$ 0	\$ 0	\$ (0)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Union North	Rate 100	Commodity Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 12,423	\$ 12,626	\$ 10,621	\$ 10,172	\$ 10,732	\$ 11,329	\$ 10,982	\$ 11,952	\$ 12,612	\$ 12,916	\$ 12,913	\$ 12,910	\$ 12,907
		Other Costs	\$ 89	\$ 304	\$ 306	\$ 235	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Union South	Rate M4	Commodity Cost	\$ 4,175	\$ 4,033	\$ 6,221	\$ 5,714	\$ 7,107	\$ 6,424	\$ 7,402	\$ 7,976	\$ 7,971	\$ 8,006	\$ 8,006	\$ 8,006	\$ 8,006
		Distribution Cost (Fixed & Variable)	\$ 14,738	\$ 17,306	\$ 22,319	\$ 29,928	\$ 30,717	\$ 31,618	\$ 32,072	\$ 30,066	\$ 32,868	\$ 33,361	\$ 33,664	\$ 33,967	\$ 34,269
		Other Costs	\$ 1,152	\$ 1,509	\$ 114	\$ 125	\$ 150	\$ 159	\$ 204	\$ 167	\$ 167	\$ -	\$ -	\$ 167	\$ 167
Union South	Rate M5	Commodity Cost	\$ 1,077	\$ 955	\$ 1,038	\$ 876	\$ 811	\$ 306	\$ 691	\$ 771	\$ 771	\$ 772	\$ 772	\$ 772	\$ 772
		Distribution Cost (Fixed & Variable)	\$ 6,134	\$ 6,470	\$ 5,371	\$ 2,711	\$ 2,608	\$ 2,288	\$ 2,571	\$ 2,504	\$ 2,470	\$ 2,449	\$ 2,426	\$ 2,403	\$ 2,380
		Other Costs	\$ 297	\$ 363	\$ 23	\$ 19	\$ 17	\$ 8	\$ 19	\$ 16	\$ 16	\$ -	\$ -	\$ 16	\$ 16
Union South	Rate M7	Commodity Cost	\$ 2,879	\$ 2,197	\$ 3,485	\$ 3,382	\$ 3,325	\$ 3,063	\$ 3,223	\$ 5,250	\$ 7,242	\$ 7,242	\$ 7,242	\$ 7,242	\$ 7,242
		Distribution Cost (Fixed & Variable)	\$ 12,180	\$ 11,011	\$ 12,085	\$ 13,597	\$ 15,292	\$ 18,786	\$ 16,296	\$ 22,315	\$ 23,099	\$ 24,335	\$ 25,574	\$ 26,812	\$ 28,051
		Other Costs	\$ 799	\$ 870	\$ 68	\$ 75	\$ 72	\$ 80	\$ 81	\$ 102	\$ 143	\$ -	\$ -	\$ 143	\$ 143
Union South	Rate M9	Commodity Cost	\$ -	\$ 652	\$ 3,549	\$ 3,682	\$ 3,725	\$ 1,910	\$ 2,745	\$ 2,212	\$ 2,212	\$ 2,212	\$ 2,212	\$ 2,212	\$ 2,212
		Distribution Cost (Fixed & Variable)	\$ 805	\$ 889	\$ 1,212	\$ 1,354	\$ 1,637	\$ 1,564	\$ 1,472	\$ 1,604	\$ 1,604	\$ 1,604	\$ 1,604	\$ 1,604	\$ 1,604
		Other Costs	\$ -	\$ 253	\$ 78	\$ 79	\$ 79	\$ 46	\$ 76	\$ 46	\$ 46	\$ -	\$ -	\$ 46	\$ 46
Union South	Rate M10	Commodity Cost	\$ 43	\$ 27	\$ 41	\$ 55	\$ 53	\$ 42	\$ 38	\$ 49	\$ 49	\$ 49	\$ 49	\$ 49	\$ 49
		Distribution Cost (Fixed & Variable)	\$ 16	\$ 15	\$ 19	\$ 29	\$ 29	\$ 27	\$ 28	\$ 28	\$ 28	\$ 28	\$ 28	\$ 28	\$ 28
		Other Costs	\$ 11	\$ 9	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ 1	\$ -	\$ -	\$ 1	\$ 1
Union South	Rate T1	Commodity Cost	\$ (2)	\$ 481	\$ 25	\$ 3	\$ -	\$ 2	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 9,663	\$ 9,788	\$ 10,939	\$ 12,490	\$ 12,448	\$ 13,315	\$ 7,509	\$ 12,837	\$ 13,007	\$ 13,006	\$ 13,005	\$ 13,004	\$ 13,003
		Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Union South	Rate T2	Commodity Cost	\$ 21	\$ 3,959	\$ 122	\$ 63	\$ 11	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 47,406	\$ 50,538	\$ 57,036	\$ 66,781	\$ 69,324	\$ 72,289	\$ 67,546	\$ 71,960	\$ 72,021	\$ 73,592	\$ 73,887	\$ 75,249	\$ 75,543
		Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Union South	Rate T3	Commodity Cost	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
		Distribution Cost (Fixed & Variable)	\$ 4,524	\$ 4,804	\$ 6,475	\$ 6,722	\$ 6,627	\$ 6,939	\$ 6,825	\$ 6,972	\$ 6,972	\$ 6,973	\$ 6,973	\$ 6,973	\$ 6,973
		Other Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total			\$ 165,481	\$ 165,799	\$ 173,988	\$ 201,259	\$ 207,198	\$ 211,654	\$ 197,070	\$ 215,710	\$ 222,413	\$ 225,047	\$ 226,826	\$ 230,573	\$ 232,658
Total for all Rate Classes			\$ 4,595,044	\$ 4,050,119	\$ 4,372,577	\$ 4,588,992	\$ 4,695,255	\$ 4,164,315	\$ 4,181,860	\$ 4,677,940	\$ 4,843,297	\$ 4,872,185	\$ 4,895,891	\$ 4,944,842	\$ 4,971,347

** Carbon costs by rate class are not available, please refer to Attachment 2 and 3 of Exhibit I.E.D.12 for the total carbon costs for each year.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Please provide a table, both in PDF and Excel formats, with the following annual information regarding Enbridge's historic (2015-2020) and forecast current and future year (2021 through 2027) DSM program participation, gas savings and spending by rate class, as well as in total for all rate classes combined:

- Number of Unique customers participating
- Annual m3 savings
- Lifetime/cumulative m3 savings
- Spending (past years) or budget (current and future years)

To the extent that current and/or future participation, savings and/or spending have not been estimated at the rate class level of disaggregation, please provide the information in as granular a level as is possible.

Response:

For the following 2015-2027 information, refer to Attachment 1:

- Number of Unique customers participating
- Annual m3 savings
- Lifetime/cumulative m3 savings

Note that 2021-2027 participant and savings by rate class are forecasted based on the proportion of historical annual saving by rate class.

For 2015-2027 spending (past years) or budget (current and future years), please refer to Exhibit I.7.EGI.STAFF.17 Attachment 1.

Legacy Rate Zone	Rate Class	2015			2016			2017			2018		
		Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
EGD	Rate 1	7,538	7,891,861	130,482,477	31,204	19,168,044	303,878,405	26,676	9,484,530	211,579,449	31,929	9,903,642	217,259,492
EGD	Rate 6	1,442	29,863,690	552,838,932	1,423	23,410,681	413,856,216	1,481	24,593,456	432,135,696	1,104	25,144,195	460,096,256
EGD	Rate 9	0	0	0	0	0	0	0	0	0	0	0	0
EGD	Rate 100	1	0	0	1	0	0	2	0	0	1	0	0
EGD	Rate 110	56	5,011,186	81,257,329	58	3,431,226	57,674,860	49	5,578,858	81,327,618	38	2,303,478	37,697,726
EGD	Rate 115	5	4,223,478	30,600,665	6	1,193,952	11,841,162	7	1,934,740	23,224,652	6	1,001,500	18,018,625
EGD	Rate 125	0	0	0	0	0	0	0	0	0	0	0	0
EGD	Rate 135	3	159,609	3,060,528	5	152,691	3,053,811	8	1,468,951	26,940,684	10	1,817,063	30,852,172
EGD	Rate 145	2	768,864	7,736,047	1	73,705	442,227	2	17,017	241,448	2	1,201,214	29,788,545
EGD	Rate 170	6	1,052,867	20,189,471	7	3,093,290	46,367,361	5	939,122	11,721,782	1	855,513	13,761,541
EGD	Rate 200	0	0	0	0	0	0	0	0	0	0	0	0
EGD	Rate 300	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal - EGD Rate Zone		9,053	48,971,556	826,165,451	32,705	50,523,589	837,114,042	28,230	44,016,674	787,171,329	33,091	42,226,605	807,474,357
Union South	M1	22,698	8,920,216	165,934,101	8,043	8,761,471	199,525,829	14,313	12,694,913	285,003,163	16,422	14,040,628	313,088,818
Union South	M2	376	12,832,957	236,620,316	335	9,197,168	174,266,014	344	9,376,092	157,961,343	321	9,105,916	156,974,059
Union South	M4	77	12,055,087	185,194,844	60	7,200,772	122,125,573	83	19,309,735	294,502,187	68	19,330,137	295,001,218
Union South	M5	21	3,743,002	48,893,547	15	6,786,058	101,043,051	13	3,585,247	51,958,885	11	712,452	7,379,848
Union South	M7	29	14,955,473	228,537,027	23	10,262,569	153,973,313	25	3,898,032	44,887,295	24	6,032,908	90,901,060
Union South	M9	0	0	0	0	0	0	0	0	0	0	0	0
Union South	M10	0	0	0	0	0	0	0	0	0	0	0	0
Union South	T1	17	8,842,211	121,416,767	12	3,242,461	53,664,186	22	6,268,014	109,695,055	16	2,325,576	37,133,165
Union South	T2	16	50,153,666	603,578,141	14	6,559,202	78,053,652	14	7,968,530	99,801,882	15	7,510,553	78,173,242
Union South	T3	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal - Union South Rate Zone		23,234	111,502,613	1,590,174,743	8,502	52,009,702	882,651,619	14,814	63,100,563	1,043,809,810	16,877	59,058,170	978,651,411
Union North	R01	2,656	1,726,629	34,164,933	893	1,623,133	35,973,641	1,970	2,378,398	55,848,593	1,773	2,373,856	52,656,343
Union North	R10	72	1,359,418	28,201,995	67	1,206,386	25,422,371	112	2,322,547	44,155,164	68	1,633,299	30,927,459
Union North	R20	17	2,956,852	43,791,103	13	917,634	13,592,977	13	702,776	12,923,442	12	2,565,182	51,258,395
Union North	R25	0	0	0	0	0	0	0	0	0	0	0	0
Union North	R100	7	7,531,680	54,432,706	6	212,851	1,794,650	7	1,505,937	26,002,233	5	545,191	11,023,654
Subtotal - Union North Rate Zone		2,752	13,574,580	160,590,737	979	3,960,004	76,783,639	2,102	6,909,659	138,929,432	1,858	7,117,528	145,865,852
Total		35,039	174,048,749	2,576,930,931	42,186	106,493,294	1,796,549,300	45,146	114,026,896	1,969,910,572	51,826	108,402,303	1,931,991,619

Legacy Rate Zone	Rate Class	2019			2020			2021		
		Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
EGD	Rate 1	34,148	12,402,647	283,196,583	38,771	11,395,298	247,553,835	39,777	13,020,858	286,505,160
EGD	Rate 6	1,319	28,772,324	495,950,401	1,305	16,897,166	312,536,900	1,573	20,466,211	351,644,225
EGD	Rate 9	0	0	0	0	0	0	0	0	0
EGD	Rate 100	3	969,652	19,845,882	2	309,302	5,067,113	4	589,283	9,614,950
EGD	Rate 110	40	3,843,836	68,730,005	46	5,748,190	107,906,275	39	5,463,531	88,952,469
EGD	Rate 115	6	4,823,891	96,947,274	5	2,139,955	40,772,570	20	3,781,492	61,312,709
EGD	Rate 125	0	0	0	0	0	0	0	0	0
EGD	Rate 135	8	1,007,998	20,037,306	15	2,628,878	48,783,232	13	2,587,278	41,893,750
EGD	Rate 145	1	0	0	1	0	0	1	6,985	123,530
EGD	Rate 170	3	440,376	3,837,699	4	631,906	8,430,540	13	839,406	14,014,324
EGD	Rate 200	0	0	0	0	0	0	0	0	0
EGD	Rate 300	0	0	0	0	0	0	0	0	0
Subtotal - EGD Rate Zone		35,528	52,260,726	988,545,151	40,149	39,750,695	771,050,466	41,439	46,755,043	854,061,117
Union South	M1	16,484	13,768,499	284,194,387	16,933	7,946,517	174,510,196	23,774	10,044,821	208,687,689
Union South	M2	287	9,668,000	166,165,257	333	3,866,165	64,600,761	258	6,893,621	111,923,626
Union South	M4	63	13,188,052	207,700,555	43	12,704,088	186,878,841	115	8,393,730	140,310,103
Union South	M5	12	648,119	8,950,741	8	88,111	1,190,529	4	459,414	7,551,672
Union South	M7	28	12,142,912	202,368,994	24	16,080,667	236,539,054	98	8,845,396	146,183,426
Union South	M9	0	0	0	0	0	0	0	0	0
Union South	M10	0	0	0	0	0	0	0	0	0
Union South	T1	13	655,167	11,638,326	9	1,228,200	23,462,576	17	2,035,854	33,188,087
Union South	T2	16	6,115,931	53,506,439	13	7,239,413	56,672,031	16	8,769,785	90,935,325
Union South	T3	0	0	0	0	0	0	0	0	0
Subtotal - Union South Rate Zone		16,903	56,186,681	934,524,698	17,363	49,153,160	743,853,989	24,282	45,442,621	738,779,929
Union North	R01	3,029	2,646,538	58,910,128	3,859	1,506,393	30,998,363	4,979	2,003,097	38,606,717
Union North	R10	71	1,674,723	36,000,471	63	482,775	9,188,220	82	785,112	12,983,873
Union North	R20	17	1,991,178	39,017,465	8	371,215	7,158,019	31	5,333,680	86,318,926
Union North	R25	0	0	0	0	0	0	0	0	0
Union North	R100	5	930,981	18,863,753	9	4,974,444	69,975,435	5	2,899,431	30,064,675
Subtotal - Union North Rate Zone		3,122	7,243,420	152,791,816	3,939	7,334,827	117,320,037	5,097	11,021,320	167,974,191
Total		55,553	115,690,827	2,075,861,664	61,451	96,238,682	1,632,224,492	70,818	103,218,984	1,760,815,237

Legacy Rate Zone	Rate Class	2022			2023			2024		
		Number of Unique Participants	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Projects/Units	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Projects/Units	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
EGD	Rate 1	32,358	11,425,165	251,671,318	37,333	10,239,236	216,774,267	38,200	10,475,967	221,777,970
EGD	Rate 6	1,526	21,189,276	367,189,089	3,443	25,637,114	438,005,625	3,497	26,141,086	446,157,056
EGD	Rate 9	0	0	0	0	0	0	0	0	0
EGD	Rate 100	4	602,657	9,837,262	8	655,763	10,118,716	8	668,708	10,317,888
EGD	Rate 110	40	5,583,915	90,945,910	85	6,042,037	92,951,835	86	6,161,550	94,786,271
EGD	Rate 115	20	3,860,233	62,594,154	44	4,132,212	63,034,777	45	4,214,666	64,291,883
EGD	Rate 125	0	0	0	0	0	0	0	0	0
EGD	Rate 135	13	2,640,127	42,749,496	29	2,816,252	42,853,294	29	2,872,577	43,710,360
EGD	Rate 145	1	7,341	130,458	2	9,251	167,829	2	9,396	170,457
EGD	Rate 170	14	864,353	14,452,730	24	995,046	15,976,416	24	1,013,906	16,276,490
EGD	Rate 200	0	0	0	0	0	0	0	0	0
EGD	Rate 300	0	0	0	0	0	0	0	0	0
Subtotal - EGD Rate Zone		33,975	46,173,066	839,570,416	40,966	50,526,911	879,882,760	41,892	51,557,857	897,488,376
Union South	M1	19,406	9,077,192	187,965,096	22,796	8,245,274	164,309,488	23,319	8,449,847	168,182,251
Union South	M2	247	7,031,063	114,745,147	698	7,291,044	113,940,306	709	7,449,138	116,314,754
Union South	M4	123	8,649,901	144,827,254	201	9,893,420	158,723,898	204	10,082,088	161,725,740
Union South	M5	4	470,859	7,745,865	8	522,150	8,161,615	8	532,330	8,319,909
Union South	M7	103	9,080,252	150,221,139	177	10,204,899	160,998,359	180	10,402,009	164,087,194
Union South	M9	0	0	0	0	0	0	0	0	0
Union South	M10	0	0	0	0	0	0	0	0	0
Union South	T1	17	2,081,705	33,950,894	39	2,256,452	34,821,457	39	2,300,930	35,505,871
Union South	T2	15	8,439,433	87,509,852	66	6,989,244	69,892,438	67	7,129,029	71,290,287
Union South	T3	0	0	0	0	0	0	0	0	0
Subtotal - Union South Rate Zone		19,915	44,830,404	726,965,247	23,984	45,402,483	710,847,559	24,527	46,345,371	725,426,007
Union North	R01	4,386	1,900,093	36,688,884	4,729	1,832,552	34,686,295	4,833	1,880,540	35,511,079
Union North	R10	76	805,536	13,445,383	178	814,749	13,041,439	181	837,299	13,360,986
Union North	R20	31	5,442,172	88,077,605	79	5,790,464	88,137,584	80	5,906,122	89,897,918
Union North	R25	0	0	0	0	0	0	0	0	0
Union North	R100	5	2,790,212	28,932,158	22	2,310,756	23,107,559	22	2,356,971	23,569,710
Subtotal - Union North Rate Zone		4,498	10,938,013	167,144,030	5,007	10,748,521	158,972,877	5,117	10,980,932	162,339,693
Total		58,389	101,941,483	1,733,679,692	69,958	106,677,914	1,749,703,196	71,535	108,884,161	1,785,254,075

Legacy Rate Zone	Rate Class	2025			2026			2027		
		Number of Projects/Units	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Projects/Units	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)	Number of Projects/Units	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
EGD	Rate 1	38,964	10,685,486	226,213,529	39,744	10,899,196	230,737,800	40,538	11,117,180	235,352,556
EGD	Rate 6	3,579	26,725,158	455,692,697	3,626	27,132,161	463,531,551	3,698	27,674,805	472,802,182
EGD	Rate 9	0	0	0	0	0	0	0	0	0
EGD	Rate 100	9	682,082	10,524,246	9	695,724	10,734,730	9	709,638	10,949,425
EGD	Rate 110	88	6,284,781	96,681,997	90	6,410,476	98,615,637	92	6,538,686	100,587,949
EGD	Rate 115	45	4,298,959	65,577,721	46	4,384,938	66,889,276	47	4,472,637	68,227,061
EGD	Rate 125	0	0	0	0	0	0	0	0	0
EGD	Rate 135	30	2,930,029	44,584,567	30	2,988,629	45,476,259	31	3,048,402	46,385,784
EGD	Rate 145	2	9,584	173,866	2	9,776	177,344	2	9,971	180,891
EGD	Rate 170	25	1,034,184	16,602,020	25	1,054,868	16,934,060	26	1,075,965	17,272,742
EGD	Rate 200	0	0	0	0	0	0	0	0	0
EGD	Rate 300	0	0	0	0	0	0	0	0	0
Subtotal - EGD Rate Zone		42,742	52,650,264	916,050,643	43,572	53,575,769	933,096,656	44,443	54,647,284	951,758,589
Union South	M1	23,790	8,645,111	171,808,562	24,255	8,763,336	174,697,960	24,740	8,938,602	178,191,919
Union South	M2	726	7,615,903	118,818,872	734	7,731,205	120,825,088	748	7,885,829	123,241,590
Union South	M4	208	10,283,730	164,960,255	212	10,489,404	168,259,460	217	10,699,192	171,624,649
Union South	M5	8	542,977	8,486,307	8	553,837	8,656,033	8	564,913	8,829,154
Union South	M7	184	10,610,049	167,368,938	188	10,822,250	170,716,317	191	11,038,695	174,130,643
Union South	M9	0	0	0	0	0	0	0	0	0
Union South	M10	0	0	0	0	0	0	0	0	0
Union South	T1	40	2,346,948	36,215,989	41	2,393,887	36,940,309	42	2,441,765	37,679,115
Union South	T2	69	7,271,609	72,716,092	70	7,417,041	74,170,414	72	7,565,382	75,653,822
Union South	T3	0	0	0	0	0	0	0	0	0
Subtotal - Union South Rate Zone		25,026	47,316,328	740,375,016	25,508	48,170,961	754,265,581	26,018	49,134,380	769,350,892
Union North	R01	4,932	1,928,185	36,321,640	5,027	1,945,862	36,839,202	5,127	1,984,779	37,575,986
Union North	R10	186	861,212	13,699,877	186	863,517	13,824,681	190	880,788	14,101,175
Union North	R20	82	6,024,244	91,695,876	83	6,144,729	93,529,794	85	6,267,624	95,400,390
Union North	R25	0	0	0	0	0	0	0	0	0
Union North	R100	23	2,404,110	24,041,104	23	2,452,193	24,521,926	24	2,501,236	25,012,365
Subtotal - Union North Rate Zone		5,222	11,217,752	165,758,498	5,320	11,406,301	168,715,603	5,426	11,634,427	172,089,915
Total		72,991	111,184,344	1,822,184,157	74,399	113,153,031	1,856,077,840	75,887	115,416,091	1,893,199,397

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Please provide a table, both in PDF and Excel formats, with the following annual information regarding Enbridge's historic (2015-2020) and forecast current and future year (2021 through 2027) DSM program participation, gas savings and spending by program, as well as for all programs combined:

- Number of unique customers participating
- Annual m3 savings
- Lifetime/cumulative m3 savings
- Spending (past years) or budget (current and future years)

Please provide the information for past and future programs that are the same or similar to each other on the same row of the table.

Note that use the term "program" to refer to each of the program components shown in Table 4 (Sch. 1, p. 11) of the Company's revised plan filing. For example, please provide the information requested separately for not just the "Residential Program", but for the Residential Whole Home, Residential Single Measure, and Residential Smart Home initiatives or program components.

Response:

For the following 2015-2027 information, refer to Attachment 1.

- Number of Unique customers participating
- Annual m3 savings
- Lifetime/cumulative m3 savings

For 2015-2020 spending (past years) or budget (current and future years), refer to Exhibit I.6.EGI.STAFF.13f Attachment 3.

It is important to note that while Enbridge Gas has endeavored to align previously approved programs, there are multiple footnotes in the attachment that outline the challenges with this comparison. There are many cases where Enbridge Gas has attempted to combine numbers but the reader should be warned a direct comparison has limitations. In addition, there are new programs proposed and other programs that do not continue.

2015 DSM Programs/Offerings	Number of Unique Participants ⁷	Net Annual Natural Gas Savings (m ³)	Net Cumulative Natural Gas Savings (m ³)
Residential Program	8,181	9,951,837	160,159,915
<i>Residential Whole Home</i>	8,181	9,951,837	160,159,915
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	0	0	0
Low Income Program	3,394	6,582,427	144,217,404
<i>Home Winterproofing</i>	3,206	2,564,686	63,914,690
<i>Affordable Housing Multi-Residential</i>	188	4,017,741	80,302,714
Commercial Program	2,432	42,099,502	750,759,380
<i>Commercial Custom²</i>	721	26,742,503	463,338,058
<i>Prescriptive Downstream³</i>	1,711	15,356,999	287,421,322
<i>Direct Install</i>	0	0	0
<i>Prescriptive Midstream</i>	0	0	0
Industrial Program	309	47,707,957	727,565,684
<i>Industrial Custom⁴</i>	309	47,707,957	727,565,684
Large Volume Program	38	66,527,557	779,427,613
<i>Direct Access⁵</i>	38	66,527,557	779,427,613
Energy Performance Program¹	0	0	0
Building Beyond Code Program	43	0	0
<i>Residential Savings by Design</i>	19	0	0
<i>Commercial Savings by Design</i>	24	0	0
<i>Affordable Housing Savings By Design</i>	0	0	0
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	0	0	0
<i>School Energy Competition</i>	0	0	0
<i>Run It Right / RunSmart</i>	0	0	0
<i>Comprehensive / Strategic Energy Management</i>	0	0	0
<i>Optimum Home</i>	0	0	0
<i>Home Labelling (2015)</i>	0	0	0
2015-2022 Other	20,883	1,179,468	14,800,935
<i>Energy Savings Kits (2015)</i>	20,883	1,179,468	14,800,935
<i>Furnace End-of-Life (2016-2022)</i>	N/A	N/A	N/A
<i>Indigenous (2016-2022)</i>	N/A	N/A	N/A
<i>My Home Health Record (2015)</i>	0	0	0
Total	35,280	174,048,749	2,576,930,931

2016 DSM Programs/Offerings	Number of Unique Participants ⁷	Net Annual Natural Gas Savings (m ³)	Net Cumulative Natural Gas Savings (m ³)
Residential Program	36,611	22,425,226	385,374,577
<i>Residential Whole Home</i>	19,581	19,400,698	340,006,657
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	17,030	3,024,528	45,367,920
Low Income Program	3,624	7,945,181	178,343,299
<i>Home Winterproofing</i>	3,452	2,986,886	74,568,955
<i>Affordable Housing Multi-Residential</i>	172	4,958,295	103,774,344
Commercial Program	2,017	27,627,015	496,815,274
<i>Commercial Custom²</i>	618	11,140,276	206,689,320
<i>Prescriptive Downstream³</i>	1,289	11,209,166	210,962,359
<i>Direct Install</i>	110	5,277,573	79,163,595
<i>Prescriptive Midstream</i>	0	0	0
Industrial Program	336	41,722,203	656,138,741
<i>Industrial Custom⁴</i>	336	41,722,203	656,138,741
Large Volume Program	18	6,772,053	79,848,302
<i>Direct Access⁵</i>	18	6,772,053	79,848,302
Energy Performance Program¹	0	0	0
Building Beyond Code Program	80	0	0
<i>Residential Savings by Design</i>	31	0	0
<i>Commercial Savings by Design</i>	43	0	0
<i>Affordable Housing Savings By Design</i>	6	0	0
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	151	0	0
<i>School Energy Competition</i>	25	0	0
<i>Run It Right / RunSmart</i>	116	0	0
<i>Comprehensive / Strategic Energy Management</i>	10	0	0
<i>Optimum Home</i>	0	0	0
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	24	1,617	29,106
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	24	1,617	29,106
<i>Indigenous (2016-2022)</i>	0	0	0
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	42,861	106,493,294	1,796,549,300

2017 DSM Programs/Offerings	Number of Unique Participants ⁷	Net Annual Natural Gas Savings (m ³)	Net Cumulative Natural Gas Savings (m ³)
Residential Program	39,406	16,479,267	386,606,187
<i>Residential Whole Home</i>	25,118	13,941,718	348,542,955
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	14,288	2,537,549	38,063,232
Low Income Program	2,834	6,876,603	145,581,118
<i>Home Winterproofing</i>	2,617	1,987,484	49,426,769
<i>Affordable Housing Multi-Residential</i>	217	4,889,120	96,154,349
Commercial Program	2,357	30,614,254	539,165,075
<i>Commercial Custom²</i>	778	12,271,098	216,961,518
<i>Prescriptive Downstream³</i>	1,335	12,686,320	237,351,007
<i>Direct Install</i>	244	5,656,837	84,852,549
<i>Prescriptive Midstream</i>	0	0	0
Industrial Program	397	50,465,806	771,529,283
<i>Industrial Custom⁴</i>	397	50,465,806	771,529,283
Large Volume Program	20	9,474,468	125,804,115
<i>Direct Access⁵</i>	20	9,474,468	125,804,115
Energy Performance Program¹	0	0	0
Building Beyond Code Program	77	0	0
<i>Residential Savings by Design</i>	24	0	0
<i>Commercial Savings by Design</i>	42	0	0
<i>Affordable Housing Savings By Design</i>	11	0	0
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	144	75,252	376,261
<i>School Energy Competition</i>	65	0	0
<i>Run It Right / RunSmart</i>	64	75,252	376,261
<i>Comprehensive / Strategic Energy Management</i>	5	0	0
<i>Optimum Home</i>	10	0	0
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	773	41,245	848,532
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	410	24,570	442,260
<i>Indigenous (2016-2022)</i>	363	16,675	406,272
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	46,008	114,026,896	1,969,910,572

Footnotes provided on final page

2018 DSM Programs/Offerings	Number of Unique Participants ⁷	Net Annual Natural Gas Savings (m ³)	Net Cumulative Natural Gas Savings (m ³)
Residential Program	46,805	17,412,374	406,428,031
<i>Residential Whole Home</i>	30,543	14,524,243	363,106,063
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	16,262	2,888,131	43,321,968
Low Income Program	3,247	8,738,623	188,253,946
<i>Home Winterproofing</i>	3,079	1,975,650	47,793,725
<i>Affordable Housing Multi-Residential</i>	168	6,762,973	140,460,221
Commercial Program	1,887	32,553,508	599,987,103
<i>Commercial Custom²</i>	467	12,920,774	250,811,450
<i>Prescriptive Downstream³</i>	361	12,450,427	241,441,041
<i>Direct Install</i>	1,059	7,182,306	107,734,613
<i>Prescriptive Midstream</i>	0	0	0
Industrial Program	269	41,624,376	647,849,865
<i>Industrial Custom⁴</i>	269	41,624,376	647,849,865
Large Volume Program	19	8,055,743	89,196,896
<i>Direct Access⁵</i>	19	8,055,743	89,196,896
Energy Performance Program¹	0	0	0
Building Beyond Code Program	97	0	0
<i>Residential Savings by Design</i>	35	0	0
<i>Commercial Savings by Design</i>	49	0	0
<i>Affordable Housing Savings By Design</i>	13	0	0
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	136	7,748	38,741
<i>School Energy Competition</i>	14	0	0
<i>Run It Right / RunSmart</i>	106	-4,210	-21,050
<i>Comprehensive / Strategic Energy Management</i>	8	11,958	59,791
<i>Optimum Home</i>	8	0	0
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	16	9,932	237,039
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	0	0	0
<i>Indigenous (2016-2022)</i>	16	9,932	237,039
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	52,476	108,402,303	1,931,991,619

Footnotes provided on final page

2019 DSM Programs/Offerings	Number of Unique Participants ⁷	Net Annual Natural Gas Savings (m ³)	Net Cumulative Natural Gas Savings (m ³)
Residential Program	46,292	17,912,664	418,736,421
<i>Residential Whole Home</i>	27,433	15,004,647	375,116,165
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	18,859	2,908,017	43,620,256
Low Income Program	7,410	9,368,115	195,299,414
<i>Home Winterproofing</i>	7,229	3,429,762	78,764,396
<i>Affordable Housing Multi-Residential</i>	181	5,938,353	116,535,018
Commercial Program	1,891	33,975,844	592,673,030
<i>Commercial Custom²</i>	556	10,612,291	198,417,305
<i>Prescriptive Downstream³</i>	866	10,700,580	204,655,090
<i>Direct Install</i>	436	12,548,320	188,224,802
<i>Prescriptive Midstream</i>	33	114,653	1,375,834
Industrial Program	281	47,352,182	796,153,786
<i>Industrial Custom⁴</i>	281	47,352,182	796,153,786
Large Volume Program	22	7,046,912	72,370,192
<i>Direct Access⁵</i>	22	7,046,912	72,370,192
Energy Performance Program¹	0	0	0
Building Beyond Code Program	107	0	0
<i>Residential Savings by Design</i>	39	0	0
<i>Commercial Savings by Design</i>	57	0	0
<i>Affordable Housing Savings By Design</i>	11	0	0
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	185	8,451	42,255
<i>School Energy Competition</i>	32	0	0
<i>Run It Right / RunSmart</i>	142	8,451	42,255
<i>Comprehensive / Strategic Energy Management</i>	7	0	0
<i>Optimum Home</i>	4	0	0
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	165	26,659	586,567
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	111	5,922	106,596
<i>Indigenous (2016-2022)</i>	54	20,737	479,971
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	56,353	115,690,827	2,075,861,664

2020 DSM Programs/Offerings	Number of Unique Participants ⁷	Net Annual Natural Gas Savings (m ³)	Net Cumulative Natural Gas Savings (m ³)
Residential Program	51,746	16,342,654	364,790,297
<i>Residential Whole Home</i>	21,627	11,965,048	299,126,210
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	30,119	4,377,606	65,664,088
Low Income Program	8,146	7,503,667	153,150,711
<i>Home Winterproofing</i>	8,040	3,076,046	65,054,010
<i>Affordable Housing Multi-Residential</i>	106	4,427,621	88,096,700
Commercial Program	1,801	17,250,507	305,448,585
<i>Commercial Custom²</i>	743	12,108,515	234,687,226
<i>Prescriptive Downstream³</i>	283	2,383,218	34,404,679
<i>Direct Install</i>	178	2,013,697	26,168,311
<i>Prescriptive Midstream</i>	597	745,077	10,188,370
Industrial Program	204	41,774,356	676,419,233
<i>Industrial Custom⁴</i>	204	41,774,356	676,419,233
Large Volume Program	22	12,213,857	126,647,466
<i>Direct Access⁵</i>	22	12,213,857	126,647,466
Energy Performance Program¹	0	0	0
Building Beyond Code Program	110	0	0
<i>Residential Savings by Design</i>	35	0	0
<i>Commercial Savings by Design</i>	60	0	0
<i>Affordable Housing Savings By Design</i>	15	0	0
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	79	1,153,640	5,768,200
<i>School Energy Competition</i>	7	0	0
<i>Run It Right / RunSmart</i>	65	-52,360	-261,800
<i>Comprehensive / Strategic Energy Management</i>	7	1,206,000	6,030,000
<i>Optimum Home</i>	0	0	0
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	0	0	0
<i>Indigenous (2016-2022)</i>	0	0	0
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	62,108	96,238,682	1,632,224,492

2021 DSM Programs/Offerings ⁸	Number of Unique Participants ⁹	Net Annual Natural Gas Savings (m3) ¹⁰	Net Cumulative Natural Gas Savings (m3)
Residential Program	59,261	19,000,000	420,488,167
<i>Residential Whole Home</i>	21,756	13,548,816	338,720,403
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	37,505	5,451,184	81,767,764
Low Income Program	8,939	8,051,350	164,425,000
<i>Home Winterproofing</i>	8,827	3,377,295	71,425,000
<i>Affordable Housing Multi-Residential</i>	112	4,674,055	93,000,000
Commercial Program	2,371	18,217,399	305,510,000
<i>Commercial Custom</i>	611	9,952,534	192,900,000
<i>Prescriptive Downstream</i>	355	2,992,472	43,200,000
<i>Direct Install</i>	350	3,955,319	51,400,000
<i>Prescriptive Midstream</i>	1,055	1,317,074	18,010,000
Industrial Program	226	46,281,019	749,392,070
<i>Industrial Custom</i>	226	46,281,019	749,392,070
Large Volume Program	21	11,669,216	121,000,000
<i>Direct Access</i>	21	11,669,216	121,000,000
Energy Performance Program¹	0	0	0
Building Beyond Code Program	80	0	0
<i>Residential Savings by Design</i>	24	N/A	N/A
<i>Commercial Savings by Design</i>	43	N/A	N/A
<i>Affordable Housing Savings By Design</i>	13	N/A	N/A
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	96	0	0
<i>School Energy Competition</i>	0	N/A	N/A
<i>Run It Right / RunSmart</i>	94	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	2	N/A	N/A
<i>Optimum Home</i>	0	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	0	0	0
<i>Indigenous (2016-2022)</i>	0	0	0
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	70,994	103,218,984	1,760,815,237

Footnotes provided on final page

2022 DSM Programs/Offerings	Number of Unique Participants ⁹	Net Annual Natural Gas Savings (m3) ¹⁰	Net Cumulative Natural Gas Savings (m3) ¹¹
Residential Program	46,818	16,312,045	361,816,775
<i>Residential Whole Home</i>	15,180	11,713,610	292,840,257
<i>Residential Single Measure¹</i>	N/A	N/A	N/A
<i>Residential Smart Home</i>	31,638	4,598,435	68,976,518
Low Income Program	9,052	8,644,313	176,270,742
<i>Home Winterproofing</i>	8,927	3,415,257	72,227,838
<i>Affordable Housing Multi-Residential</i>	125	5,229,056	104,042,904
Commercial Program	2,268	18,529,099	314,450,588
<i>Commercial Custom</i>	659	10,735,958	208,084,331
<i>Prescriptive Downstream</i>	355	2,985,961	43,106,001
<i>Direct Install</i>	322	3,643,588	47,349,004
<i>Prescriptive Midstream</i>	932	1,163,592	15,911,252
Industrial Program	231	47,226,381	764,699,577
<i>Industrial Custom</i>	231	47,226,381	764,699,577
Large Volume Program	20	11,229,645	116,442,010
<i>Direct Access</i>	20	11,229,645	116,442,010
Energy Performance Program¹	0	0	0
Building Beyond Code Program	98	0	0
<i>Residential Savings by Design</i>	23	N/A	N/A
<i>Commercial Savings by Design</i>	63	N/A	N/A
<i>Affordable Housing Savings By Design</i>	12	N/A	N/A
<i>Commercial Air Tightness Testing¹</i>	N/A	N/A	N/A
Low Carbon Transition Program¹	0	0	0
Market Transformation & Energy Management Programs	227	0	0
<i>School Energy Competition</i>	58	N/A	N/A
<i>Run It Right / RunSmart</i>	157	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	12	N/A	N/A
<i>Optimum Home</i>	0	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	0	0	0
<i>Indigenous (2016-2022)</i>	0	0	0
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	58,714	101,941,483	1,733,679,692

2023 DSM Programs/Offerings	Number of Projects/Units ¹²	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
Residential Program	55,860	14,757,274	308,435,483
<i>Residential Whole Home</i>	14,850	7,759,125	193,978,125
<i>Residential Single Measure</i>	6,260	826,549	21,883,358
<i>Residential Smart Home</i>	34,750	6,171,600	92,574,000
Low Income Program	8,136	7,888,400	164,914,978
<i>Home Winterproofing</i>	7,974	2,872,796	66,089,226
<i>Affordable Housing Multi-Residential</i>	162	5,015,604	98,825,752
Commercial Program	5,338	24,355,344	416,796,419
<i>Commercial Custom</i>	877	17,051,254	320,361,059
<i>Prescriptive Downstream</i>	1,522	1,734,187	25,102,822
<i>Direct Install</i>	1,364	3,542,144	46,309,452
<i>Prescriptive Midstream</i>	1,575	2,027,759	25,023,086
Industrial Program	511	50,376,897	766,556,319
<i>Industrial Custom</i>	511	50,376,897	766,556,319
Large Volume Program	88	9,300,000	92,999,997
<i>Direct Access</i>	88	9,300,000	92,999,997
Energy Performance Program	25	0	0
Building Beyond Code Program	1,501	0	0
<i>Residential Savings by Design¹³</i>	1,450	N/A	N/A
<i>Commercial Savings by Design</i>	28	N/A	N/A
<i>Affordable Housing Savings By Design</i>	18	N/A	N/A
<i>Commercial Air Tightness Testing¹⁴</i>	5	N/A	N/A
Low Carbon Transition Program¹⁵	0	0	0
Market Transformation & Energy Management Programs⁸	0	0	0
<i>School Energy Competition</i>	N/A	N/A	N/A
<i>Run It Right / RunSmart</i>	N/A	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	N/A	N/A	N/A
<i>Optimum Home</i>	N/A	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other⁶	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	N/A	N/A	N/A
<i>Indigenous (2016-2022)</i>	N/A	N/A	N/A
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	71,459	106,677,914	1,749,703,196

2024 DSM Programs/Offerings	Number of Projects/Units ¹²	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
Residential Program	57,179	15,105,763	315,719,114
<i>Residential Whole Home</i>	15,201	7,942,355	198,558,872
<i>Residential Single Measure</i>	6,408	846,067	22,400,129
<i>Residential Smart Home</i>	35,571	6,317,341	94,760,113
Low Income Program	8,299	8,046,168	168,213,283
<i>Home Winterproofing</i>	8,133	2,930,252	67,411,010
<i>Affordable Housing Multi-Residential</i>	165	5,115,916	100,802,273
Commercial Program	5,422	24,736,794	423,324,238
<i>Commercial Custom</i>	891	17,318,308	325,378,518
<i>Prescriptive Downstream</i>	1,546	1,761,348	25,495,980
<i>Direct Install</i>	1,385	3,597,620	47,034,745
<i>Prescriptive Midstream</i>	1,600	2,059,518	25,414,995
Industrial Program	521	51,384,435	781,887,445
<i>Industrial Custom</i>	521	51,384,435	781,887,445
Large Volume Program	90	9,486,000	94,859,997
<i>Direct Access</i>	90	9,486,000	94,859,997
Energy Performance Program	25	125,000	1,250,000
Building Beyond Code Program	2,058	0	0
<i>Residential Savings by Design¹³</i>	2,000	N/A	N/A
<i>Commercial Savings by Design</i>	31	N/A	N/A
<i>Affordable Housing Savings By Design</i>	21	N/A	N/A
<i>Commercial Air Tightness Testing¹⁴</i>	6	N/A	N/A
Low Carbon Transition Program^{15,16}	2,209	0	0
Market Transformation & Energy Management Programs⁵	0	0	0
<i>School Energy Competition</i>	N/A	N/A	N/A
<i>Run It Right / RunSmart</i>	N/A	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	N/A	N/A	N/A
<i>Optimum Home</i>	N/A	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other⁶	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	N/A	N/A	N/A
<i>Indigenous (2016-2022)</i>	N/A	N/A	N/A
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	75,802	108,884,161	1,785,254,075

Footnotes provided on final page

2025 DSM Programs/Offerings	Number of Projects/Units ¹²	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
Residential Program	58,323	15,407,878	322,033,496
<i>Residential Whole Home</i>	15,505	8,101,202	202,530,049
<i>Residential Single Measure</i>	6,536	862,989	22,848,131
<i>Residential Smart Home</i>	36,282	6,443,688	96,655,315
Low Income Program	8,465	8,207,092	171,577,548
<i>Home Winterproofing</i>	8,296	2,988,857	68,759,230
<i>Affordable Housing Multi-Residential</i>	169	5,218,235	102,818,319
Commercial Program	5,530	25,231,530	431,790,722
<i>Commercial Custom</i>	909	17,664,675	331,886,088
<i>Prescriptive Downstream</i>	1,577	1,796,575	26,005,899
<i>Direct Install</i>	1,413	3,669,573	47,975,440
<i>Prescriptive Midstream</i>	1,632	2,100,708	25,923,295
Industrial Program	532	52,412,124	797,525,194
<i>Industrial Custom</i>	532	52,412,124	797,525,194
Large Volume Program	92	9,675,720	96,757,197
<i>Direct Access</i>	92	9,675,720	96,757,197
Energy Performance Program¹⁸	50	250,000	2,500,000
Building Beyond Code Program¹⁷	0	0	0
<i>Residential Savings by Design¹³</i>	N/A	N/A	N/A
<i>Commercial Savings by Design</i>	N/A	N/A	N/A
<i>Affordable Housing Savings By Design</i>	N/A	N/A	N/A
<i>Commercial Air Tightness Testing¹⁴</i>	N/A	N/A	N/A
Low Carbon Transition Program¹⁷	0	0	0
Market Transformation & Energy Management Programs⁵	0	0	0
<i>School Energy Competition</i>	N/A	N/A	N/A
<i>Run It Right / RunSmart</i>	N/A	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	N/A	N/A	N/A
<i>Optimum Home</i>	N/A	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other⁶	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	N/A	N/A	N/A
<i>Indigenous (2016-2022)</i>	N/A	N/A	N/A
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	72,991	111,184,344	1,822,184,157

2026 DSM Programs/Offerings	Number of Projects/Units ¹²	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
Residential Program	59,489	15,716,036	328,474,166
<i>Residential Whole Home</i>	15,815	8,263,226	206,580,650
<i>Residential Single Measure</i>	6,667	880,248	23,305,094
<i>Residential Smart Home</i>	37,008	6,572,561	98,588,421
Low Income Program	8,634	8,371,233	175,009,099
<i>Home Winterproofing</i>	8,462	3,048,634	70,134,414
<i>Affordable Housing Multi-Residential</i>	172	5,322,599	104,874,685
Commercial Program	5,641	25,736,161	440,426,537
<i>Commercial Custom</i>	927	18,017,968	338,523,810
<i>Prescriptive Downstream</i>	1,608	1,832,506	26,526,017
<i>Direct Install</i>	1,441	3,742,964	48,934,949
<i>Prescriptive Midstream</i>	1,664	2,142,723	26,441,761
Industrial Program	542	53,460,366	813,475,698
<i>Industrial Custom</i>	542	53,460,366	813,475,698
Large Volume Program	93	9,869,234	98,692,340
<i>Direct Access</i>	93	9,869,234	98,692,340
Energy Performance Program¹⁸	0	0	0
Building Beyond Code Program¹⁷	0	0	0
<i>Residential Savings by Design¹³</i>	N/A	N/A	N/A
<i>Commercial Savings by Design</i>	N/A	N/A	N/A
<i>Affordable Housing Savings By Design</i>	N/A	N/A	N/A
<i>Commercial Air Tightness Testing¹⁴</i>	N/A	N/A	N/A
Low Carbon Transition Program¹⁷	0	0	0
Market Transformation & Energy Management Programs⁵	0	0	0
<i>School Energy Competition</i>	N/A	N/A	N/A
<i>Run It Right / RunSmart</i>	N/A	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	N/A	N/A	N/A
<i>Optimum Home</i>	N/A	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other⁶	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	N/A	N/A	N/A
<i>Indigenous (2016-2022)</i>	N/A	N/A	N/A
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	74,399	113,153,031	1,856,077,840

2027 DSM Programs/Offerings	Number of Projects/Units ¹²	Net Annual Natural Gas Savings (m3)	Net Cumulative Natural Gas Savings (m3)
Residential Program	60,679	16,030,357	335,043,649
<i>Residential Whole Home</i>	16,131	8,428,491	210,712,263
<i>Residential Single Measure</i>	6,800	897,853	23,771,196
<i>Residential Smart Home</i>	37,748	6,704,013	100,560,190
Low Income Program	8,807	8,538,658	178,509,281
<i>Home Winterproofing</i>	8,631	3,109,607	71,537,103
<i>Affordable Housing Multi-Residential</i>	175	5,429,051	106,972,179
Commercial Program	5,753	26,250,884	449,235,068
<i>Commercial Custom</i>	945	18,378,328	345,294,286
<i>Prescriptive Downstream</i>	1,640	1,869,156	27,056,538
<i>Direct Install</i>	1,470	3,817,823	49,913,648
<i>Prescriptive Midstream</i>	1,698	2,185,577	26,970,596
Industrial Program	553	54,529,574	829,745,212
<i>Industrial Custom</i>	553	54,529,574	829,745,212
Large Volume Program	95	10,066,619	100,666,187
<i>Direct Access</i>	95	10,066,619	100,666,187
Energy Performance Program¹⁸	0	0	0
Building Beyond Code Program¹⁷	0	0	0
<i>Residential Savings by Design¹³</i>	N/A	N/A	N/A
<i>Commercial Savings by Design</i>	N/A	N/A	N/A
<i>Affordable Housing Savings By Design</i>	N/A	N/A	N/A
<i>Commercial Air Tightness Testing¹⁴</i>	N/A	N/A	N/A
Low Carbon Transition Program¹⁷	0	0	0
Market Transformation & Energy Management Programs⁵	0	0	0
<i>School Energy Competition</i>	N/A	N/A	N/A
<i>Run It Right / RunSmart</i>	N/A	N/A	N/A
<i>Comprehensive / Strategic Energy Management</i>	N/A	N/A	N/A
<i>Optimum Home</i>	N/A	N/A	N/A
<i>Home Labelling (2015)</i>	N/A	N/A	N/A
2015-2022 Other⁶	0	0	0
<i>Energy Savings Kits (2015)</i>	N/A	N/A	N/A
<i>Furnace End-of-Life (2016-2022)</i>	N/A	N/A	N/A
<i>Indigenous (2016-2022)</i>	N/A	N/A	N/A
<i>My Home Health Record (2015)</i>	N/A	N/A	N/A
Total	75,887	115,416,091	1,893,199,397

Footnotes provided on final page

1. Does not exist prior to 2023
2. Includes Energy Leaders Initiative and Run it Right - Resource Acquisition (both EGD)
3. Commercial Prescriptive Downstream and Commercial Direct Install includes 2015-2020 Commercial and Industrial
4. Includes Comprehensive Energy Management - Resource Acquisition (EGD)
5. 2015 includes T1's, which were part of the Union Large Volume Program although not eligible for Direct Access
6. There are no equivalent offerings for these in 2023 and beyond
7. Since this view is counting participants at an offering level, it could result in the same customer being counted more than once if they participated in multiple offerings. For an overall unique participant count, refer to 5.GEC.3 for unique participant count based on rate class.
8. 2021 forecast of results and spend are as detailed in interrogatory response to I.6.EGI.STAFF.13 a, Attachment 1. However the numbers may vary due to rounding adjustments
9. For offerings with no participant metric, unique participants are forecasted based on 2020 data.
10. Annual M3 savings are forecasted based on 2020 data.
11. 2022 cumulative saving results are forecasted based on 100% targets. Breakdowns at the offering level are forecasted based on 2021 year forecast.
12. Due to difficulties in forecasting unique participants, these numbers represent forecasted number of units for TRM program offerings, and forecasted participants otherwise.
13. Participant count only includes forecasted Energy Star Homes. For Net Zero Ready Homes forecast, refer to 100% target in Exhibit D Tab 1 Schedule 3 Table 2-6.
14. Only includes forecasted number of participants. For Qualified Agents forecast, refer to 100% target in Exhibit D Tab 1 Schedule 3 Table 2-6.
15. As the Low Carbon program spans two-years (2023-2024), the result forecasts are included in 2024 table
16. Only includes number of installations. For contractors forecast, refer to 100% target in Exhibit D Tab 1 Schedule 3 Table 7.
17. The Building Beyond Code and Low Carbon Transition Programs to be reassessed at the mid-point assessment.
18. Energy Performance targets to be reassessed at the mid-point assessment.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Please provide an Excel spreadsheet, with formulae intact, that shows Enbridge's estimated annual savings and rebate spending by measure, program and for the DSM program portfolio as a whole, for each year from 2023 through 2027. Please include in the spreadsheet for each efficiency measure:

- number of forecast participants;
- average per measure gross savings;
- average per measure incremental cost;
- average per measure rebate;
- net-to-gross (or free ridership) assumptions;
- any other adjustments used to estimate savings; and
- average savings life.

If there are programs for which Enbridge has estimated participation, savings and costs only for measure bundles (and not for individual measures), please provide the requested values for such bundles. If there are programs for which Enbridge has estimated participation, savings and costs only at the program level (and not for individual measures or measure bundles), please provide the requested values at the program level.

Note that this information will also be helpful in addressing Issue #9 on scorecards and metrics and Issue #10 on programs.

Response:

Please see Attachment 1 to this interrogatory response.

Program ^{1,2,3}	Offering	Measure	Number of Projects / Number of Units ^{4,5}	Average NTG (%) ⁶	Adjustment Factor (%)	Average EUL (years) ⁷	Gross Annual Gas Savings (m3/unit)	Gross Annual Electricity Savings (kWh/unit)	Gross Annual Water Savings (m3/unit)	Gross Incremental Equipment Costs (\$/unit)	Budgeted Incentive Cost Per Unit (\$/unit) ⁸	242,805,492	106,677,914	30,340,531	21,046,650
												Gross Annual Gas Savings (m3)	Net Annual Gas Savings (m3)	Gross Annual Electricity Savings (kWh)	Net Annual Electricity Savings (kWh) ⁹
Large Volume Program	Direct Access	Custom/Prescriptive	88	15.3%	100%	10.0	690,280	7,720	400	323,440	28,398	60,744,609	9,300,000	679,360	104,010
Commercial Program	Commercial Custom	Commercial Custom	877	50.8%	100%	18.4	38,262	7,804	0	24,399	12,480	33,555,586	17,051,254	6,844,242	3,477,898
Industrial Program	Industrial Custom	Industrial Custom	511	43.7%	100%	15.3	225,544	15,023	18	52,891	26,348	115,253,150	50,376,897	7,676,571	3,355,412
Residential Program	Residential Whole Home	Whole Home Custom	14,850	95.0%	100%	25.0	550	359	-	2,941	1,760	8,167,500	7,759,125	5,331,150	5,064,593
Residential Program	Residential Smart Home	Adaptive Thermostat	32,250	96.0%	100%	15.0	185	176	-	300	77	5,966,250	5,727,600	5,676,000	5,448,960
Residential Program	Residential Smart Home	Adaptive Thermostat (Moderate Income)	2,500	96.0%	100%	15.0	185	176	-	300	128	462,500	444,000	440,000	422,400
Residential Program	Residential Single Measure	Residential Air Sealing	1,043	95.0%	100%	15.0	196	245	-	625	443	204,428	194,207	255,535	242,758
Residential Program	Residential Single Measure	Residential Attic	3,756	67.0%	100%	30.0	178	172	-	1,671	571	668,568	447,941	646,032	432,841
Residential Program	Residential Single Measure	Residential Wall	84	67.0%	100%	30.0	293	109	-	3,261	1,131	24,612	16,490	9,156	6,135
Residential Program	Residential Single Measure	Residential Basement (includes crawl space, slab on	1,377	67.0%	100%	30.0	182	208	-	1,551	621	250,614	167,911	286,416	191,899
Commercial Program	Direct Install	Air Curtains	319	95.0%	100%	15.0	5,266	199	-	10,241	7,472	1,679,973	1,595,974	63,484	60,310
Commercial Program	Direct Install	Dock Doors Seals	572	95.0%	100%	10.0	2,476	628	-	1,661	1,321	1,416,052	1,345,249	359,275	341,311
Commercial Program	Direct Install	DCV	15	95.0%	100%	15.0	5,516	7,296	-	6,249	13,760	82,737	78,600	109,443	103,971
Commercial Program	Direct Install	Ozone Laundry	8	92.0%	100%	15.0	7,421	413	403	18,214	13,934	59,369	54,620	3,302	3,038
Commercial Program	Direct Install	DCV	200	95.0%	100%	15.0	1,039	-	-	1,050	1,058	207,883	197,489	-	-
Commercial Program	Direct Install	Destratification Fan	30	90.0%	100%	15.0	2,327	-	-	7,961	4,825	69,800	62,820	-	-
Commercial Program	Direct Install	ERV Improved Effectiveness	21	95.0%	100%	14.0	205	-	-	492	897	4,314	4,099	-	-
Commercial Program	Direct Install	ERV	140	95.0%	100%	14.0	926	(813)	-	3,027	2,159	129,600	123,120	(113,879)	(108,185)
Commercial Program	Direct Install	HRV Improved Effectiveness	5	95.0%	100%	14.0	1,850	-	-	4,907	2,193	9,249	8,787	-	-
Commercial Program	Direct Install	HRV	49	95.0%	100%	14.0	1,136	(1,163)	-	4,954	3,364	55,681	52,897	(56,974)	(54,126)
Commercial Program	Direct Install	MUA	5	95.0%	100%	20.0	3,892	2,633	-	3,118	3,150	19,462	18,489	13,165	12,507
Commercial Program	Prescriptive Downstream	Air Curtains	55	50.0%	100%	15.0	3,510	(230)	-	5,394	2,538	193,068	96,534	(12,663)	(6,332)
Commercial Program	Prescriptive Downstream	DCV	80	62.0%	100%	15.0	7,984	11,739	-	8,360	4,835	638,746	396,023	939,086	582,233
Commercial Program	Prescriptive Downstream	DCV	170	8.0%	100%	15.0	1,989	-	-	1,011	611	338,211	27,057	-	-
Commercial Program	Prescriptive Downstream	Destratification Fan	65	90.0%	100%	15.0	2,173	-	-	7,961	2,651	141,240	127,116	-	-
Commercial Program	Prescriptive Downstream	Dock Doors Seals	215	50.0%	100%	10.0	2,072	524	-	1,830	892	445,470	222,735	112,615	56,308
Commercial Program	Prescriptive Downstream	ERV Improved Effectiveness	90	30.0%	100%	14.0	1,314	-	-	2,613	361	118,294	35,488	-	-
Commercial Program	Prescriptive Downstream	ERV	590	30.0%	100%	14.0	1,538	(598)	-	4,675	1,113	907,309	272,193	(352,843)	(105,853)
Commercial Program	Prescriptive Downstream	HRV Improved Effectiveness	12	95.0%	100%	14.0	861	-	-	3,466	795	10,329	9,812	-	-
Commercial Program	Prescriptive Downstream	HRV	210	95.0%	100%	14.0	1,363	(624)	-	3,549	1,066	286,143	271,836	(131,080)	(124,526)
Commercial Program	Prescriptive Downstream	MUA	20	95.0%	100%	20.0	8,348	7,333	-	4,974	4,322	166,952	158,604	146,662	139,329
Commercial Program	Prescriptive Downstream	Ozone Laundry	15	92.0%	100%	15.0	8,463	471	460	23,714	9,116	126,945	116,790	7,060	6,495
Commercial Program	Prescriptive Midstream	Condensing Unit Heater	28	100.0%	100%	18.0	1,125	(413)	-	2,161	381	31,488	31,488	(11,564)	(11,564)
Commercial Program	Prescriptive Midstream	Commercial Under-Fired Broiler	12	80.0%	100%	12.0	3,557	-	-	1,900	286	42,679	34,143	-	-
Commercial Program	Prescriptive Midstream	Condensing Tankless Water Heater	137	98.0%	100%	20.0	466	-	-	2,227	172	63,909	62,631	-	-
Commercial Program	Prescriptive Midstream	Commercial Energy Star Fryer	650	80.0%	100%	12.0	1,408	-	-	2,476	286	915,200	732,160	-	-
Commercial Program	Prescriptive Midstream	Commercial Energy Star Steam Cooker	11	80.0%	100%	12.0	8,889	-	340	3,880	381	97,779	78,223	-	-
Commercial Program	Prescriptive Midstream	Commercial Energy Star Convention Oven	11	80.0%	100%	12.0	865	40	-	1,200	286	9,515	7,612	441	353
Commercial Program	Prescriptive Midstream	Commercial Energy Star Rack Oven - Single Rack	33	80.0%	100%	12.0	830	749	-	1,544	286	27,390	21,912	24,717	19,774
Commercial Program	Prescriptive Midstream	Commercial Energy Star Rack Oven - Double Rack	33	80.0%	100%	12.0	1,076	1,685	-	2,591	343	35,508	28,406	55,605	44,484
Commercial Program	Prescriptive Midstream	Combi-Ovens	450	80.0%	100%	12.0	2,287	-	-	4,470	477	1,029,150	823,320	-	-
Commercial Program	Prescriptive Midstream	Commercial Griddles	120	80.0%	100%	12.0	534	-	-	1,069	95	64,080	51,264	-	-
Commercial Program	Prescriptive Midstream	Conveyor Ovens	90	80.0%	100%	12.0	2,175	-	-	3,613	477	195,750	156,600	-	-
Low Income Program	Affordable Housing Multi-Residential	Custom/Prescriptive	162	100.0%	100%	19.7	30,961	2,811	-	21,564	37,677	5,015,604	5,015,604	455,418	455,418
Low Income Program	Home Winterproofing	HWP - Insulation	2,800	100.0%	100%	25.0	827	140	-	2,993	3,095	2,314,200	2,314,200	392,000	392,000
Low Income Program	Home Winterproofing	Adaptive Thermostat - Prescriptive	2,800	100.0%	100%	15.0	185	176	-	300	292	518,000	518,000	492,800	492,800
Low Income Program	Home Winterproofing	Basic Measures - Prescriptive	2,374	100.0%	100%	11.4	17	-	5	2	12	40,596	40,596	-	-

Refer to Notes on final page

			SUBTOTALS						
			71,556	34,889	169,600,662	110,119,382	3,615,802,604	1,748,633,282	81,994,302
Program ^{1,2,3}	Offering	Measure	Gross Annual Water Savings (m3)	Net Annual Water Savings (m3) ⁹	Gross Participant Equipment Costs (\$)	Net Participant Equipment Costs (\$) ⁹	Gross Cumulative Gas Savings (m3)	Net Cumulative Gas Savings (m3) ⁹	Incentive Costs - Measure Level (\$)
Large Volume Program	Direct Access	Custom/Prescriptive	35,166	5,384	28,462,720	4,357,642	607,446,092	92,999,997	2,499,000
Commercial Program	Commercial Custom	Commercial Custom	206	105	21,398,005	10,873,385	617,236,697	313,648,508	10,944,600
Industrial Program	Industrial Custom	Industrial Custom	9,286	4,059	27,027,053	11,813,465	1,766,650,325	772,198,955	13,464,000
Residential Program	Residential Whole Home	Whole Home Custom	-	-	43,670,880	41,487,336	204,187,500	193,978,125	26,140,935
Residential Program	Residential Smart Home	Adaptive Thermostat	-	-	9,675,000	9,288,000	89,493,750	85,914,000	2,467,125
Residential Program	Residential Smart Home	Adaptive Thermostat (Moderate Income)	-	-	750,000	720,000	6,937,500	6,660,000	318,750
Residential Program	Residential Single Measure	Residential Air Sealing	-	-	651,875	619,281	3,066,420	2,913,099	461,766
Residential Program	Residential Single Measure	Residential Attic	-	-	6,276,276	4,205,105	20,057,040	13,438,217	2,145,612
Residential Program	Residential Single Measure	Residential Wall	-	-	273,924	183,529	738,360	494,701	95,023
Residential Program	Residential Single Measure	Residential Basement (includes crawl space, slab on	-	-	2,135,727	1,430,937	7,518,420	5,037,341	855,432
Commercial Program	Direct Install	Air Curtains	-	-	3,266,876	3,103,532	25,199,595	23,939,615	2,383,542
Commercial Program	Direct Install	Dock Doors Seals	-	-	950,176	902,667	14,160,520	13,452,494	755,820
Commercial Program	Direct Install	DCV	-	-	93,732	89,045	1,241,055	1,179,002	206,397
Commercial Program	Direct Install	Ozone Laundry	3,224	2,966	145,712	134,055	890,536	819,293	111,470
Commercial Program	Direct Install	DCV	-	-	210,000	199,500	3,118,248	2,962,336	211,650
Commercial Program	Direct Install	Destratification Fan	-	-	238,830	214,947	1,047,000	942,300	144,753
Commercial Program	Direct Install	ERV Improved Effectiveness	-	-	10,327	9,811	60,401	57,381	18,847
Commercial Program	Direct Install	ERV	-	-	423,745	402,557	1,814,398	1,723,679	302,316
Commercial Program	Direct Install	HRV Improved Effectiveness	-	-	24,533	23,306	129,490	123,015	10,965
Commercial Program	Direct Install	HRV	-	-	242,742	230,605	779,528	740,551	164,851
Commercial Program	Direct Install	MUA	-	-	15,591	14,811	389,248	369,786	15,752
Commercial Program	Prescriptive Downstream	Air Curtains	-	-	296,662	148,331	2,896,020	1,448,010	139,608
Commercial Program	Prescriptive Downstream	DCV	-	-	668,837	414,679	9,581,190	5,940,338	386,819
Commercial Program	Prescriptive Downstream	DCV	-	-	171,900	13,752	5,073,172	405,854	103,789
Commercial Program	Prescriptive Downstream	Destratification Fan	-	-	517,465	465,719	2,118,600	1,906,740	172,284
Commercial Program	Prescriptive Downstream	Dock Doors Seals	-	-	393,390	196,695	4,454,700	2,227,350	191,698
Commercial Program	Prescriptive Downstream	ERV Improved Effectiveness	-	-	235,204	70,561	1,656,110	496,833	32,455
Commercial Program	Prescriptive Downstream	ERV	-	-	2,757,974	827,392	12,702,320	3,810,696	656,747
Commercial Program	Prescriptive Downstream	HRV Improved Effectiveness	-	-	41,592	39,512	144,602	137,371	9,536
Commercial Program	Prescriptive Downstream	HRV	-	-	745,257	707,994	4,006,003	3,805,703	223,917
Commercial Program	Prescriptive Downstream	MUA	-	-	99,472	94,498	3,339,032	3,172,080	86,436
Commercial Program	Prescriptive Downstream	Ozone Laundry	6,894	6,343	355,710	327,253	1,904,181	1,751,847	136,740
Commercial Program	Prescriptive Midstream	Condensing Unit Heater	-	-	60,501	60,501	566,786	566,786	10,674
Commercial Program	Prescriptive Midstream	Commercial Under-Fired Broiler	-	-	22,800	18,240	512,148	409,718	3,431
Commercial Program	Prescriptive Midstream	Condensing Tankless Water Heater	-	-	305,099	298,997	1,278,174	1,252,611	23,501
Commercial Program	Prescriptive Midstream	Commercial Energy Star Fryer	-	-	1,609,400	1,287,520	10,982,400	8,785,920	185,835
Commercial Program	Prescriptive Midstream	Commercial Energy Star Steam Cooker	3,742	2,993	42,680	34,144	1,173,348	938,678	4,193
Commercial Program	Prescriptive Midstream	Commercial Energy Star Convention Oven	-	-	13,200	10,560	114,180	91,344	3,145
Commercial Program	Prescriptive Midstream	Commercial Energy Star Rack Oven - Single Rack	-	-	50,952	40,762	328,680	262,944	9,435
Commercial Program	Prescriptive Midstream	Commercial Energy Star Rack Oven - Double Rack	-	-	85,503	68,402	426,096	340,877	11,322
Commercial Program	Prescriptive Midstream	Combi-Ovens	-	-	2,011,500	1,609,200	12,349,800	9,879,840	214,425
Commercial Program	Prescriptive Midstream	Commercial Griddles	-	-	128,280	102,624	768,960	615,168	11,436
Commercial Program	Prescriptive Midstream	Conveyor Ovens	-	-	325,170	260,136	2,349,000	1,879,200	42,885
Low Income Program	Affordable Housing Multi-Residential	Custom/Prescriptive	-	-	3,493,295	3,493,295	98,825,752	98,825,752	6,103,628
Low Income Program	Home Winterproofing	HWP - Insulation	-	-	8,380,400	8,380,400	57,855,000	57,855,000	8,665,209
Low Income Program	Home Winterproofing	Adaptive Thermostat - Prescriptive	-	-	840,000	840,000	7,770,000	7,770,000	818,011
Low Income Program	Home Winterproofing	Basic Measures - Prescriptive	13,040	13,040	4,695	4,695	464,226	464,226	28,535

Refer to Notes on final page

Notes

- 1. Measure-level data for 2024-2027 are not provided in this file as forecast results for 2024-2027 have been derived through the Target Adjustment Mechanism by achievement of 100% of targets, year over year.
- 2. The Energy Performance Program is not included as there are no savings in the first year of the program (2023).
- 3. The data provided does not include details on Building Beyond Code and Low Carbon Programs as there are no measured savings for these programs.
- 4. The following offerings display number of units:
 - Residential Smart Home
 - Residential Single Measure
 - Direct Install
 - Prescriptive Downstream
 - Prescriptive Midstream
 - Affordable Housing Multi-Residential [Prescriptive Component]
 - Home Winterproofing [Prescriptive Component]
- 5. The following offerings display number of projects:
 - Direct Access
 - Commercial Custom
 - Industrial Custom
 - Residential Whole Home
 - Affordable Housing Multi-Residential [Custom Component]
 - Home Winterproofing [Custom Component]
- 6. For NTG, within a sub category/measure if multiple NTG values were present, an average was used.
- 7. For EUL, within a sub category/measure if multiple EULs values were present, an average value was used. This may have resulted in an EUL with decimal places.
- 8. Budgeted Incentive Cost Per Unit (\$/unit) will vary from the standard customer incentive rates due to factors such as time-limited promotions, DNQs, etc.
- 9. Due to the bundling of Commercial Custom and Industrial Custom, the NTG value is weighted based on Net Annual Gas Savings. Therefore, the calculations of the following fields could vary slightly.
 - Net Annual Electricity Savings (kWh),
 - Net Annual Water Savings (m3)
 - Net Participant Equipment Costs
 - Net Cumulative Gas Saved (m3)

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

To the extent not provided in response to the above IRs (5.GEC.4 and .5), please provide all assumptions, down to the measure level wherever available, and calculations underpinning all of the incentive costs and delivery costs shown in Tables 4 through 9 in Exh. D, Tab 1, Schedule 1, pp. 11-16. Please provide the requested information in an Excel file with formulae intact.

Response:

For calculations underpinning incentive costs, please see the response to Exhibit I.5.EGI.GEC.7. Please note that the calculation for incentives is not always done at the measure level.

Delivery costs, as noted in the response to Exhibit I.6.EGI.STAFF.15h, scale with programming and are therefore a function of assumed participation levels to varying degrees, depending on the offering. A large component of delivery costs across the portfolio are third-party delivery fees. Third-party delivery fees generally have a fixed and variable component in the contracts; however, the delivery fees accounted for in Exhibit D, Tab 1, Schedule 1, pages 9 to 16, Tables 4 through 9 are high level estimates because Enbridge Gas has not finalized procurement for most offers. Examples of delivery costs that do have a formulaic tie-back to participation levels are as follows:

- Residential Program Whole Home pays post-assessment incentives on a per-participant basis;
- Single Measure delivery agent costs for Professional Air Sealing has been calculated on a per-participant basis;
- Low Income Program Home Winterproofing pays post-assessment incentives on a per-participant basis; and/or
- The Prescriptive Midstream offering includes per-unit incentives paid to mid-market actors.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Please provide Enbridge's annual DSM results calculator, fully unlocked and with all formulas intact, for each of the years 2018, 2019 and 2020. This should be the calculator that contains measure level data for all offerings and is used to calculate annual draft DSM results and is provided to the OEB's Evaluation Contractor for comparison to the EC's Annual Verification Calculator in the annual verification process. The 2018 and 2019 versions should be the updated versions to reflect any changes made by the evaluator.

Response:

For clarity, Enbridge Gas does not provide the EC with a measure-level calculator of its DSM results. Rather, Enbridge Gas provides the EC with a flat file containing participant-level raw data. To provide meaningful information in response to this interrogatory, Enbridge Gas has produced Excel documents that provides measure-level information and calculations of the Company's 2018 and 2019 DSM results (post-audit) and 2020 DSM result (draft audit).

For the EGD rate zone, please see Attachment 1. For the Union rate zones, please see Attachment 2.

Attachments 1 and 2 have been provided in excel.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Issue 5

Question(s):

Regarding Exhibit F, Tab 1, Schedule 3:

- a) Please provide this table in an Excel file with formulae intact.
- b) What is the number of customers in each rate class shown in the Exhibit table?
- c) What is the source of the numbers of 2021 billing units in column (d)?
- d) Was the number of 2021 billing units in column (d) weather-normalized? If not, what would the weather-normalized values be for each rate class listed?
- e) What is Enbridge's current forecast of billing units (thousands of m3) for each year from 2023 through 2027 for each rate class? Please provide such estimates in a table in both PDF form and in an Excel file.
- f) What is Enbridge's forecast DSM budget by rate class (analogous to column (b) in the Exhibit) for each year from 2024 through 2027? Please provide a table of such values in both PDF form and in an Excel file.

Response:

- a) The schedule has been attached and filed in excel format as Attachment 1.
- b) Please see response to Exhibit I.6.EGI.OGVG.1a.
- c) The 2021 billing units at Exhibit F, Tab 1, Schedule 3, column (d) represent Enbridge Gas's 2021 volume forecast and were included as part of Enbridge Gas's 2021 Rates application (EB-2020-0095) to derive 2021 DSM and PDO unit rates.¹
- d) Yes, the 2021 billing units provided are weather-normalized.
- e) The current forecast of billing units by rate class for 2023 through 2027 has been attached and filed in excel format as Attachment 2.

¹ EB-2020-0095, Exhibit D, Tab 2, Rate Order, Working Papers, Schedule 9 and Schedule 11.

- f) Please see Exhibit F, Tab 1, Schedule 2 for Enbridge Gas's forecast DSM budget by rate class for 2024 through 2027.

ENBRIDGE GAS INC.
 2023 - 2027 DSM Plan
 2023 DSM Budget Bill Impacts

Line No.	Rate Class	2022	2023	Change (%)	2021	2022	2023	Representative Annual Billing Units (m ³)	2023 DSM Amounts in Total Bill		2023	April 2021	2023 DSM Budget	
		DSM Budget in Rates (1) (\$000s)	Proposed DSM Budget (2) (\$000s)		Billing Units (10 ³ m ³)	DSM Unit Rate (cents/m ³)	Proposed DSM Unit Rate (3) (cents/m ³)		Annual (\$)	Monthly (\$)	Budget Change Impact (\$ / customer)	QRAM Total Bill (4) (\$)	Total Bill (%)	Change Impact (%)
		(a)	(b)	(c)=(b-a)/(a)	(d)	(e)=(a/d)*100	(f)=(b/d)*100	(g)	(h)=(f*g)/100	(i)=(h/12)	(j)=(f-e)*(g)/100	(k)	(l)=(h/k)	(m)=(j/k)
EGD Rate Zone														
1	Rate 1	39,406	45,112	14%	5,118,240	0.7699	0.8814	2,400	21.15	1.76	2.68	1,069	2.0%	0.3%
2	Rate 6	21,074	23,823	13%	4,923,001	0.4281	0.4839	22,606	109	9	13	8,088	1.4%	0.2%
3	Rate 9	3	-	-	-	-	-	-	-	-	-	-	-	-
4	Rate 100	-	-	-	34,607	-	-	339,188	0	0	-	99,893	0.0%	0.0%
5	Rate 110	2,208	2,531	15%	990,703	0.2228	0.2554	598,568	1,529	127	195	165,622	0.9%	0.1%
6	Rate 115	1,319	1,450	10%	486,459	0.2711	0.2982	4,471,609	13,332	1,111	1,208	1,145,755	1.2%	0.1%
7	Rate 125 (5)	110	166	51%	111,124	0.0991	0.1498	-	41,606	3,467	14,087	-	-	-
8	Rate 135	255	287	12%	63,812	0.4000	0.4494	598,567	2,690	224	296	150,203	1.8%	0.2%
9	Rate 145	1,147	1,178	3%	28,113	4.0814	4.1893	598,568	25,076	2,090	646	173,251	14.5%	0.4%
10	Rate 170	2,195	2,362	8%	276,738	0.7933	0.8535	9,976,120	85,144	7,095	6,007	2,352,250	3.6%	0.3%
11	Rate 200 (5)	38	40	6%	181,849	0.0210	0.0221	-	40,265	3,355	2,105	-	-	-
12	Rate 300 (5)	2	1	-59%	187	0.9800	0.4034	-	755	63	(1,079)	-	-	-
13	Total EGD	<u>67,757</u>	<u>76,949</u>											
Union South Rate Zone														
14	Rate M1	27,446	27,346	0%	3,142,868	0.8733	0.8701	2,200	19.14	1.60	-0.07	880	2.2%	0.0%
15	Rate M2	10,658	11,257	6%	1,340,433	0.7951	0.8398	250,000	2,099	175	112	67,744	3.1%	0.2%
16	Rate M4 (6)	4,765	5,145	8%	707,951	0.6731	0.7267	875,000	6,359	530	469	238,244	2.7%	0.2%
17	Rate M5 (6)	499	405	-19%	68,930	0.7238	0.5872	6,500,000	38,170	3,181	(8,879)	1,585,878	2.4%	-0.6%
18	Rate M7	2,034	2,214	9%	595,232	0.3418	0.3720	36,000,000	133,905	11,159	10,867	8,445,804	1.6%	0.1%
19	Rate M9	-	17	-	103,990	-	0.0162	6,950,000	1,128	94	1,128	1,119,963	0.1%	0.1%
20	Rate M10	-	0	-	391	-	0.0423	94,500	40	3	40	20,105	0.2%	0.2%
21	Rate T1	1,569	1,634	4%	444,974	0.3526	0.3672	11,565,938	42,465	3,539	1,684	2,721,662	1.6%	0.1%
22	Rate T2	4,725	4,783	1%	4,571,591	0.1034	0.1046	197,789,850	206,924	17,244	2,481	43,934,364	0.5%	0.0%
23	Rate T3	-	106	-	283,374	-	0.0375	272,712,000	102,249	8,521	102,249	42,468,987	0.2%	0.2%
24	Total Union South	<u>51,698</u>	<u>52,906</u>											
Union North Rate Zone														
25	Rate 01	6,625	6,030	-9%	1,023,451	0.6473	0.5892	2,200	12.96	1.08	-1.28	1,140	1.1%	-0.1%
26	Rate 10	3,127	3,264	4%	359,134	0.8706	0.9087	250,000	2,272	189	95	86,150	2.6%	0.1%
27	Rate 20	1,753	1,852	6%	686,307	0.2554	0.2699	15,000,000	40,478	3,373	2,161	3,837,257	1.1%	0.1%
28	Rate 25	-	75	-	80,723	-	0.0932	2,275,000	2,121	177	2,121	579,929	0.4%	0.4%
29	Rate 100	1,147	1,184	3%	1,089,225	0.1053	0.1087	240,000,000	260,964	21,747	8,170	65,692,840	0.4%	0.0%
30	Total Union North	<u>12,652</u>	<u>12,405</u>											
31	Total EGI	<u>132,107</u>	<u>142,260</u>											

Notes:

- Updated to equal 2021 Board-approved DSM budget, consistent with what was included in the 2022 Rates application (EB-2021-0147, Exhibit D, Tab 2, Rate Order, Working Papers, Schedule 10, p. 1).
- Exhibit F, Tab 1, Schedule 2.
- 2023 proposed DSM unit rates calculated based on 2021 billing units. At the time of filing the application, the available billing units to calculate DSM unit rates are for 2021.
- Total sales service bill based on EB-2021-0070 (April 2021 QRAM) excluding cost/price adjustments. Total bill for Rate M9, Rate M10 and Rate T3 excludes the federal carbon charge.
- Annual bill impact amounts for EGD Rate 125, Rate 200, and Rate 300 are for average customers in each rate class.
- Rate M4 and Rate M5 DSM costs are pooled and reallocated in proportion to forecast volumes. Forecast volumes are updated through the annual rate setting proceedings.

Enbridge Gas Inc.

EGI Forecast Volumes by Rate Classes (10³ m³)

General Service/Rate Zone	Rate Class	2023	2024	2025	2026	2027
EGD	Rate 1	5,129,331	5,162,340	5,193,658	5,226,434	5,257,913
EGD	Rate 6	4,765,429	4,785,268	4,809,154	4,837,878	4,866,432
Union South	M1	3,144,086	3,168,991	3,162,749	3,171,434	3,179,198
Union South	M2	1,291,379	1,297,768	1,293,153	1,293,741	1,293,958
Union North	R01	1,029,177	1,038,943	1,038,381	1,043,157	1,047,504
Union North	R10	367,990	369,762	368,440	368,649	368,735
Total		15,727,393	15,823,073	15,865,534	15,941,294	16,013,741

Contract Market / Rate Zone	Rate Class	2023	2024	2025	2026	2027
EGD	Rate 100	30,331	29,423	28,515	27,607	26,699
EGD	Rate 110	1,142,179	1,138,577	1,134,974	1,131,371	1,127,769
EGD	Rate 115	368,967	364,455	359,943	355,431	350,919
EGD	Rate 125	558,826	558,826	558,826	558,826	558,826
EGD	Rate 135	58,036	57,093	56,150	55,207	54,264
EGD	Rate 145	25,939	25,939	25,939	25,939	25,939
EGD	Rate 170	253,114	252,691	252,267	251,843	251,420
EGD	Rate 200	188,317	188,317	188,317	188,317	188,317
EGD	Rate 300	123	123	123	123	123
EGD	Rate 315	-	-	-	-	-
Union North	Rate_20	799,996	798,220	796,117	794,013	805,597
Union North	Rate_25	91,136	89,180	89,180	89,180	89,180
Union North	Rate_100	1,096,177	1,110,212	1,109,120	1,108,027	1,106,935
Union South	Rate_M4	609,732	608,088	606,463	604,838	603,212
Union South	Rate_M5	61,601	60,887	60,172	59,458	58,744
Union South	Rate_M7	703,063	724,759	746,455	768,151	789,848
Union South	Rate_M9	88,845	88,845	88,845	88,845	88,845
Union South	Rate_M10	360	360	360	360	360
Union South	Rate_T1	421,617	420,906	420,195	419,485	418,774
Union South	Rate_T2	4,234,321	4,243,081	4,251,841	4,337,432	4,346,193
Union South	Rate_T3	264,209	264,209	264,209	264,209	264,209
Total		10,996,888	11,024,189	11,038,010	11,128,662	11,156,170

Total EGI Volumes		26,724,281	26,847,262	26,903,544	27,069,956	27,169,911
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ENBRIDGE GAS INC.

Answer to Interrogatory from
Low-Income Energy Network (LIEN)

Interrogatory

Issue 5

Preamble:

Regarding the allocation of funds between programs, Exhibit C Tab 1 Schedule 1 page 15 of 66 states, *“However, if Enbridge Gas decides to re-allocate funds among existing, approved DSM programs, Enbridge Gas should inform the OEB, as well as stakeholders, in the event that cumulative fund transfers among OEB approved DSM programs exceed 30% of the approved annual DSM budget for an individual DSM program (either the program funds are being transferred from, or the program funds are being transferred to).”*

Question(s):

- a) For each program offering within the low-income program of Union Gas and Enbridge Gas rate zones, please indicate by rate zone for each year between 2015 and 2021 any dollar transfer amount, either from the low-income program offering to another program, or from another program to the low-income offering, and indicate the source and endpoint of the transfer.

Response:

See Table 1 and Table 2 below for the requested information for 2015-2020. Transfer amounts for 2021 are not available.

Table 1 - Low Income Budget Transfers - Union Rate Zones

Transfers To/(From) - Low Income Program	2015	2016	2017	2018	2019	2020
Low-Income Single Family - Home Weatherization	-	-	-	-	-	-
Low-Income Single Family - Indigenous	-	-	-	-	-	-
Low-Income Single Family - Furnace End of Life	-	-	-	-	-	-
Low-Income Multi Family	-	-	-	-	-	-
Low-Income Evaluation	152,852	(58,395)	(59,115)	(70,023)	76,617	(71,758)
Low-Income Administration	(192,388)	-	(456,102)	(439,138)	(601,894)	(746,211)
Net Transfer To/(From) Low Income Program	(39,536)	(58,395)	(515,217)	(509,161)	(525,277)	(817,969)
Net Transfer Source/(Endpoint)						
Residential Program Costs	-	-	-	-	-	746,211
Residential Evaluation Costs	-	58,395	515,217	509,161	525,277	71,758
Portfolio Evaluation Costs	(152,852)	-	-	-	-	-
Portfolio Administration	192,388	-	-	-	-	-
Net Transfer Endpoint/(Source)	39,536	58,395	515,217	509,161	525,277	817,969

Table 2 - Low Income Budget Transfers - EGD Rate Zone

Transfers To/(From) - Low Income Program	2015	2016	2017	2018	2019	2020
Home Winterproofing	(516,703)	(56,934)	(1,750,580)	-	316,759	(373,198)
Low-Income Multi-Residential Affordable Housing	(241,470)	(56,934)	(652,290)	-	(611,063)	(1,019,665)
Low-Income New Construction	-	(335,009)	(41,044)	-	294,304	262,424
Low Income Overheads	65,369	(139,603)	(15,905)	-	(105,711)	(134,091)
Net Transfer To/(From) Low Income Program	(692,804)	(588,480)	(2,459,819)	-	(105,711)	(1,264,530)
Net Transfer Source/(Endpoint)						
Residential Program Costs	692,804	571,488	1,714,499	-	-	1,264,530
Market Transformation Program Costs	-	16,992	745,320	-	-	-
Collaboration & Innovation Fund	-	-	-	-	105,711	-
Net Transfer Endpoint/(Source)	692,804	588,480	2,459,819	-	105,711	1,264,530

ENBRIDGE GAS INC.

Answer to Interrogatory from
Low-Income Energy Network (LIEN)

Interrogatory

Issue 5

Preamble:

Regarding Enbridge Gas's proposal to include as a low-income program feature described at Exhibit C Tab 1 Schedule 1 page 18 of 66, "*Require no, or low, upfront costs to the income qualified consumer*":

Question(s):

- a) How does Enbridge Gas determine such an upfront cost? For example, is it a percent of the total measure cost or is it based on ability to pay?
- b) What is Enbridge Gas's rationale for including the low-income program feature of charging a low-income participant a low upfront cost?
- c) Under what circumstances will Enbridge Gas require a low upfront cost be paid by a low-income participant?
- d) Does the upfront cost apply to low-income homeowners as well as tenants in affordable housing?
- e) What research has Enbridge Gas conducted specific to the Ontario low-income segment, or any other jurisdictional research, to justify the charging of an upfront cost for low-income homeowners and tenants, as well as other low-income participants? Please provide this research.
- f) What research has Enbridge Gas conducted specific to the Ontario low-income segment, or any other jurisdictional research, to justify the amount of upfront cost a low-income participant should pay for a particular measure or service? Please provide this research.
- g) For the 2015 to 2021 period for each of Enbridge Gas and Union Gas rate zones, which low-income program offerings required a low-income homeowner or tenant to provide an upfront financial contribution to a program offering measure or service, what was the dollar amount of that contribution/measure or service and contribution/participant, and how many participants provided this type of contribution?

Response:

- a) Please refer to part b below.
- b) The Low Income Program Considerations of the Proposed Framework (Exhibit C, Tab 1, Schedule 1, page 18) include the feature “Require no, or low, upfront costs to the income qualified energy consumer.” This language was adopted from the OEB’s 2015-2020 Filing Guidelines Low-Income Program Requirements section, that low-income natural gas DSM programs “Require no, or low, upfront cost to the low-income energy consumer and result in an improvement in energy efficiency within the consumer’s residence.”¹ The statements reference further includes: “It is generally expected that low-income DSM programs will require no upfront costs to the low-income consumer. However, if a gas utility feels it is appropriate to require some level of upfront costs from the low-income consumer, it must clearly show the benefits of this approach and discuss the rationale for the proposal.”²

Enbridge Gas is committed to offering no-cost measures that do not require upfront costs be borne by the income qualified participant at this time for the single family offering. Consistent with the direction provided in the 2015-2020 DSM Filing Guidelines, and adopted as part of the Proposed Framework, should Enbridge Gas identify an opportunity for a new measure that requires some upfront cost from the low income consumer, the Company would present the rationale behind the opportunity and discuss with stakeholders before implementation.

At this time, low costs measures are offered as part of the multi-residential offering where financial contributions are made by the building owner or property manager. Tenants of participating income qualified buildings do not bear any costs.

- c - e) Please refer to part b above.
- f) During 2015-2019, the Furnace End of Life offer was available to low income customers (including homeowners, landlords and social housing providers) in Union Gas’s franchise area. As per the 2015-2020 Decision and Order, low income homeowners could receive 100% of the incremental cost of the furnace upgrade. Where a landlord was upgrading a furnace for a low income tenant, the OEB found it appropriate for Union Gas to contribute 50% of the incremental cost (being the difference in price between the high efficiency equipment and the existing base case equipment), similar to the contribution paid for social housing providers.³

¹ EB-2014-0134, OEB Filing Guidelines to the Demand Side Management Framework for Natural Gas Distributors (2015-2020) (December 22, 2014), p. 10.

² Ibid, (ref 3).

³ EB-2015-0029/EB-2015-0049, OEB Decision and Order (January 20, 2016), p. 28.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Low-Income Energy Network (LIEN)

Interrogatory

Issue 5

Preamble:

Regarding Enbridge Gas's proposal to provide a list at Exhibit C Tab 1 Schedule 1 page 18-19 of 66, "*Low Income Program Considerations*":

Question(s):

- a) For measures directly installed in low-income homeowner and tenant dwellings, please provide rationale as to why identifying, documenting and reporting on potential health and safety hazards that were addressed during installation or that prevented installation of a particular measure(s) not included as a low-income program feature?
- b) Would Enbridge Gas be willing to include this as a feature and provide such documentation?

Response:

- a) Enbridge Gas recognizes the importance of Health & Safety tracking, and reporting will be implemented as a requirement for our Delivery Agents in 2022 and beyond.
- b) Please see response to part a above.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Low-Income Energy Network (LIEN)

Interrogatory

Issue 5

Preamble:

Regarding Enbridge Gas's proposal for the content of the mid-point assessment at Exhibit D Tab 1 Schedule 1 page 6 of 26, Enbridge proposes: *"Any other changes to the DSM Plan deemed appropriate by Enbridge Gas for program offerings to ensure they are meeting customer needs and the objectives for such offerings...Enbridge Gas will reasonably consider the feedback of customers and stakeholders received as part of its stakeholder efforts for the purposes of informing the mid-point assessment application."*:

Question(s):

- a) What is Enbridge Gas's customer and stakeholder engagement plan for DSM for 2022 to the mid-point assessment and from the mid-point assessment to the end of 2027?
- b) In particular, what are the specifics – timing and type of engagement, feedback expected to be sought etc. - by year regarding engagement with low-income energy customers, social service agencies, and LIEN?
- c) Would Enbridge Gas be open to stakeholders and customer groups having the opportunity to raise recommended changes to DSM programs, including recommending new programs, as part of the mid-point assessment?

Response:

- a) Please see response to Exhibit I.17.EGI.EP.26a.
- b) In addition to the annual DSM Stakeholder meetings with intervenors, Enbridge Gas intends to regularly engage with its low income stakeholders throughout the DSM Plan term. Enbridge Gas will continue to solicit feedback from contractors, community partners, service organizations, and Indigenous groups on a regular basis to understand how income qualified customers are responding to its low income offerings and identify any challenges or opportunities for improvement.
- c) Please see response to Exhibit I.4.EGI.CME.6b.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Low-Income Energy Network (LIEN)

Interrogatory

Issue 5

Question(s):

Exhibit B Tab 1 Schedule 1 indicates that Enbridge Gas is proposing a 3% policy growth escalator over the previous year for the 2023-2027 period covered by its proposed DSM Plan.

- a) Given that low-income communities and households have been hit harder by Covid-19 than other sectors of the Ontario economy, how did Enbridge Gas take this situation into account in setting the 3% policy growth escalator for the DSM Program budgets?
- b) What is
 - i. Enbridge Gas's forecast customer growth rate and total customer increment for each of the years covered by the proposed 2022-2027 DSM Plan, and
 - ii. growth rate and customer increment for each of the years covered by the DSM Plan, broken down by the following segments: residential, low income, on-reserve First Nations, commercial, and industrial sectors?
- c) Did Enbridge Gas consider its customer growth rate or customer increment by sector in determining the 3% policy growth escalator? And if so, how? And if not, why not?
- d) What factors did Enbridge Gas take into account and which of these were most important to Enbridge Gas in determining the 3% policy growth rate escalator?

Response:

- a) Enbridge Gas did not factor in long lasting effects of the pandemic into the proposed 2023-2027 DSM Plan, as the Company has no basis on which to forecast any lasting impacts for the plan term. The Company notes that the growth is directed to programming that benefits the vast majority of gas customers, including Low Income customers.
- b) i) and ii)

Below table includes Enbridge Gas's current customer forecast, customer increment and growth rate by sector (Residential, Commercial, Industrial) for the period of

2022-2027. The Company doesn't have forecast broken down by low income, on-reserve First Nations.

Table: Enbridge Gas Customers and Year-over-Year Changes by Sector

	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027
General Service						
Residential						
Number of Customers	3,542,988	3,581,336	3,619,638	3,656,897	3,694,224	3,730,290
Incremental change	38,989	38,348	38,302	37,259	37,327	36,065
Percent (%) change	1.1%	1.1%	1.1%	1.0%	1.0%	1.0%
Small Commercial						
Number of Customers	285,070	286,603	288,046	289,422	290,719	291,893
Incremental change	1,999	1,533	1,443	1,376	1,297	1,174
Percent (%) change	0.7%	0.5%	0.5%	0.5%	0.4%	0.4%
Small Industrial						
Number of Customers	10,976	10,974	10,973	10,971	10,970	10,969
Incremental change	1	(1)	(1)	(1)	(1)	(1)
Percent (%) change	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total General Service						
Number of Customers	3,839,034	3,878,914	3,918,658	3,957,291	3,995,913	4,033,151
Incremental change	40,988	39,880	39,744	38,633	38,623	37,238
Percent (%) change	1.1%	1.0%	1.0%	1.0%	1.0%	0.9%
Contract						
Large Commercial/Industrial						
Number of Customers	988	989	989	989	989	989
Incremental change	9,167	9,372	9,399	9,413	9,504	9,531
Percent (%) change						
Power Generation						
Number of Customers	25	25	25	25	25	25
Annual Volumes (10 ⁶ m ³)*	1,437	1,437	1,437	1,437	1,437	1,437
Total Contract						
Number of Customers	1,013	1,014	1,014	1,014	1,014	1,014
Incremental change	7	1	0	-	-	-
Percent (%) change	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%
Total EGI						
Number of Customers	3,840,046	3,879,927	3,919,671	3,958,304	3,996,927	4,034,164
Incremental change	40,995	39,881	39,744	38,633	38,623	37,238
Percent (%) change	1.1%	1.0%	1.0%	1.0%	1.0%	0.9%

- c) Enbridge Gas did not consider the customer growth rate by sector when the 3% policy growth escalator was developed.
- d) Please see response to Exhibit I.10.EGI.PP.29.

ENBRIDGE GAS INC.

Answer to Interrogatory from
London Property Management Association (LPMA)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, page 5

Question(s):

The evidence states that EGI's ratepayer funded DSM plan should consider a number of secondary objectives including "Help lower overall average annual natural gas usage".

- a) Does EGI interpret this secondary objective as lowering the overall level of average annual natural gas usage, or as lowering the overall average annual natural gas usage per customer?
- b) If the response to part (a) is lowering the overall average annual natural gas usage per customer, will EGI be tracking the normalized average use per customer for each rate class? Please explain fully.

Response:

- a) Enbridge Gas interprets, "overall average annual natural gas usage" as being the normalized overall average per customer, not tied to a specific rate class. The Company interprets "Help..." as DSM programming should attempt to provide opportunities to gas customers so that they can manage their gas usage over time.
- b) Enbridge Gas has proposed specific performance metrics but tracking normalized average consumption per customer for each rate class is not being proposed as part of the DSM Plan. The Company believes tracking normalized usage per customer for each rate class would entail a significant effort given the number of rate classes. As well, due to extraneous factors such as customer movement between rate classes, new customers or changes in usage due to production levels (to name a few examples), Enbridge Gas believes that this could give rise to uncertainty comparing results and in the end, it would not be of benefit to the OEB nor stakeholders.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Issue 5

Reference:

Deferred Participant Costs

Question(s):

- a) Please explain when Enbridge started the practice of deferring participant costs and why that approach is better than realizing costs when they are paid.
- b) Please explain what happens if participant costs are deferred and that program is cancelled before the results can be counted.

Response:

- a) Enbridge Gas Distribution (“EGD”) first requested the approval of a Demand Side Management Participant Incentive Deferral Account (“DSMPIDA”) in its 2015-2020 DSM Plan Application (EB-2015-0049) “to record the variance between actual incentive payments made, and the budgeted incentive amounts included within the respective year’s DSM budget, to participants enrolled in multi-year programs.”¹

EGD requested the DSMPIDA due to budget impacts from the Savings by Design program established in 2012. The initial IDP costs for both residential and commercial builders in the SBD program offerings were managed within the 2012-2014 budgets. However, due to the 3 to 5 year lag time between IDP’s and actual construction, the amounts owed in incentive payments were delayed over time. Due to the unknown of when a builder will construct units, it is difficult for the Company to forecast actual budget for programs with multi-year payout schedules. The DSMPIDA was intended to track the variance in the incentive amounts paid to program participants and collect from ratepayers overpaid eligible incentives and reimburse ratepayers in years eligible incentives were underpaid.

¹ EB-2015-0049, Enbridge Gas Distribution Inc. Multi-Year Demand Side Management Plan (2015 to 2020) Corrected Evidence (June 26, 2015), Exhibit B, Tab 1, Schedule 6, pp. 1-2.

In the Mid-Term Decision the OEB ultimately agreed that a mechanism was required to support programs with multi-year payout schedules and approved “the DSMVA to track future financial commitments for programs with deferred customer incentives.”²

Exhibit C, Tab 1, Schedule 1, page 52 of 66 of the Proposed Framework includes the Company’s proposal to track and hold both incentive and program costs (excluding internal salary and overhead allocation) in the DSMVA, referred to as Deferred Participant Costs. Enbridge Gas would use the DSMVA, as approved in the Mid-Term Decision, to hold the funds associated with meeting a future program commitment at the time the participant signs up for the program. This allows Enbridge Gas to meet its future financial commitments to participants when payments are due outside of the DSM Plan term and has the costs of programs within the plan term recovered from ratepayers during that term as closely as is practical.

- b) Should a program be cancelled before the end of the DSM Plan term, Enbridge Gas would complete the audit and evaluation process for participants that signed up prior to the cancellation date of the program. The Company would honour the financial commitments to those participants through the held Deferred Participant Costs in the DSMVA.

² EB-2017-0127 / EB-2017-0128, Report of the Ontario Energy Board Mid-Term Review of the Demand Side Management (DSM) Framework for Natural Gas Distributors (2015-2020) (November 29, 2018), p. 22.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Issue 5

Question(s):

Enbridge's Framework proposal indicates that Enbridge should be able to reallocated up to 30% of its DSM budget (estimated to be approximately \$43 million in 2023) without additional OEB approval. However, Enbridge indicates that "Any requisite re-allocation of costs amounting to \$1,000,000 or more in a given year will require Enbridge Gas to file for an adjustment to the DSM Plan." Please reconcile the apparent discrepancy in determining a dollar threshold for what is material.

Response:

Please see response to Exhibit I.5.EGI.STAFF.7

The question first references 30% budget flexibility which is carried forward from the existing OEB approved DSM framework and outlined in the pre-filed evidence from Exhibit C, Tab 1, Schedule 1, page 15 where it states:

However, if Enbridge Gas decides to re-allocate funds amongst existing, approved DSM programs, Enbridge Gas should inform the OEB, as well as stakeholders, in the event that cumulative fund transfers among OEB approved DSM programs exceed 30% of the approved annual DSM budget for an individual DSM program (either the program the funds are being transferred from, or the program the funds are being transferred to). This level of guidance is meant to ensure that adequate flexibility in DSM program and portfolio design is maintained, while recognizing that Enbridge Gas is ultimately responsible and accountable for its actions. This flexibility should ensure that Enbridge Gas can appropriately react to and adapt with current and anticipated market developments.

This reference is clearly in relation to budget flexibility within the OEB approved DSM program set.

The question then references and compares information from Exhibit C, Tab 1, Schedule 1, Section 7.6 which is clearly titled, Energy Efficiency and Integrated Resource Planning. A more complete portion of the evidence reference states:

...part of an IRP plan may, in some cases, encompass the same measures, aimed at the same customer group(s). It is also likely that the staff supporting DSM delivery of these energy efficiency measures may also support delivery of an ETEE for an IRP project. Accordingly, even though there may be incremental budget/resources allocated

to delivering one or more ETEEs as part of an IRP Plan, it is appropriate that some costs, such as existing DSM administration and overheads, should be re-allocated to, or from, the DSM plan/budget to reflect such shared costs. It is therefore reasonable to establish a threshold of materiality to address such consideration as follows:

- Any requisite re-allocation of costs amounting to \$1,000,000 or more in a given year will require Enbridge Gas to file for an adjustment to the DSM Plan.

It is clear the second portion referenced in the question relates to allocation of DSM Plan costs to IRP plans when and if there are DSM budget resources utilized for IRP purposes.

The Company notes there is no 'apparent discrepancy' to reconcile.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Issue 5

Question(s):

Enbridge filed its initial evidence May 3, 2021 and filed updated evidence September 29, 2021. Pollution Probe has been assumed that the updated evidence replaces the original evidence filed in whole. Please confirm that this is correct and if it is not correct, please indicate what portions of the Enbridge evidence filed May 3, 2021 are still valid.

Response:

Confirmed, as outlined in the first page of the September 29, 2021 filing to the OEB.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Issue 5

Question(s):

Figure 1 [Exhibit D, Tab 1, Schedule 1, Page 19 of 26] indicates 160 DSM FTEs, but Table 11 [Exhibit D, Tab 1, Schedule 1, Page 18 of 26] indicates 169 DSM FTEs.

Please reconcile the discrepancy.

Response:

The 160 DSM FTEs presented in Exhibit D, Tab 1, Schedule 1, page 19 is a snapshot of the FTE headcount across the DSM portfolio and reference to the 2021 DSM Plan/Rollover application (EB-2019-0271). This represents post-integration of the legacy utilities organizational structures and is intended as a reference point.

The 169 DSM FTEs presented in Exhibit D, Tab 1, Schedule, 1, page18 is the proposed FTE headcount across the DSM portfolio for 2023 and 2024.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Issue 5

Question(s):

The Building Beyond Code Program is approximately half the size (by budget) compared to the Low Carbon Transition Program. Based on this, please explain why the FTE count for the Building Beyond Code Program more than double the Low Carbon Transition Program.

Response:

The Building Beyond Code Program includes 3 offers, across 3 different sectors that are based primarily on a 'direct sales' approach that relies on utility staff whereas the Low Carbon Transition program will rely more on 3rd parties to deliver the offers.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. B/1/1, p. 9, C/1/1, p. 8

Question(s):

Please confirm that, under the current DSM Framework, and under the Framework being proposed by the Applicant, the utility is not exposed to any financial risk as a result of its DSM activities, as all costs are reimbursed through rates, and all lost revenues are reimbursed through LRAMVA or other adjustments.

Response:

Not confirmed. For example, in January of this year, the OEB issued its decision on the 2017 and 2018 DSM Deferral and Variance Accounts Clearance Application (EB-2020-0067). In that decision it identified that Enbridge Gas should bear over \$500,000 in costs related to what Enbridge Gas considered legitimate spending on the DSM Tracking and Reporting system.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. B/1/1, p. 9

Question(s):

Please explain the rationale for proposing that the DSM Framework have no end date. Please confirm the Applicant is proposing that the DSM Framework continue unchanged after 2023 unless and until the Applicant proposes changes to it.

Response:

The DSM Framework is a policy document that outlines the goals and objectives of DSM, guiding principles for programs, and the overall structure of how DSM Plans and programming should be governed and evaluated. In previous frameworks, the OEB had given guidance in the DSM Framework on the maximum budget envelope that the utilities should propose for their DSM plans. This is no longer the case. Without specific budgetary guidance embedded in the DSM Framework, there is no need to attach a term to the DSM Framework. This concept was raised at the stakeholder day discussion during the Post-2020 Framework consultation and the Company believes it has merit. Policy frameworks do not need to have a sunset date if there is no implicit or explicit budgetary element that would require periodic review from an economic regulator.

To be clear, Enbridge Gas is not suggesting that the DSM Framework not evolve or that the Company should be the only party that could propose changes. The Company is suggesting that removing the framework sunset and fully de-coupling the DSM Framework from DSM Plans may assist the OEB with managing the timelines with DSM related proceedings. The OEB could review the DSM Framework periodically (separate from their review of DSM Plan Applications), with any changes to come into effect for the next new DSM Plan term. Having a standing DSM Framework in place and simply addressing any specific topic areas as necessary to evolve with the OEB's mandate for energy conservation as well as provincial policy, would allow utilities to develop future DSM Plan applications with clarity thus ensuring the timing required to have continuous programming in the market is maintained, to the benefit of all parties involved.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 6

Question(s):

Please confirm that, implicit in the second guiding principle, is the assumption that the costs allocated to each group of customers to whom DSM opportunities are provided should be commensurate with the benefits available to that group of customers from the programs and offerings.

Response:

The guiding principle in reference is as follows:

“DSM plans should be designed to provide opportunities for a broad spectrum of consumer groups and customer needs to encourage widespread customer participation over time and “ensure all segments of the market are reached.”^{1 2}

“Programs should be designed to remove financial, information and other barriers in the marketplace to increase uptake of DSM programs”³ over time.

This guiding principle is included to encourage accessibility over time and fairness in the provision of DSM opportunities for all customers.

In so doing, the Company supports the principle that the costs associated with the provision of DSM allocated to each group of customers should reflect to the extent reasonable the benefits accruing to that group of customers.

¹ EB-2021-0002, DSM Multi-year Plan and Framework Application, (Updated September 30, 2021), Exhibit C, Tab 1, Schedule 1, p. 6.

² EB-2019-0003, OEB Letter Post-2020 Natural Gas Demand Side Management Framework (December 1, 2020), p. 5.

³ Consistent with: EB-2014-0134, OEB Report of the Board Demand Side Management Framework for Natural Gas Distributors (2015-2020) (December 22, 2014), p. 8.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 7

Question(s):

Does the Applicant agree that it is obligated to co-ordinate all of its DSM offerings with electricity CDM efforts, with the only exceptions being those situations in which there is a barrier to that co-ordination that cannot be overcome with reasonable effort?

Response:

Enbridge Gas understands it is expected to make efforts to coordinate the delivery of DSM with CDM where appropriate, as per the following:

- 1) In a Ministerial Directive on September 30, 2020 to the IESO, the Ontario government included the following:

To the degree reasonably practicable, the IESO will coordinate the delivery of the CDM programs with entities delivering natural gas Demand Side Management programs.¹

- 2) In the OEB's December 1, 2020 DSM Letter, the OEB provided:

[T]he OEB expects that Enbridge Gas will endeavor to coordinate the delivery of DSM programs with electricity CDM programs where possible, including modifying the participant eligibility requirements of its current low-income program in order to be consistent with the electricity income-tested CDM program eligibility requirements.²

¹ Ministerial Directive issued by the Minister of Energy, Northern Development and Mines (September 30, 2020). <https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/2021-2024-Conservation-and-Demand-Management-Framework>

² EB-2019-0003, OEB Letter Post-2020 Natural Gas Demand Side Management Framework (December 1, 2020), p. 4.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 8

Question(s):

Please explain why only part of the shareholder incentive should be “directly related to the achievement of net benefits”. Why is it not more appropriate that the entire shareholder incentive be dependent on achieving net benefits?

Response:

This interrogatory is referencing a guiding principle outlined in the Proposed Framework. For context, the complete guiding principle is as follows:

Shareholder Incentives will be commensurate with both performance and efficient use of funds.¹ The amount of shareholder incentive will depend on performance against DSM targets, and will take into consideration the relative difficulty in achieving other objectives and guiding principles Enbridge Gas is expected to achieve. In addition, shareholder incentive will be in part directly related to the achievement of net benefits.²

As detailed further in the response at Exhibit I.10.EGI.STAFF.18, Enbridge Gas believes it has proposed a reasonable and balanced performance incentive mechanism which is responsive to the objectives of DSM in Ontario and has considered feedback received through the last framework period including the Mid-Term Review and the Post-2020 Framework consultation.

Enbridge Gas agrees that the achievement of net benefits is important and should be a focus across all DSM delivery; however, the Company is expected to deliver programs across all customer groups including harder to reach customer groups, for example, low income and small volume business customers for which program delivery is often not as cost effective and therefore drives lower net benefits than efforts to support energy efficiency with larger commercial or industrial customers. Generally speaking, net

¹ Consistent with: EB-2014-0134, OEB Report of the Board Demand Side Management Framework for Natural Gas Distributors (2015-2020) (December 22, 2014), p. 9.

² EB-2021-0002, DSM Multi-year Plan and Framework Application (Updated September 29, 2021), Exhibit C, Tab 1, Schedule 1, p. 8.

benefits can be expected to be more significant with larger commercial or industrial programming. Nonetheless residential (including low income) and small volume business customers comprise the significant majority of Enbridge Gas's customer base.

In order to ensure a balanced approach in the assessment of performance, the Company has therefore proposed a hybrid incentive structure that requires a balanced delivery of DSM programming, one that ensures that all customers are fairly provided opportunities for support of energy efficiency improvements. By designing separate scorecards with differentiated gas savings performance metrics at a sector level (and in the case of the Commercial sector by defining separate metrics for small and large volume customers), the Company is incented to maintain a focus on the achievement of gas savings across each customer group, in line with expected areas of focus highlighted by the OEB in their December 1, 2020 DSM letter), while at the same time maintaining a focus on driving net benefits across the entire portfolio.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 11

Question(s):

Please confirm that the Applicant proposed a 50% lower bound to earn a shareholder incentive in the last DSM Plan, and the Board rejected that proposal, instead implementing a 75% lower bound, i.e. no incentive unless the Applicant reaches 75% of target. What has changed since that time to warrant a change in the Board's decision?

Response:

The last DSM Plan had a 75% lower bound, however since the 2015-2020 DSM Framework was established in 2014 (seven years ago), there have been changes in government policy, updates to higher building codes, increasing efficiency of energy systems, evolution of energy efficiency baselines and evolving consideration of ratepayer funded DSM. In addition, the OEB has stated its continued support of a utility shareholder incentive. The DSM Letter provides that the "OEB expects that future performance be assessed relative to measurable, outcome-based metrics"¹ The OEB has also indicated the 2015-2020 DSM framework will end having provided updated objectives for DSM programming in its December 1, 2020 DSM Letter. Prior to issuing that letter, the OEB had initiated a consultation process to consider the future framework (which had included a review of the shareholder incentive approach) which it has now determined will be considered through this Application.

In response to the OEB direction, as well as feedback provided through the Mid-Term review and the Post-2020 DSM Framework consultation, Enbridge Gas has proposed a number of changes, reflecting a hybrid shareholder incentive approach across a number of scorecards, including separated Resource Acquisition type annual scorecards which tie distinct natural gas savings performance targets to each sector or program area. These annual scorecards have fixed weights intended to ensure continued focus on each of the key sectors and include performance metrics linearly interpolated around a 100% target, starting at 50% shareholder incentive through to a maximum earning opportunity at 150% performance.

¹ EB-2019-0003, OEB Letter Post-2020 Natural Gas Demand Side Management Framework (December 1, 2020), p. 5.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 12

Question(s):

Please provide a chart covering 2015-2021 showing the TAM calculations and the resulting targets for each metric for each year. In every case in which the TAM resulted in a reduced target, please explain the rationale for the reduced target. Please provide explanations of every example of a target that was adjusted from the TAM-generated number, if any.

Response:

For a chart of the targets from 2015-2021, please see the response to Exhibit I.5.EGI.FRPO.4. Please note that the TAM did not apply to the 2015 and 2016 targets as well as new metrics introduced to the Market Transformation and Performance based scorecards of the Union Rate zone in 2017 and 2018.

The calculation for each metric from 2017-2021 is the previous year's cost effectiveness calculated as results divided by spend, times the current year's budget, times a productivity factor of 2% for resource acquisition, large volume and low-income programs and 10% for market transformation and performance-based programs. The previous years results are based on audited results and for gas savings utilizes the LRAM gas savings which uses best available assumptions.

Also included in the response to FRPO 4 is identification of every case from 2017 to 2021 where the TAM resulted in a reduced target. The rational in each case is a function of the cost effectiveness in the previous year. In other words, if the ratio of the results to spend of the program decreased more than the productivity factor, the TAM will calculate a lower target the following year.

Exceptions to this calculation are as follows.

- The 2017 EGD Rate Zone Resource Acquisition Large and Small Volume Customers - Cumulative Natural Gas Savings (m3) metric was adjusted to account for the changes to custom EULs for various measures that occurred after the LRAM values were finalized.
- The 2017 Union Rate Zone Market Transformation New Developments enrolled metric was set to the 2016 value as there were no actuals in 2016 to calculate a 2017 target.
- The 2018 Union Rate Zone Performance Based SEM Participants metric was set to the 2016 value as there were no actuals in 2017 to calculate a 2018 target.
- The 2019 Union Rate Zone Resource Acquisition Cumulative Natural Gas Savings (m3) metric was adjusted to include the addition of adaptive thermostats.
- The 2020 Union Rate Zone Performance Based SEM savings % metric was set to the 2019 value as there were no actuals in 2019 to calculate a 2020 target.
- The 2021 Union Rate Zone Performance Based RunSmart participant metric was set to the 2020 value as there were no actuals in 2020 to calculate the 2021 target and the saving % metric was set to the 2020 value as the 2019 actuals were negative resulting in a negative calculation for the 2021 target.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 14

Question(s):

Please confirm that the Applicant is proposing to index the maximum shareholder incentive, not starting in 2023, but starting in 2022. Please confirm that the effect of this is to increase the maximum incentive available by about \$2.4 million over five years.

Response:

Not confirmed. Enbridge Gas has proposed to index a portion of the maximum shareholder incentive, which is the portion allocated to annual incentives. The remainder of the maximum shareholder incentive is held flat over the term. The indexing is calculated starting in 2022 for the portion that is indexed.

Not confirmed. The maximum incentive available increases by about \$1.6 million over the 5 year term and by about \$2.0 million over 2021/2022. Enbridge Gas notes that the proposed increase in the maximum incentive available is lower than inflation both over 2022 and for each year of the proposed 2023-2027 term.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 15

Question(s):

Please provide details of all offerings in the proposed Plan that involve fuel switching away from natural gas.

Response:

In so far as fuel switching “away from natural gas aligns with the OEB’s stated DSM objectives” and does not involve completely switching the participant off natural gas completely, the following offers could provide incentives to support fuel switching measures:

- Commercial Custom – financial incentives
- Industrial Custom – financial incentives
- Direct Access – financial incentives
- Residential Savings by Design – supports design planning and exploration of a variety of technology solutions and completion of discovery home
- Commercial Savings by Design – supports design planning and exploration of a variety of technology solutions
- Affordable Housing Savings by Design – supports design planning and exploration of a variety of technology solutions and provides financial incentives to support the completion of homes / units.
- Whole Building P4P – financial incentives

The Residential Low Carbon introduces support for hybrid heating, which is a measure that involves fuel switching a part of a customer’s heating load away from natural gas.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 17

Question(s):

Please explain why free ridership for all low income programs should be zero. Please confirm that many low income program participants, including social housing agencies and private landlords, have other reasons for implementing energy efficiency measures besides the influence of the Applicant's programs.

Response:

Historically, the free ridership values applicable to low income programs have been set at, or close to, zero (0) for reasons agreed upon by parties to the DSM Settlement Agreements. The 2012-2014 Enbridge Gas Distribution DSM Plan Settlement Agreement whereby parties agreed that "free ridership for all low income measures both prescriptive and custom shall be set at zero"¹ has been adhered to for the EGD rate zone since the Settlement Agreement was approved by the OEB. Enbridge Gas believes the precedent remains appropriate for this DSM Plan as barriers for low income customers remain true to today.

It is common practice among many jurisdictions across North America that differentiate programming between residential generally and low income customers, to apply an agreed to NTG ratio of one (100%), said differently a free-ridership and spillover of zero (0), in recognition of the obvious unique challenges facing that customer group.

Agreement on NTG ratios is practical when the cost of conducting more detailed analyses of NTG factors poses a barrier. Locally, as detailed in the IESO's 2021 EM&V protocols,

¹ EB-2012-0394, Enbridge Gas Distribution Inc. Update to the 2012 to 2014 DSM Plan, Settlement Agreement (February 28, 2013) at Exhibit B, Tab 2, Schedule 9, p. 9.

there is a consensus among evaluators and program stakeholders that NTG ratios for most low-income programs are unlikely to be significantly different than one (1.0), particularly when the person making the participation decision is the low-income customer. It is perceived that there is little to no free riders among low-income program participants, in instances where it is assumed that participants would not procure the energy-efficient equipment/service in the absence of the program.²

Enbridge Gas agrees with the statement above given the challenges faced in the affordable housing sectors and given that low income customers are not likely to undertake energy efficiency measures if energy conservation programming was not available to them, due to the significant financial barriers unique to these customers.

Enbridge Gas confirms that there are ancillary benefits to undertaking energy efficiency projects, such as home comfort or improved health and safety, however without the support of DSM Programs, low income program participants, including social housing agencies and private landlords, are challenged to undertake energy efficiency measures.

² IESO, Evaluation, Measurement and Verification Protocol V4.0 (February 2021), pp. 39-40.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 20

Question(s):

Please provide a comprehensive list of all pilot and test programs from 2018 to 2021, including a description of the program, the cost (with a breakdown), the results, and the tangible benefits to the ratepayers of the program. Please provide a similar list of all pilot and test programs currently planned for 2022 to 2027, with forecasts of the same details.

Response:

Please see response to Exhibit I.11.EGI.STAFF.82a and e.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 24

Question(s):

Please provide an example of how the proposed integration of IRP activities and DSM activities would work in practice, and the impacts on DSM budgets, targets, LRAM, and incentives.

Response:

Enbridge Gas has not proposed integration of IRP activities and DSM activities in this application, as there are currently no IRP activities to integrate. The inclusion of the materiality thresholds for the areas where there *may* be some DSM/IRP overlap was intended as a simple, efficient solution to a possible eventuality of overlap between DSM and IRP activities in the future.

Enbridge Gas notes that this application does not ask for relief or funding with respect to any IRP Plan and proposes that IRP not be an issue within this proceeding, as doing so would be duplicative. Enbridge Gas does request that the OEB make a determination that the above allocation rules and thresholds are reasonable and should be included in the new DSM Framework beginning in 2023.”; and “...these thresholds could then be reviewed at the first applicable clearance proceeding where any impact of IRP on DSM results and the DSMVA, if any, could be the subject of review.”¹

The Company does not believe duplicating or extending the litigation from the IRP Framework proceeding can possibly provide value to Ontarians especially when there is no IRP Plan under consideration. Any further questioning with respect to IRP can and should be reviewed in the context of an actual IRP Plan before the OEB.

Also, please see response to Exhibit I.5.EGI.STAFF.7.

¹ EB-2021-0002, DSM Multi-year Plan and Framework Application (Updated September 29, 2021), Exhibit C, Tab 1, Schedule 2, p. 5, para. 16.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 26

Question(s):

Please confirm the Applicant is proposing that:

- a) The Applicant will have the right to measure gross savings in any manner it sees fit, and
- b) Impact evaluations will have to use the same method to measure results.

Response:

a) and b)

Part a) is not confirmed; part b) is confirmed. Enbridge Gas is proposing the gross measurement methodologies to be used for its DSM programs within this application for approval by the OEB. As per Exhibit C, Tab 1, Schedule 1, page 26: "It is critical that gross measurement approaches are determined and approved for each program offering at the beginning of the DSM Multi-Year Plan term, as they directly impact how the program offerings are delivered, and how DSM budgets and targets are set. Any impact evaluation undertaken should align with the gross measurement approach." For further information, please see the response to Exhibit I.5.EGI.STAFF.11 part (b).

Following OEB approval of Enbridge Gas's application and during the 2023+ DSM Framework term, "should a fundamental change to gross measurement approaches be recommended by Enbridge Gas (for example, to account for new/innovative ways of determining savings and delivering program offerings) Enbridge Gas will file a letter with the OEB advising of such change."¹

¹ EB-2021-0002, DSM Multi-year Plan and Framework Application, (Updated September 29, 2021), Exhibit C, Tab 1, Schedule 1, page 26.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 26

Question(s):

Please provide a chart showing, for each metric in each offering, the gross measurement approach the Applicant is proposing. Please confirm that the Applicant is seeking approval of those approaches, and that if the Applicant during the plan wishes to change any of those approaches, it will do so by Application to the Board for an amended approval.

Response:

Offering Name	Gross Measurement Methodology	Reference
Whole Home	NRCAN HOT2000 software, used in Energuide Mode, is required for estimating natural gas savings for participants in the Whole Home offering. Homes will be initially modelled based on the existing state of the home and again based on the post-retrofit state of the home. All completed HOT2000 assessments and associated documentation will be submitted to NRCAN in accordance with its QA/QC processes. To correctly claim energy savings, Enbridge Gas will make adjustments to the savings determined by the HOT2000 models to account for baseline considerations as appropriate.	Exhibit E, Tab 1, Schedule 2, Page 14
Single Measure	For prescriptive measures, the offering will use the TRM (including the established process for the introduction of new measures) as the basis for natural gas savings (m ³) gross measurement. Projects must meet requirements as outlined in the version of the TRM applicable to the program year. For project-specific inputs in the case of professional air sealing, a custom calculator will be used.	Exhibit E, Tab 1, Schedule 2, Page 18

Smart Home	The offering will use the TRM as the basis for natural gas savings (m ³) gross measurement. Projects must meet requirements as outlined in the version of the TRM applicable to the program year.	Exhibit E, Tab 1, Schedule 2, Page 22
Home Winterproofing	NRCan HOT2000 software, used in General Mode, is currently required for estimating natural gas savings achieved from weatherization improvements of participants in the Home Winterproofing offering. Homes will be initially modelled based on the existing state of the home (pre-assessment) and again after upgrades have been installed in the home (post-assessment). In the case of direct install prescriptive measures installed, the offering will reference the TRM as the basis for natural gas savings (m ³). Projects must meet requirements as outlined in the version of the TRM applicable to the program year.	Exhibit E, Tab 1, Schedule 3, Page 13
Affordable Housing Multi-Residential	Custom Projects: This offering will employ several customized approaches in the calculation of natural gas savings (m ³) including engineering calculations and energy modelling, as determined reasonable by Enbridge Gas's technical experts. In the case of modelling analysis, specific tools may be used such as, eQUEST, EnergyPlus, CANQUEST, Integrated Environmental Solutions ("IES") and Tas Engineering. For commonly implemented measures, standard calculators have been developed such as e-tools to ensure that common baseline assumptions and calculation methodology are applied across similar types of projects. Prescriptive and Direct Install Measures: Natural gas savings claims (m ³) will reference the current version of TRM applicable to the program year.	Exhibit E, Tab 1, Schedule 3, Page 18
Prescriptive Downstream	The offering will use the TRM as the basis for natural gas savings (m ³) gross measurement. Projects must meet requirements as outlined in the version of the TRM applicable to the program year.	Exhibit E, Tab 1, Schedule 4, Page 30

Commercial Custom	This offering will use several customized approaches as the basis for natural gas savings (m ₃) gross measurement, examples include engineering calculations and energy modelling, as determined appropriate by Enbridge Gas technical experts. For commonly implemented measures, standard calculators have been developed such as e-tools to ensure that common baseline assumptions and calculation methodologies are applied across similar project types.	Exhibit E, Tab 1, Schedule 4, Page 20
Direct Install	The offering will use the TRM as the basis for natural gas savings (m ₃) gross measurement. Projects must meet requirements as outlined in the version of the TRM applicable to the program year.	Exhibit E, Tab 1, Schedule 4, Page 26
Prescriptive Midstream	The offering will use the TRM as the basis for natural gas savings (m ₃) gross measurement. Projects must meet requirements as outlined in the version of the TRM applicable to the program year.	Exhibit E, Tab 1, Schedule 4, Page 35
Industrial Custom	This offering will use several customized approaches as the basis for natural gas savings (m ₃) gross measurement, examples include engineering calculations and energy modelling such as the USDA Agricultural Research Service's Virtual Grower, as determined appropriate by Enbridge Gas's technical experts.	Exhibit E, Tab 1, Schedule 5, Page 15
Direct Access Offering	Net annual natural gas savings achieved by customers in the Direct Access offering will be quantified by professional engineers using the custom engineered approach (determined relative to an Enbridge Gas approved baseline), incorporating the use of engineering calculations and process data. Due to the size, complexity and production variability of the customers participating in this offering, site meter-based analysis will not be used.	Exhibit E, Tab 1, Schedule 6, Page 8

<p>Whole Building Pay for Performance (“P4P”) Offering</p>	<p>Annual natural gas savings are calculated based on comparing the Adjusted Baseline Model to Adjusted P4P Period consumption, evaluated at the end of each P4P Period (on an annual basis). Annual Gas Savings (m3) Calculation:</p> <ul style="list-style-type: none"> • Year 1 P4P Annual Gas Savings (m3) = (BM - P4P1) at or above zero • Year 2 P4P Annual Gas Savings (m3) = [(Lesser of BM or P4P1) - P4P2] at or above zero • Year 3 P4P Annual Gas Savings (m3) = [(Lesser of BM or P4P1 or P4P2) - P4P3] at or above zero <p>Where: BM is the Adjusted Baseline Model Consumption P4P1 is the Adjusted P4P Year 1 Period Consumption P4P2 is the Adjusted P4P Year 2 Period Consumption P4P 3 is the Adjusted P4P Year 3 Period Consumption</p> <p><i>Baseline Model Requirements:</i></p> <ul style="list-style-type: none"> • Baseline Period should have a minimum 12 months of baseline history using utility data or interval data (if already available via customer) and should be based on the most recent 12 months of data. However, alternative Baseline Periods may be accepted if the most recent data is not representative of typical building operation. • Baseline Model input/output granularity ranges from daily (most granular) to bi-monthly (least granular) intervals. • Baseline Model should be a regression model that is derived based on metered gas consumption during the Baseline Period and is adjusted for independent variables to allow for adequate representation of the baseline gas consumption during the P4P Period. • Baseline Model will be approved by Enbridge Gas prior to participant being enrolled into the program offering. • Baseline Model, once approved, should not change for the balance of the program offering. 	<p>Exhibit E, Tab 2, Schedule 1, Pages 8-9</p>
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	<p><i>P4P Period:</i></p> <ul style="list-style-type: none">• P4P Period is defined as a maximum 12-month period in which metered gas consumption is measured against the Baseline Model• P4P period consumption should be adjusted for the same set of independent variables as applied to the baseline model.• P4P Period data granularity will be at a minimum of daily intervals.	
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Offerings that don't report energy savings do not include a gross savings methodology (for example, offerings within the Building Beyond Code Program).

Enbridge Gas's request for approval of these gross measurement methodologies and how potential changes will be handled, can be found in Exhibit I.5.EGI.SEC.17.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 27

Question(s):

Please describe the value of reporting gross savings in the Annual Report. Please explain how gross savings relate to the results of the Applicant's programs, if at all, and how readers of the Report would be informed by the reporting of gross savings.

Response:

Gross savings reflect the savings processed through the utility's programs. Net savings (i.e. savings that have been adjusted for net to gross or other adjustment factors) are then calculated directly from gross savings. Net savings cannot be calculated without gross savings.

By reporting gross savings, along with many other reporting components included in the utility's DSM Annual Report, stakeholders who are not directly involved with the evaluation of Enbridge Gas's programs are provided clear information, to understand the outcomes of DSM programming in Ontario. If gross savings were not reported, easily avoidable confusion among stakeholders, evaluators, and the utility would likely occur. Enbridge Gas views it as basic demand-side management practice to report gross and net savings.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

Ex. C/1/1, p. 30

Question(s):

Please explain why it is not appropriate to have process evaluation carried out by independent experts, much like impact evaluation, overseen by an independent group like the EAC that includes the utility.

Response:

Please see response to Exhibit I.5.EGI.STAFF.10c.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 36]

Question(s):

If the Applicant's proposal to delay application of certain new or modified input assumptions until the Applicant has an opportunity to adjust its operations for those changes, how should the Applicant report results prior to the change that it knows are incorrect, but are being presented to the public? To what extent, if any, should public reporting include a warning or disclaimer or other wording to alert readers to the fact that the reported figures are not correct?

Response:

Enbridge Gas proposes for prescribed input assumptions and for NTG adjustments for mass-market offerings, to report targets and results using the same figures. Enbridge Gas has always attempted to be transparent in its reporting but can look to provide a disclaimer clarifying how the targets and results are presented in cases where, for example, prospective input assumptions have been changed.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 38]

Question(s):

Please confirm that the Applicant is proposing no cost-effectiveness testing of individual offerings, however significant, and that no restrictions should be placed on the Applicant's ability to initiate or continue offerings that would, if tested, be found not to be cost effective.

Response:

Please see response at Exhibit I.10.EGI.STAFF.28a.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 42]

Question(s):

Please confirm that the Applicant does not propose to allocate any costs (other than specific customer incentives) to offerings, but only to programs. If that is not the case, please describe how costs will be allocated as between offerings, programs, and portfolio.

Response:

Not confirmed. Enbridge Gas does allocate costs other than customer incentives to the offer level where appropriate. For example, if there are promotion costs for a specific offer, such as marketing targeted for the residential smart home offering, Enbridge Gas would assign those costs to that offer. Where costs are incurred at the program level, for example Energy Solutions Advisors that deliver our suite of commercial offers, Enbridge Gas would assign those costs at the program level.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 49]

Question(s):

Please identify all capital assets in the proposed 2023 budget. If there are none, where are the costs associated with capital assets used in the DSM activities? How are the costs associated with capital assets used by the DSM group allocated to that group and included in the DSM budgets?

Response:

There are no capital assets in the proposed 2023 DSM budget. Capital assets used by the DSM group such as IT hardware or office space are included in Enbridge Gas's rate base. Costs associated with these capital assets are not allocated to the DSM budget.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 51]

Question(s):

Please confirm that the 15% rule is intended to apply at the program level, meaning for example that the Applicant cannot access additional funds for Residential unless and until it has achieved an overall 100% success on the Residential scorecard, no matter how successful any individual offering might be.

Response:

Confirmed, the 100% is on the scorecard target on a pre-audited basis.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 51-2]

Question(s):

Please discuss the merits of having a separate deferral account for deferred participant costs, rather than including it in the DSMVA.

Response:

Enbridge Gas is not requesting a separate deferral account for deferred participant costs in this proceeding (see Exhibit C, Tab 1, Schedule 1, page 52).

The advantage of having a separate deferral account is that it would make it easier to track and report the Deferred Participant Costs.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 56]

Question(s):

Please confirm that the advocacy prohibition applies equally to the utility representatives on the EAC.

Response:

Utility representatives of the EAC are employed by the utility only, and as such do not have advocacy conflicts or advocacy transparency concerns. Should a utility representative have an advocacy conflict from employment outside of the utility, they would be required to declare it. It is more common however for non-utility stakeholder members of the EAC to be employed by advocacy groups, and as such the advocacy prohibition ensures that non-utility stakeholder members of the EAC are providing input and advice to the EAC in representation of the broader Ontario stakeholder base and ratepayer base, rather than of a particular interest group.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 60]

Question(s):

Please advise where the roles and accountabilities of the independent experts are included in the proposed ToR. Are those the same as the Stakeholder Members?

Response:

The roles and accountabilities of independent experts are the same as the Stakeholder Members which can be found in Exhibit C, Tab 1, Schedule 1, Appendix 1, page 5.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 64]

Question(s):

Please confirm that:

- a) Non-final materials can be shared with the permission of OEB Staff, and each EAC member does not have a veto over such permission.
- b) This ToR is proposing the OEB Staff are members of the EAC, rather than external to it.
- c) The obligation of EAC members to sign the Declaration and Undertaking does not apply to OEB Staff.
- d) The rules relating to conflicts of interest apply to the utility members of the EAC as well as the other members. In this regard, please provide a list of all conflict disclosures by utility members of the EAC since the EAC was formed.

Response:

- a) Not confirmed. If an EAC member would like to share non-final materials outside of the EAC, that EAC member should request permission from all other EAC members. If any EAC member denies the request, the material should not be shared until it is considered final. While the interpretation of "final" material can become contentious, Enbridge Gas expects that all EAC members act with integrity and in the spirit of the Committee. The intention of preventing non-final material from being shared outside the EAC is to prevent incomplete and non-final information from being unintentionally mis-used by individuals outside of the EAC.
- b) Confirmed
- c) Confirmed

- d) Confirmed. Enbridge Gas is not aware of any conflict of interest of its utility members since the EAC was formed.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Issue 5

Reference:

[Ex. C/1/1, p. 65]

Question(s):

Please explain why the ToR stipulates the rules for cost claims, which are normally the sole responsibility of the OEB.

Response:

The purpose of the proposed Evaluation Governance Terms of Reference is listed Exhibit C, Tab 1, Schedule 1, pages 30 to 31. This includes effective outcomes of the evaluation governance process, clarity and consistency, and reduced disputes between stakeholders.

Section 3.5 of Evaluation Governance Terms of Reference provides clarity to EAC members regarding cost claims, including timing. Timing of the processing of cost claims is important to Enbridge Gas, to ensure the utility can process and report its financial accounting responsibilities in a timely manner. Section 3.5 also sets out that cost awards are available under Section 30 of the OEB Act which is an act that the OEB is responsible for.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, page 9

Question(s):

In order to fund the costs of administering and delivering DSM programs, including marketing efforts, financial incentives to participants, and educating consumers, long-term and annual DSM budgets must be developed that will enable the achievement of DSM objectives over the duration of a DSM plan period.

Please provide the total marketing costs, financial incentive costs to participants, and education costs broken down by DSM program category for the years 2020 to 2023.

Response:

Please see response to Exhibit I.6.EGI.STAFF.13f. Note that Enbridge Gas has provided spend/forecasts based on the cost categories it used to develop its DSM Plan (Exhibit C, Tab 1, Schedule 1, pages 42 to 45), which may differ from the cost categories referenced in the Interrogatory.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, page 22

Question(s):

With respect to attribution of benefits between Enbridge Gas and other parties, where Enbridge Gas's allocated share of natural gas savings in the partnership agreement is more than 20% of the share that would have been allocated based on a "percentage of total dollars spent" basis, an explanation for the difference should be provided.

Please explain how the 20% threshold was determined.

Response:

The paragraphs outlining the attribution of benefits between Enbridge Gas and other parties in the Proposed Framework are wholly consistent with the OEB direction outlined in the 2015-2020 DSM Framework including the 20% threshold.¹ In other words, the OEB had previously directed this approach and threshold. Enbridge Gas is not proposing any changes and has included consistent language in the Proposed Framework.

¹ EB-2014-0134, OEB Report of the Board Demand Side Management Framework for Natural Gas Distributors (2015-2020), (December 22, 2014), p. 22.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, page 2

Question(s):

With respect to re-allocation of DSM Plan costs, Enbridge Gas indicates any requisite reallocation of costs amounting to \$1,000,000 or more in a given year will require Enbridge Gas to file for an adjustment to the DSM Plan.

Please explain the basis for the \$1,000,000 threshold.

Response:

Please see response to Exhibit I.5.EGI.STAFF.7.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Issue 5

Reference:

Exhibit C, Tab 1, Schedule 1, page 39

Question(s):

To recognize that the Low Income natural gas DSM program may result in important benefits not captured by the TRC-Plus test, this program should continue to be screened using a lower threshold value of 0.7. Low Income offerings that fail to meet a TRC-Plus cost-benefit ratio of 0.7 can still be applied for, and approval of these programs will be considered on their merits.

Please discuss if Enbridge Gas reviewed lowering the threshold value of 0.70 for the low income sector. If yes, please provide details and any evaluation and analysis undertaken.

Response:

Enbridge Gas requested comments and feedback during the March 2021 Low Income program stakeholder consultation on the existing TRC-Plus screening threshold. At that time, stakeholders commented that they were open to revisiting the screening threshold as part of this DSM Plan proceeding. No further analysis was undertaken.

The DSM Plan does not include any recommended change to the existing 0.7 Low Income program TRC-Plus screening threshold at this time.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Issue 5

Reference:

Exhibit D, Tab 1, Schedule 1, page 5

Question(s):

Please summarize all key components of the DSM Framework/Plan that Enbridge Gas proposes to exclude from the Mid-Point Assessment.

Response:

Please see response to Exhibit I.4.EGI.CME.6a.